SZENT ISTVÁN UNIVERSITY

FACULTY OF ECONOMICS AND SOCIAL SCIENCES, GÖDÖLLŐ

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INCREASING NUTRIENT SUPPLY OF SOIL WITH ORGANIC AND INORGANIC FERTILIZERS ON MAIZE

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ABSTRACT

This study was carried out in a research farm of Szent István University under glass house experiment in randomized complete pot design (RCPD) replicated three times. Three different rates of organic fertilizers biogas, cow manure, compost separately in each pot and inorganic fertilizers (NPK) in combined form were applied to maize variety sown at the depth of 2-3 cm. The main objective of the study was to analyze the soil before and after the experiment: pH, KA, CaCO3, humus, Nmin, AL-P2O5, AL-K20 and the plant for measuring plant height during vegetation, wet and dry masses at the end of experiment as well as NPK contents.
The result indicated the vital role of NPK fertilizers in improved growth, wet and dry masses parameters in maize plant. Plants treated with NPK; potassium the highest, whiles phosphorus and nitrogen proved in the second stage.
Soils in NPK treatments had pHKCl showed higher than all other treatments in the laboratory determination; while pHH2O parameters showed similarly with other treatments or slightly different while, the humus content looked lower than other treatments except from control.
Compost application and cow manure, did not show more improvement like NPK and biogas digestate treatments due to the plant height, wet mass and dry mass parameters.
Soils in compost showed pHH2O higher than all other treatments except from cow manure. In determination, pHKCl also increased in terms of the other treatments but showed similarity with NPK in laboratory soil analyses. In Humus, content looked higher than NPK and control treatments, but lower than biogas digestate, cow manure and initial soils.
In potassium content; the compost had showed the highest treatment from all other treatments; while phosphorous higher than control and NPK and lower than biogas digestate, cow manure treatments and as well as the initial soil.
In water holding capacity (KA), Compost and cow manure indicated the highest. But, the plants of these treatments were weak due to the other treatments.

Keywords: *Biogas digestate, Cow manure, Compost, NPK, Brown soil and maize*

INTRODUCTION

Background

Agriculture is known to be the oldest industry in the world. Its purpose in the production of crops and animal are geared the meeting of food and feeds demand of man and livestock. Over the years, grain yields have depreciated drastically due to the degrading nature of soils, poor fertility management and low input technology to improve the fertility of the soil. The use of organic manure could be adopted (Gee and Bauder, 1986; Rouant, 1992; Chiefetz et al., 1996). Following the geometric increase in population of the world; adequate attention should be directed towards massive and cheapest way of food production. In order to achieve this, first

emphasis should be laid on the easiest means of enriching our soil and second to analyze the key problems which limit production and the expansion of crops such as maize.
Maize (Zea-mays), belongs to the grass family of Gramineae (Gordon, 1993), and originates from Central America. It is otherwise known as corn. According to the Statistical Analysis System Institute (SAS, 1990), maize is widely grown in both tropical and sub-tropical regions of the world. The popularity of maize has increased enormously in globally. Maize is one of the most domesticated and evolved member of the plant kingdom. It is believed that maize was Maize requires heavy fertilizer application for optimum yield in terms of nitrogen derived from chemical or organic fertilizers (Awotundun, 2005). Maize therefore is high demanding crop for nitrogen than any other cereals (Onwueme and Sinha, 1991). However, the amount applied depends mainly on the projected maize yield that appears available and attainable in the locality and the fertility level of the soil as determined by soil test (Shukla, 1990).
For optimum maize growth, nutrients must be available in sufficient and balanced quantities. Soils contain natural reserves of plant nutrients, but these reserves are largely in forms unavailable to plants, and only a minor portion is released each year through biological activity or chemical processes. This release is too slow to compensate for the removal of nutrients by agricultural production and to meet crop requirements. Therefore, fertilizers are designed to supplement the nutrients already present in the soil (Birkás, 2017). The use of chemical fertilizer.

Justification

Successful maize production depends on the correct application of inputs that will sustain the environment as well as agricultural production. The nutrient demands of maize are very high especially for nitrogen. Inorganic fertilizers are commonly used to provide maize crops with the required nutrients. However, mineral fertilizers are often expensive, and heavy reliance upon them can have adverse effects on soil biology, leading to the degradation of soil and a loss in the long-term capacity of those soils to sustain food production. In order to increase maize yield while minimizing production cost and ensuring quality soil environment as well as the genetic component of crop, there is a need to study organic fertilizers especially biogas digestate, compost, animal manure, which provide fertility as well as soil organic matter (SOM) content.

Time Scope of the Study

The first stage of the study was conducted on April 25, 2017 in which one kilogram of soil was taken from the field to the laboratory for testing. The second stage had occurred on May 2, 2017 in germination seed test conducted in the laboratory of the Crop Production Institute to determine the purity germination of the crop before the field. The third stage was on June, 22, 2017 the seed sowing date to the pots and the fourth stage took place on August 25, 2017 where maize plants were harvested and taken to the agrochemistry laboratory.

Objective

1. To assess the growth of maize under organic and inorganic fertilizer applications
2. To assess (PH, KA, CaCO3, Humus, Nmin, AL-P2O5 and AL-K2O) before and after organic and inorganic fertilizer application in the soil.
3. Measuring plant height from germination period until harvest for dry mass, and to determine N.P.K content.

LITERATURE REVIEW

Temporal and geographic origin of maize

There is general consensus in the literature that maize was domesticated between 7,000 and 10,000 years ago (Doebley, 2004; Galinat, 1988; Goodman, 1988; Wilkes, 2004). However, the geographic origin of domestication, like the ancestral origin, is speculative. Mangelsdorf, (1974) introduced the idea of maize lineages from six different geographical regions ranging from Mexico to South America. Many advocate a mexican origin because teosinte, the closest relative to maize, is essentially restricted to Mexico (Galinat, 1988; Goodman, 1988; Wilkes, 2004). Supporters of the teosinte hypothesis accept the Balsas River drainage in southwestern Mexico as the cradle of maize domestication (Matsuoka, 2005). This is the location of the populations of teosinte ssp. parviglumis that most closely resemble maize in isozyme and microsatellite analyses (Doebley, 1990; Matsuoka et al., 2002). Thus, the Balsas River drainage is becoming more widely accepted in the literature as the geographic origin of domestication.
The dispute over the origin of maize is anything but settled, though the teosinte hypothesis currently reigns in popularity. The study of the origin of maize is interdisciplinary, including geographical, archeological, botanical, historical, and genetic evidences (Brown, 1978; Goodman, 1988; Wilkes, 2004).

Races of maize

There is great genetic diversity found within maize (Wright et al., 2005). In the previous century there have been several monographs and surveys on the races of maize. (Sturtevant, 1899) placed maize varieties into six "species groups" based on kernel morphology. (Anderson and Cutler 1942) recognized the artificial nature of these groupings and called for a more comprehensive study of the races of maize. Over 300 races of maize in the Americas were identified by the Rockefeller Foundation and the National Academy of Sciences through a series of monographs (Brieger et al., 1958; Brown, 1960; Grant et al., 1963; Grobman et al., 1961; Hatheway, 1957; Paterniani and Goodman, 1977; Ramirez et al., 1960; Roberts et al., 1957; Timothy et al., 1961, 1963; Wellhausen et al., 1952, 1957). Goodman and Brown (1988) provide the most comprehensive summaries to date of the aforementioned monographs.
A series of publications by Goodman, Tuber, and associates represent the most complete molecular surveys on the genetic diversity among the races of maize based on isozyme markers (Bretting et al., 1987, 1990; Goodman and Tuber, 1983; Goodman et al., 1980; Sanchez and Goodman, 1992a, 1992b; Sanchez et al., 2000a, 2000b, 2006).
According to (Sridhar and Adobe, 2003), maize has a fibrous rough system which has seminal and prop root in the soil branch repeatedly and spread out. As an annual crop, it has stem, stalk which are solid unbranched and herbaceous where ear bearing branches are formed. Maize can supply human requirement for iron when largely consumed (Whitney, 1993).

Factors determine the increase and the decrease of maize production.

Low soil fertility is one of the limiting factors in maize production. Low inputs in production mainly explain the cause of low and declining harvests in many countries of south Sahara (Simpson et al 1996). The application of N:P:K fertilizer to the soil actually boosts the performance of Zea mays. However, its persistence use destroys soil reaction and disturbs the activities of soil microorganisms as a result rendering the soil acidic and toxic to maize (Omisore, 2010). Significantly, the chemical fertilizer is not affordable to local farmers and so the use of organic manure is of great advantage, hence it contains many nutrient required by

plant for optimal performance and also helps in improving soil texture and structure. The application of organic manure has been observed to increase soil pH (Abeam et al, 2006) and (Jinadasa, 1997). Organic manure are essential constituent of soil, they are present in various forms, ranging from plants and livestock materials (Tivy,1990). While describing the components of organic manure highlighted that organic manure comprises of waste and residues from crops and livestock. He further mentioned that farmyard manure alone is not really capable of returning more than 50% of the nitrogen, phosphorus and potassium to the soil. The use of organic manure when properly applied, benefits fruiting in plants like maize and generally enhance size, height and crop biomass (Asiegbu and Uzo 1984). Meanwhile, attempts to use inorganic fertilizer to replenish the soil nutrient have not be successful because of high cost, sometimes, the adulterated nature of the product has adverse effect on the soil, water and plants, hence, there is need to look for other sources of maintaining the soil fertility in order to enhance optimum yield maize.

Application of organic and inorganic fertilizers on maize

Successful maize production depends on the appropriate application of production inputs that will sustain the environment as well as agricultural production (Awotundun, 2005). The nutrient requirements of maize are very high especially for nitrogen, thus referred to as a heavy feeder crop. Inorganic fertilizers are commonly used to provide maize crops with the required nutrients. However, mineral fertilizers are often expensive, and heavy reliance upon them (to the exclusion of organic inputs) can have adverse effects on soil biology.
An alternative to inorganic fertilizers is cow manure, compost, biogas digestible which provide fertility as well as soil organic matter content.

Application of cow manure on the soil

An application of cow manure has long been reported to improve soil physical characteristics. Reports over the last 30 years (Hayes and Naidu 1998; Khaleel et al. 1981; Sweeten and Mathers 1985; Wallingford et al.1975) have summarized that the additions of manure to soil can lead to increased organic matter content, aggregate stability and porosity; decreased bulk density; and improved infiltration rates, hydraulic conductivity, and water-holding capacity.
Manure is a most important and frequently used organic resource to improve soil fertility (Mutegi, 2007). It is different from plant material organic sources because it has already undergone a phase of decomposition when passing through the digestive system of animals (Sanginga and Woomer, 2009). Challenges related to the use of manure are its quality and its quantity, both being sizable to smallholder farming systems. Its quality depends on the diet of the animal and the manner the manure is collected, stored and handled before utilization (Lekasi, 2003; Lekasi and Kimani, 2003; Rufino et al., 2007). Mostly, manure is produced by farmers under uncovered conditions and subject to losses of its nutrients due to weather fluctuations. Therefore, there is a high range of variation between manure qualities in terms of N content (Lekasi and Kimani, 2003; Sanginga and Woomer, 2009; Murwira et al., 2002).
Bulk density is sometimes used as an indicator of soil quality.
Manure applications increase the relative number of small pores in the soil, especially for coarse textured soils (Hayes and Naidu, 1998).
Many changes in soil quality after manure additions are linked to the effects of organic matter content on soil structure and biological activity (Bronick and Lal 2005; Tisdall and Oades 1982). The humic and polysaccharide molecules of the organic matter can act as binding agents or fuel for soil organism activity (Hayes and Naidu 1998). Manure type and application rate, as well as soil texture characteristics, therefore affect the degree to which manure additions affect

soil quality characteristics. Changes in organic matter content and soil bulk density also lead to changes in the soil water characteristics. For example, increases in organic matter have been linked to increases in water infiltration. Good infiltration can reduce surface runoff, erosion, and evaporation rates. High evaporation rates have been linked to inefficient use of irrigation water (Boyle et al. 1989). Benbi et al. (1998) showed that, though additions of farmyard manure increased the soil organic carbon (C) levels significantly by 44% compared to plots which just received inorganic fertilizer, there was not a significant change in the soil bulk densities. Similarly, (Eghball, 2002) found soil bulk density to be unaffected by solid cattle manure, cattle compost or fertilizer application rates based on crop N- or P-requirement.
The application of manure is in such conditions a most feasible technology to rebuild soil fertility but was found to be slow while farmers need quick action interventions (Rutunga and Neel, 2006). On the other hand, it has been found not sufficient to sustain crop production by itself. For example, it is said that the application of 5 tone of high quality manure is able to sustain moderate yields of maize as low as 2 t ha-1 and meet N requirement for such production, but cannot meet P requirement especially in P deficient areas. Manure quality is on the other hand a problem (Bationo and Waswa, 2011).

Soil-water characteristics

Soil-water characteristics are greatly affected by the soil's physical properties. Miller et al. (2002) found that manure additions to soil significantly increased soil water Content (SWC) in the summer, coinciding with the season of maximum crop water use.
Under dry land conditions, SWC increased at the surface from 10 to 22% and at the subsurface from 11 to 21% at all rates. Under irrigation, there were significant increases in SWC, from 16 to 22%, only at the surface and only at rates 120 Mg/ha. Additionally, Miller et al. (2002) found that manure generally had no effect on infiltration under ponded water in either dry land or irrigated conditions.

EXPERIMENTAL SITE

The experiment was conducted on a field behind the Department of Soil Science and Agro-chemistry in plant protection farm at Szent István University Gödöllő. Szent István University is located in Gödöllő, 22 km from Budapest, in Pest County and the central Hungarian region (Nagy, 2017). The site of the experiment is 10 minutes walk from the university to the field. The soils of this area are brown forest soils. In spite of my experiment, a lot of other experiments were running there, involving different levels of students (BSc, MSc and PhD) from the Plant Protection Department, I have seen wide varieties of crops mainly Horticultural crops and few Cereal crops growing inside and outside of the glasshouses.
The area has the following climatic conditions; sunshine the average of 17 hrs/day and the average temperature is 22°C/72F, the experiment was under a glasshouse which is hotter than outside at around 30°C/86F. There was rainfall outside; but, the experiment was in a glasshouse to avoid the violation of summer rain in Hungary.

Materials for the study

The study was conducted in pots and the following materials were used:

1. Test crop: horse teeth maize (Zea mays) variety.
2. Soil type: brown forest soil.
3. Cow manure from animal the husbandry farm at Szent Istvan University.
4. Compost from agricultural shop.

5. Biogas digestive from Dömsöd
6. Inorganic fertilizer type: N.P.K.
7. Pots: The numbers of the pots were (5 *3) =15 in plastic buckets and the area measured 0.0491 m2 /pot.

Field experiment

Pre-planting soil analysis

Representative one kg of soil was collected from the surface field (0-15 cm) before sowing randomly. The sample was transferred to the laboratory for analysis; these soil samples were air-dried at room temperature for 5 days and crushed to pass through a 2mm mesh sieve. Sub-samples from the bulked soil sample were further grounded to pieces to pass through 100mm-mesh sieve for the determination of organic matter (Humus). The rest samples were then analyzed to determine the pH, KA, CaCO3, N, AL-P2O5 and AL-K2O of the soil. The analysis was done at the agro-chemistry laboratory of Szent István University Gödöllő (see Table 1.). According to the result from the laboratory the soil was brown forest soil with medium level of (N) good portion of (P2O5) and (K2O) medium in content. We planned 10t/ha yield of maize. Fifteen buckets of soil collected on carpet, removed large materials like debris and stones by hand. The plastic buckets used were perforated at the base to allow excess water to drain freely during the experiment.
The experiment has been irrigated with 10 liter of water on top in equal distribution daily. The recommended rate of the N.P.K (10t/ha) was applied at the time of sowing as well as the organic fertilizers. For the control (zero), inorganic treatments combination and organic treatments alone per pot (see table below) to see the pre-planting soil analysis.

Table 1. Results from the laboratory in the soil before sowing

pH_{kcl}	pH_{H2o}	Humus %	AL-P_2O_5 mg/kg	AL-K_2O mg/kg	NH4-N mg/kg	NO_3-N mg/kg	Plasticity index (K_A)	$CaCo_3$
7.1	7.9	1.68	128	140	3.7	2.5	31	1.11

Source: own edition (2018)

Three organic fertilizers, from various places, Cow manure from Animal Husbandry Department, compost from agricultural shop and biogas digestive from Dömsöd. These organic fertilizers were analyzed to determine their nutrient contents in the laboratory before application on the field, see the results in table 2 below.

Experiment design

The experiment was laid out under glass house in randomized complete pot design (RCPD). There were 5 treatments replicated 3 times. The inorganic fertilizers; nitrogen and phosphorous resources used for the experiment were Urea and single super phosphate (SSP), respective with potassium in combined form and organic fertilizers (Cow manure, Biogas and Compost) each alone, which showed the following treatments: no fertilizer application control three pots, cow manure application alone three pots, biogas application three pots and compost as well with same of cow manure.

Table 2. Details of fertilizers treatment used in this study

Treatment Code	Treatment description in (grams)
T1	Control
T2	2.99N+3.92P+2.13K
T3	154.29 Compost
T4	279.70 Cow manure
T5	196.35 biogas

Source: own edition (2018)

Planting and cultural practice

Maize seeds (Zea-mays), obtained from the laboratory of crop production department. Hundred seeds were tested in the test towel in the laboratory to determine the percentage germination of the seeds before the field within one week. Results, 91% germinated, 9% un-germinated and no broken seed, and 90 of seeds were taken to experiment field.
10 kg of soil is applied, 9 kg of soil mixed with the applied type of fertilizers whether inorganic fertilizers in combined form or organic fertilizers separately in each pot. While mixing the soil with the fertilizers, the needed amount of water has been added discontinuously, due to the KA value (31), 2 liter of water is applied to all other pots except the three containing biogas, since the biogas was liquid the amount of water added was decreased to less than 2 liter (-196.35). Mixed fertilizers with soil and water were put in the pot.
Six seeds of maize were planted per pot at the depth of 2-3 cm, the remaining of 1 kg of soil without fertilizers were put on the surface of seeds in the pot. Three maize seedlings were later thinned per pot after germination. Weeds were controlled through the use of handpicking to reduce the competition for space, water, light and nutrients between the crops and weeds. The glass house was kept clean to minimize encouragements by insects and rodents.

Data collection

The data which were collected during the experiment include; soil analysis (pH, KA, CaCO3, Humus, Nmin, AL-P2O5 and AL-K2O) and maize analysis (Germination account, Plant height, Wet mass, Dry mass at the end of experiment and N.P.K content). The soil analysis was determined before planting and the end of plant experiment.
The plant height parameter was collected every weekend during the crop growth till maturity; this was taken from sample of three randomly selected maize plants marked with each pot in the first two weeks before thinning, and later was taken the whole three plants in the pot. A ruler tape was used measuring the height from the ground level to the top most leaf during in the first two weeks and carpenter's tape was used the same till harvested.

Laboratory analysis in Hungarian standard methods

The biomass of the harvested maize was taken to the laboratory to determine the wet mass, dry mass and the N.P.K contents in the plant.

Soil analysis

The experiment was made fifteen (15) treatments pots with twelve (12) which is 4*3 in three (3) replication and three control. 200g of mixed Soil was taken each pot to the Laboratory and crushed to pass through (< 2 mm) mesh sieve with the same as the pre-planting analyses.

Analytical procedure

NH4-N and NO3-N determination in Hungarian standard

Reagents: Sodium Hydroxide (NaOH), Copper Sulphate solution (CuSO4), Iron (II) sulphate (FeSO4) and Boric acid with indicator

Statistical analysis

Data collected from the study were analyzed using R-commander which is a basic statistic graphical user interface to R. One way ANOVA was conducted to determine the statistical significance of the treatment effect. Also, mean separation analysis was carried out using the Least Significant Difference (LSD) at 5% significance level.

RESULTS AND DISCUSSIONS

This section shows and discusses the results and data obtained from the field experimentation.

Maize growth parameters

Table 3: Comparing effects of different application rates of organic and inorganic fertilizers on plant height with control (Zero), Weeks after planting till harvested. The results were obtained by performing Pairwise comparison test in ANOVA
Every pot contains 3 plants; we used an average calculation to obtain one average result all the plants with the same treatments.

Table 3. Comparing effects of different application rates of organic and inorganic fertilizers on plant height

Treatments	**Mean Plant Height (cm)**							
Weeks	2	3	4	5	6	7	8	9
Digestate	19.33 a	50.89 b	74.89 c	102.67c	113.44 c	118.78 b	137.67bc	141.67 b
Cow Manure	19.55 a	32.44 a	43.67 a	69.11a	96.22 ab	109.56 a	124.22 ab	136.55ab
Compost	22.11 b	45.55 b	65.3 b	80.33 b	101.33 b	107.44 a	116.33 a	122.67 a
N.P.K	20.67 ab	86.33 c	92.2 d	104.11c	115.66 c	120.78 b	153.11 c	160.00 c
Control	20.55 ab	47.33 b	67.2 b	77.55ab	91.11 a	108.67 a	119.89 a	121.11 a

Source: own edition (2018)

One way Analysis of Variance (ANOVA) was conducted to identify statistical significant effects on the average plant heights of the treatments at every week of the experiment.
During all the weeks of the experiment, we determined that there was a significant effect of the different treatments on the plant heights at 95% confidence level ($p<0.05$). In the second week, the found p value was 0.002438. The compost treatment recorded the highest mean and was not

significant different from the N:P:K and control treatments, while the application of biogas digestate and cow manure were significant different from compost and not significantly different from the N:P:K and control treatments.

In the 3rd week of the experiment, the found p value was < 2e-16. The N:P:K treatments reached the highest mean and was significant different from the all other treatments, while the Compost, Biogas and the control were not significant different at each other. The Cow manure was significant different and was recorded as the shortest mean from the all other treatments.

In the 4th week the p value was the same of the 3th week (p <2e-16). The N:P:K treatment recorded the highest mean and was significant different from all the other treatments. And also the other treatments were significant different at one and other in terms of their means from highest to the shortest in biogas digestate, control, and compost irrespectively.

In the fifth week the p value was 2.06e-14. The N:P:K Fertilizers application treatment was the highest mean recorded and was significant different from all the other treatments apart from biogas digestate, while the application of compost was not significant different from control, but was significant different from the cow manure, While the cow manure was not significant different from the control.

In the 6th week the p value was 6.09e-13. The N: P: K Fertilizers application treatments were the highest mean recorded and was not significant different from the all other treatments except from biogas digestate. While the compost was recorded as the second highest mean but was not significant different from the cow manure, but the shortest mean recorded was the control.

In the 7th week the p value found was 4.72e-7. The N:P:K Fertilizers application treatments were the highest mean recorded and was not significant different from the all other treatments except from biogas digestate, while the cow manure, compost and control was not significant different from one another.

In the 8th week the p value found was 1.87e-7. The N:P:K Fertilizers application treatments were the highest mean recorded and was significant different from the all the other treatments apart from the biogas digestate. While the cow manure was the second recorded and was not significant different from the compost and the control.

In the 9th week the p value 4.53e-0.8. The N:P:K treatment recorded the highest mean and were significant different from all other treatments, while the second highest mean recorded was the biogas digestate, which was not significant different from the cow manure treatment. And the cow manure was not significant different from compost as well as the compost was not shown significant different from the control.

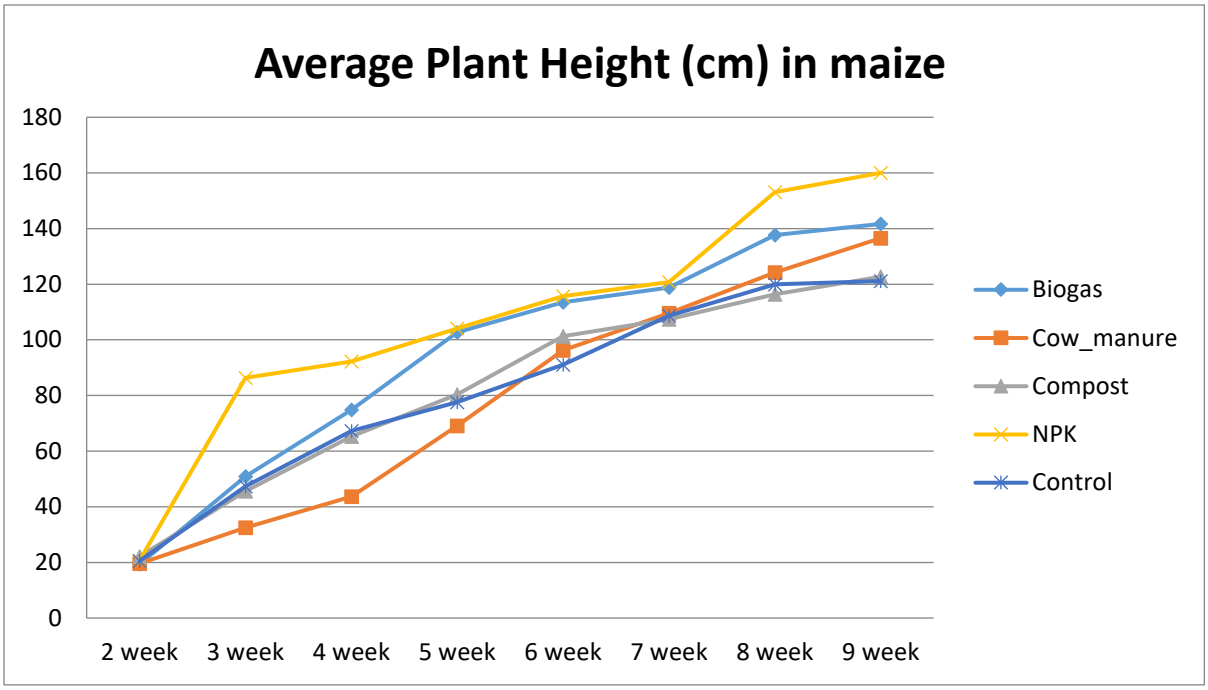

Figure 1. average plant heights on different treatments

Source: own edition (2018)

Wet and dry mass parameters in grams.

Table 4: We used an average during the determination in wet mass and dry mass.

Table 42. determination in wet mass and dry mass

Treatments	Wet mass	Dry mass.
Digestate	146.77 b	98.11 b
Cow manure	85.22 a	51.89 a
Compost	75.33 a	53.88 a
N.P.K	149.56 a	94.78 a
Control	65.11 a	46.44 a

Source: own edition (2018)

One way Analysis of Variance (ANOVA) was conducted to identify statistical significant effects on the average wet and dry plant masses of the treatments after the crop was harvested. There was a significant effect of the treatments on the wet plant mass at $p<0.05$ level. ($p=3.88e$ 10). N:P:K recorded the highest wet mass and was not significant different from the biogas digestate treatment, but, significant different from compost and the cow manure, while the cow manure and compost treatments were not significant different at one another.
In dry mass, there was also a significant effect of treatments at $p<0.05$ level. ($p=2.3e-8$).
The biogas digestate and N:P:K were recorded the highest weight and were not significant different at each other. But, the cow manure, compost and control were not significant different with one another in statistically analyses and were significant different from biogas digestate and N:P:K.

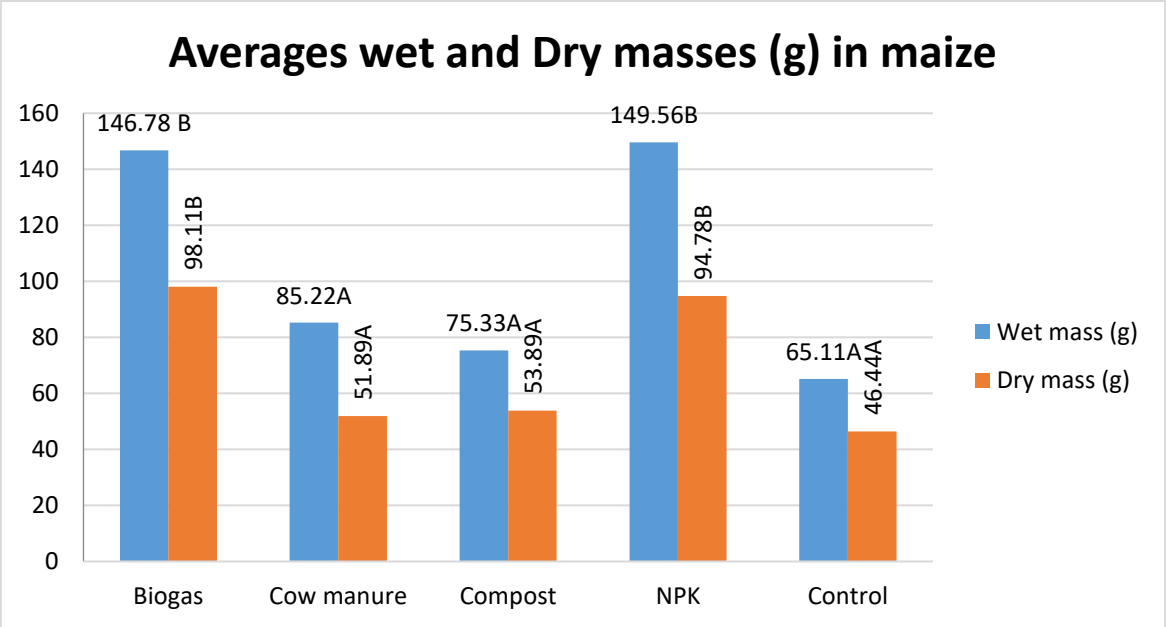

Figure 1. Average on Wet and Dry masses on different treatments on plants
Source: own edition (2018)

Table 5. Table16: Determination of N:P:K contents in maize in average.

Treatments	N%	P_2O_5%	K_2O_5
Digestate	0.83 a	0.26 a	1.92 b
Cow manure	0.78 a	0.64 c	1.63 ab
Compost	0.83 a	0.46 b	1.86 b
N.P.K	0.89 a	0.33 ab	1.64 ab
Control	0.64 a	0.33 ab	1.42 a

Source: own edition (2018)

In determination of N:P:K contents in plants. There were significant differences among treatments at a significant level of 95%. (p=0.02).
In determination of Nitrogen (N) application of inorganic fertilizers (N:P:K) showed a slight increase in the nitrogen content when compared to control which was significant (Table 16).
There are no differences among treatment groups in terms of plant nitrogen content.
In determination P2O5 contents in plants. There was significant effect of the application of the different treatments on the plant phosphorus content at a significance level of 95%.(p=0.0009126). The application of cow manure resulted in the highest phosphorus content which was significant different from all the other treatments. Compost treatment was not significant different from N:P:K and Control treatments but showed a significant difference from biogas digestate.
In determination of K2O5, the potassium content in case of biogas and compost was significantly found to be different to control. There was no significant difference found between the treatments.

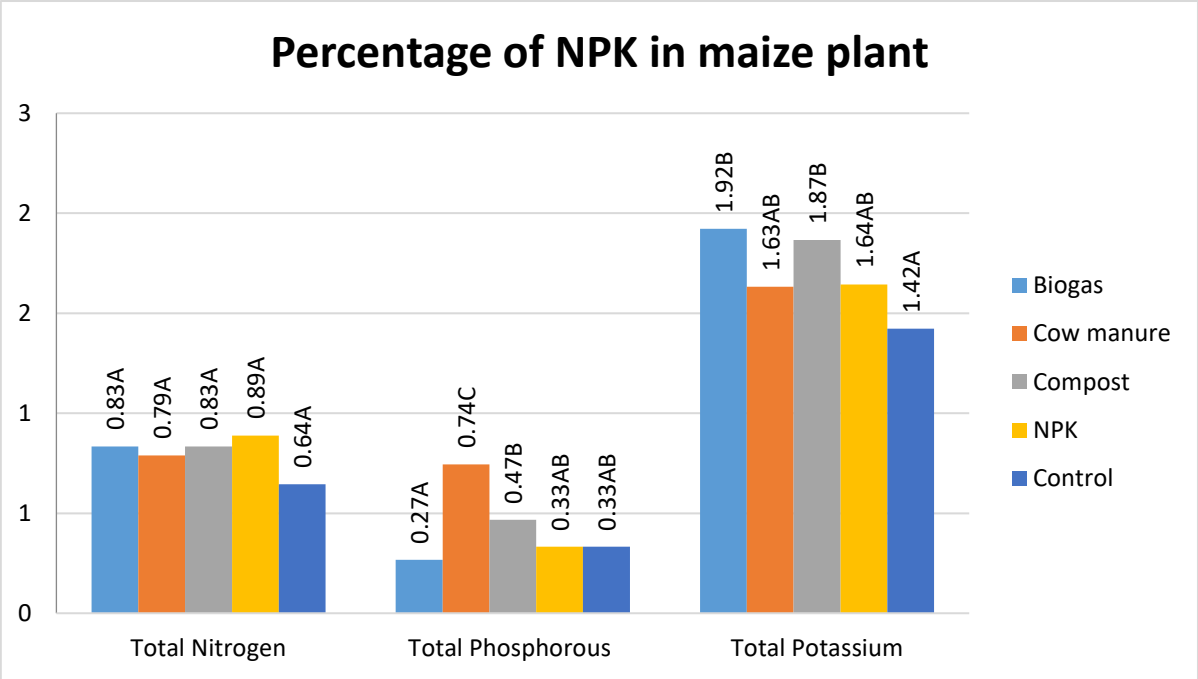

Figure 2. N:P:K Contents in plant maize from pots.

Source: own edition (2018)

Table 6. Initial and at harvest soil condition for treatment applications on organic and inorganic fertilizers.

Treatments	pH_{KCl}	pH_{H20}	Humus %	AL-P_2O_5 mg/kg	AL-K_20 mg/kg	NH_4-N mg/kg	NO_3-N mg/kg	K_A	$CaCO_3$ %
Digestate	7.36b	8.06ab	1.84ab	137 a	107.33ab	4.23 a	2.00 a	31.00 a	1.10 ab
Cow manure	7.36b	8.16 b	2.04 b	97.23ab	100.06 ab	4.36 a	3.00 a	31.66 a	1.12 ab
Compost	7.40b	8.13 b	1.65ab	75.23 a	113.33 b	4.33 a	2.33 a	31.66 a	1.13 b
N.P.K	7.40b	8.03ab	1.54 a	58.83 a	104.33ab	4.46 a	2.53 a	31.33 a	1.11 ab
Control	7.20a	8.03ab	1.51 a	57.93 a	95.87 a	4.1 a	2.43 a	30.00 a	1.09 a
Initial	7.1 a	7.9 a	1.68ab	128 ab	140 c	3.7 a	2.50 a	31.00 a	1.11 ab

Source: own edition (2018)

One way ANOVA showed a significant effect of the treatments in the soil pHKCl, and the soil content of humus, phosphorus, potassium, and calcium carbonate at 95% level of significance (p=0.00847, p=0.00773, p=0.00611, p=0.00404 and p=0,0225 respectively).

For soil pHKCl, post hoc comparisons indicated that the means of all applied fertilizers, both organic and inorganic, were significantly different from the control mean.

In the case of humus content, the application of cow manure produced a significant increase when compared to the control treatment, such increase was also significant than the application of the conventional N:P:K fertilizer. The other organic treatments were not statistically different than the control treatment or the N:P:K fertilizer.

For the soil potassium content, it was observed that the application of compost and biogas digestate produced a significant increase when compared with the control, whilst the application of the conventional fertilizer and cow manure did not have any statistical effect in comparison with the control.

Regarding calcium carbonate content, the application of compost showed a significant difference in the mean in comparison with the control treatment. The other treatments did not show a significant change when compared with the control treatment.
In the case of soil pHH2O, soil content of NH4-N and NO3-N, no significant effect was found between treatments.

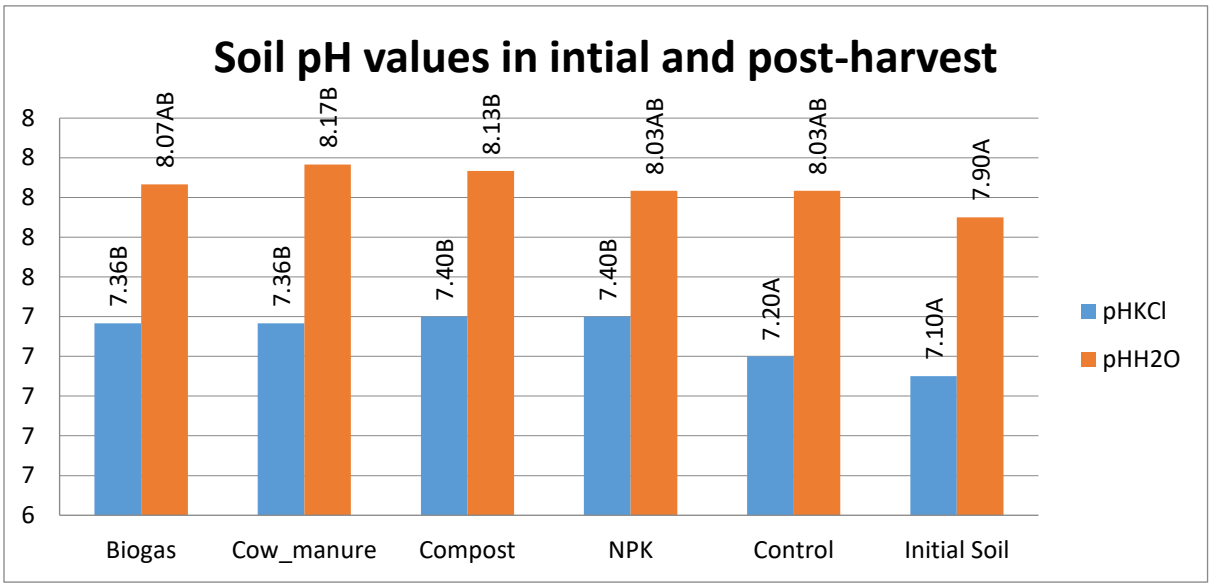

Figure 3. Soil pH determination on pHKCl and pHH20
Source: own edition (2018)

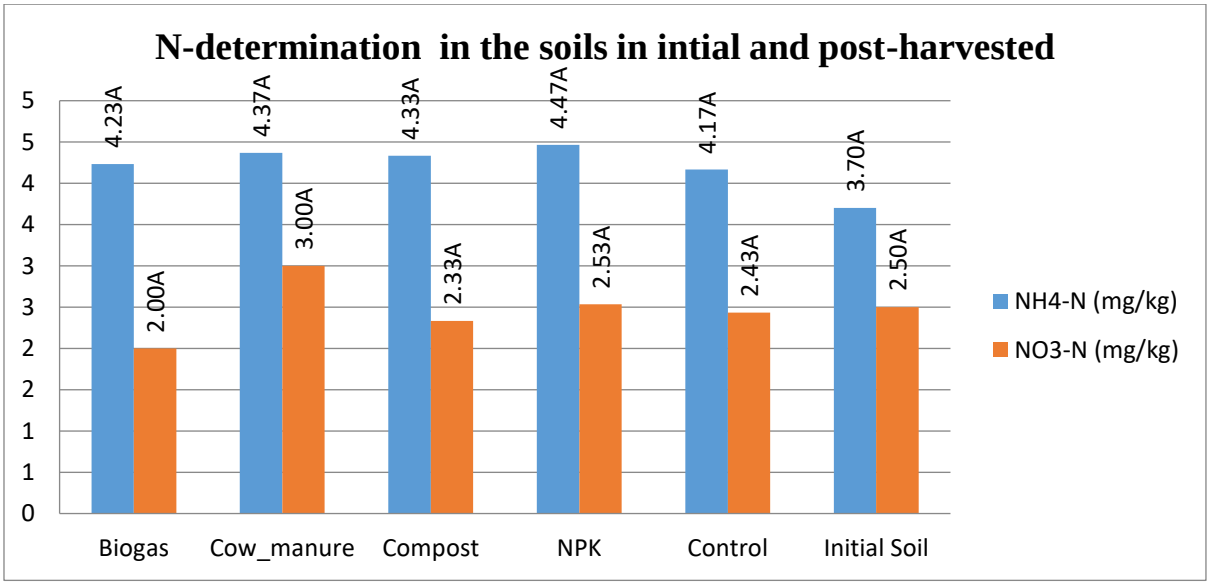

Figure 42. Nitrogen determination (NH4-N (mg/kg),(NO3-N(mg/kg) in the Soils.
Source: own edition (2018)

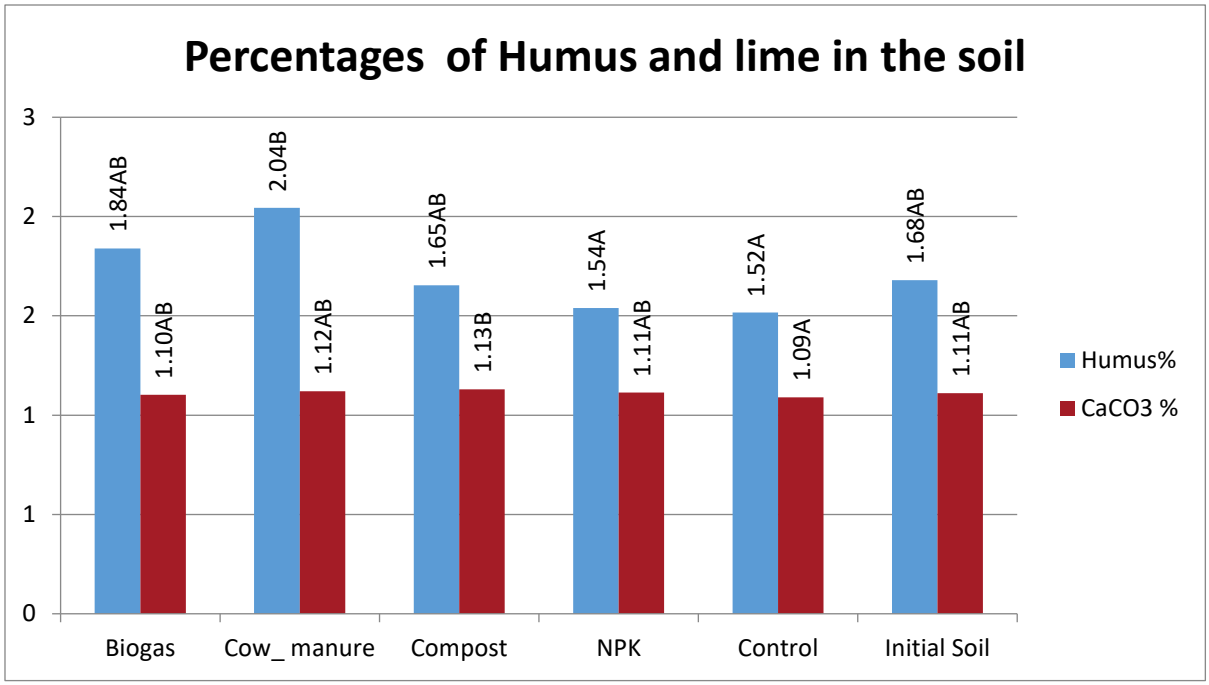

Figure 5. Determination on Humus, Lime contents in Soil

Source: own edition (2018)

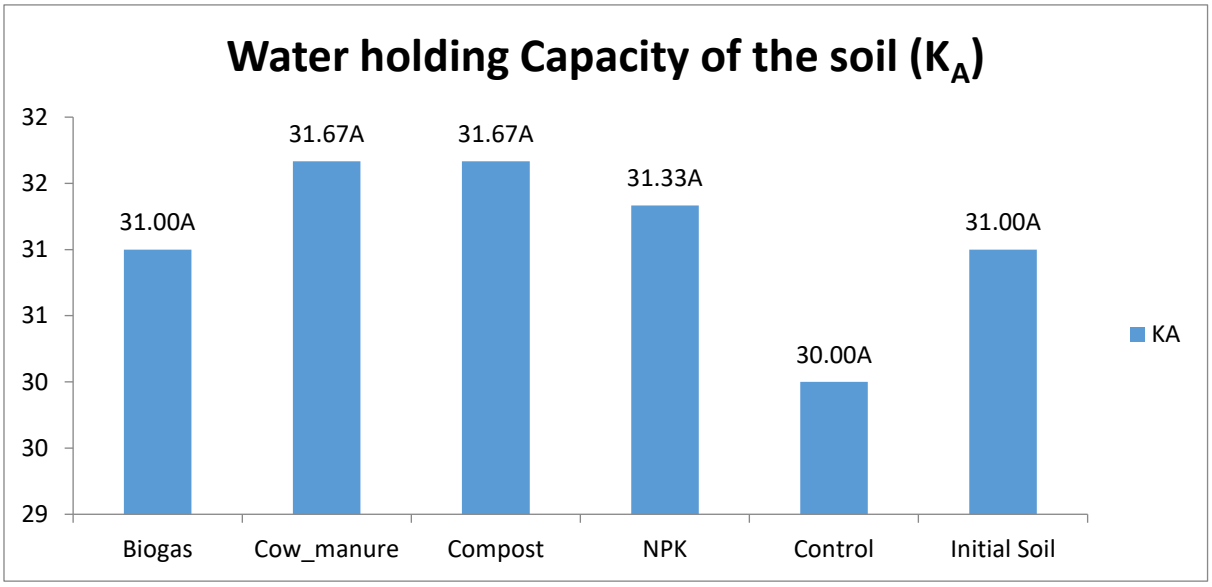

Figure 6. Comparing water holding capacities in the soils from pre-harvest and post-harvest.

Source: own edition (2018)

CONCLUSION

The experiment was conducted in glass house in randomized complete pot design (RCPD) in three different rates of organic fertilizers (Biogas digestate, Compost, Cow manure,) and combined inorganic fertilizers (NPK) with maize plant from April 2017 to February 2018.

This study confirms the role of NPK fertilizers in increased growth and wet and dry masses parameters in maize. From the result of the experiment in application rate of inorganic fertilizers (N.P.K) was: 2.99N/Pot+3.93P/Pot+2.13K/Pot.
Plants in NPK treatments potassium looked the highest, whiles phosphor and nitrogen are second irrespectively.
Soils in NPK treatments had pHKCl showed higher than all other treatments in the laboratory determination; while pHH20 parameters showed similarly with other treatments or slightly different while, the humus content looked lower than other treatments except from control.
In phosphorus, nitrogen, potassium determinations looked lower than the initial soil and slightly biogas treatments application.

RECOMMENDATIONS

The application of compost and cow manure highly increased the water holding capacity and calcium carbonate contents in the soil. Hence, this researcher recommends the application of cattle manure has a positive effect on soil water characteristics, leading to increased water retention, increased infiltration, and decreased evaporation rates in a number of soil types, climatic conditions and application rates.
More studies are needed to determine, over the long term period, the impact on maize for field not in pots in comparing the influence of organic vs inorganic nutrient sources.
In the literature review was mentioned that there is increasing concern about soil interrelated environmental problems such as soil degradation, and loss of fertility (European Commission 2006). An estimated 45 % of European soils have low soil organic matter (SOM) content, principally in southern Europe, but also in areas of France, the UK, and Germany (European Commission 2006).
Therefore, further studies should be needed on the combination of organic and inorganic fertilizers.

REFERENCES

1. Anderson, E., and H.C. Cutler. 1942. Races of Zea mays. Annals of the Missouri Botanical Garden 29:69-88.
2. Abuo el magd, M.M., Hoda, M.A. and Fawzy Z.F (2005). Relationship, growth, yields of Brocco with increasing N.P or ration in a mixture of NPK fertilizers Annals of Agricultural Science Monshotohor. Volume 43 (2): 791-805.
3. Bretting, P.K., M.M. Goodman, and C.W. Stuber. 1987. Karyological and isozyme variation in West Indian and allied American mainland races of maize. American Journal of Botany 74:1601-1613.
4. Bretting, P.K., M.M. Goodman, and C.W. Stuber. 1990. Isozymatic variation in Guatemalan races of maize. American Journal of Botany 77:211-225.
5. Production. All over view 18th Annual Conference of Soil Science Society of Nigeria,
6. Maiduguri. November, 1990. Awotundun, J.S. 2005. Comparative Effects of organic and inorganic fertilizer on the yield of Pop-corn. In: Proceedings of the 29th Annual Conference of the Soil science society Of Nigeria. December, 6th-10th, 2004. University of Agriculture Abeokuta, Nigeria: 175-179.
7. Chen, Jen-Hshuan, Jeng-Tzung Wu and Wei-Tin Huang (2001), “Effects of Compost on the Availability of Nitrogen and Phosphorus in strongly Acidic Soils”, Taiwan Agricultural research Institute, Wufeng, Taiwan.
8. Chong, Ren-Shih (2005), “Using Organic Fertilizers”, Food and Fertilizer Technology Center, Taiwan.CIAT (2006), “Improving fertilizer efficiency and developing soil and

water management Practices", Integrated Soil Fertility Management, TSBF-CIAT's Achievements and Reflections, 2002-2005.
9. Kauter, D., Claupein W., 2004. Cropping Systems for Energy Supply with Catch Crops and Energy Maize in Central Europe: Principles and Agronomic Problems. In: University of Twente, The Netherlands, Energiedalen, Sweden, WIP-Munich, Germany, ETA-Florence, Italy
10. (Eds.). Proceedings of the Second World Biomass Conference ''Biomass for Energy, Industry and Climate Protection'' Rome, Italy. 10–14, pp. 417–420.
11. Eghball, B. (2002). Soil properties as influenced by phosphorus- and nitrogen-based manure and
12. Compost applications. Agronomy Journal 94(1), 128–135.

N_2O FLUX OF PLANTED AND NOT PLANTED CROPLAND SOIL IN RESPONCE TO THE N FERTILIZER

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ABSTRACT

Global climate is changing primarily because of anthropogenic greenhouse gas (GHG) emissions into the atmosphere. Anthropogenic GHG emissions since the pre-industrial era have driven large increases in the atmospheric concentrations of carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O). Agricultural soils release significant amounts of the N2O to the atmosphere.
To explore the role of mineral fertilisation practices, soil water content manipulation and vegetation in this process, lab and field examinations of soil gas emission have particular importance.
Hence the main objective of the present study was; to identify the effect of a nitrogen fertilizer (NH4NO3), soil water content manipulation and vegetation on soil N2O emission moreover on enzyme activity of microbial populations, to know how much agricultural soils contribute to originate this GHG field measurement also has been done.
In our experiment we choose a cropland called Kartal (47.658°N, 19.532°E) which situated in Mid-Hungary and has continental climate. From this site and for the lab measurement we brought the soil to the lab and we put it into tubes of 20 cm height and 10 cm diameter. The tubes were filled to 15 cm with the soil and we used the remaining space as chambers for the emission measurements.
Our manipulation experiment in the lab environment was divided into two periods each one divided into: bare soil and planted soil with wheat plants. N fertilizer was applied on the surface of the soil at the beginning of the study period and the pots were kept under favorable conditions (12 hours of light, 20-25v% soil water content, 20°C air temperature).The sampling for N2O efflux of the soil samples and additional measurements were conducted each week during a 5 weeks long study period. Closed chamber technique was used for measuring the emission of the greenhouse gas (GHG).The N2O concentration of the samples was measured by GC ECD technique.
The fluorescein diacetate (FDA) hydrolysis assay was applied to measure the enzyme activity of microbial populations.
For the field measurement the N2O fluxes were determined by small static (closed) chambers.
The highest N2O emission was measured in the fertilized and planted samples with higher soil water content. Since the estimates of GHG efflux from agricultural soils are still highly uncertain, and there is a strong need to find correlations between the different biological processes of the soil for mitigating GHG emission of the agriculture and for biogeochemical modelling approaches.

Keywords: *Nitrous oxide, Greenhouse gas, N2O efflux, N fertilizer, Soil water content*

INTRODUCTION

Life on Earth depends on a temperature range controlled by the greenhouse effect. Changes in the concentration of greenhouse gases (GHG), mainly carbon dioxide (CO2), methane (CH4) and nitrous
oxide (N2O), have occurred in the past years and have been related to the increase in global temperature.
Anthropogenic GHG emissions since the pre-industrial era have driven large increases in the atmospheric concentrations of carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O) (IPCC, 2014). Global CH4, CO2 and N2O concentrations in the atmosphere increased at rates of 0.8%, 0.5% and 0.3% per year, respectively (Wang et al., 2013).
During the last four decades, global area of agricultural land increased due to conversions from other land uses, a change driven largely by increasing demands for food from a growing human population (IPCC, 2014; Wang et al., 2013).
Belong those GHG, N2O which present in earth's atmosphere at a trace level – its current 'mixing ratio' (i.e. the concentration in dry air) is of the order of 320 parts per billion (ppb). This mixing ratio has been increasing linearly over the last few decades as a consequence of the introduction of N2O into the atmosphere at a rate greater than its rate of removal by natural processes
N2O is environmentally important in two quite distinct respects. First, its capacity to absorb infrared radiation is about 300 times greater than that of carbon dioxide, CO2, and therefore, although its mixing ratio is a thousand times less than that of CO2, it contributes significantly to the greenhouse effect and thus to climate change. Second, when N2O reaches the stratosphere it contributes, along with some halogen-containing gases, to the loss of ozone that acts as a barrier to the penetration of ultraviolet radiation to Earth's surface, with consequences for human health.
A generation ago, the impact of N2O emissions on the ozone layer was the main environmental concern associated with this gas, but since then the increasing recognition that global warming is a major threat to life on Earth as we know it has led to a wide-ranging investigation of the factors that contribute to the warming. in particular the agricultural emissions of the long lived greenhouse gase N2O to the atmosphere because this sector was responsible for about 87.2% of N2O emissions, mainly from animal waste management and agricultural soils (Cerri et al. 2009).
From the global N2O emissions which reach about 17.7 Tg of N per year, being 6.7 Tg (37.8%) from anthropic sources. Agricultural soils share 2.8 Tg of N per year, i.e., 15.3% of the total amount of emissions, or 41.8% of anthropic emissions (Denman et al. 2007).
However, emissions have been increasing, as a consequence of adding reactive forms of nitrogen into the biosphere beyond those natural additions from, principally, biological nitrogen fixation (by leguminous plants, plants with other forms of symbiotic association with microorganisms, and free living N-fixing bacteria).
N2O is a natural product of mainly microbial origin, as a result of the biogeochemical processes occurring within the nitrogen (N) cycle.
The rhizosphere in soil–plant systems is a potential zone of hotspots of N2O production. The rhizosphere is the volume of soil occupied and influenced by plant roots (Philippotet al.2013), in which chemical, biological and physical properties show a gradient both radially and longitudinally along the roots (McNear 2013).
N2O is produced biologically in soils during denitrification (Smith and Arah 1990), nitrification (Blackmer and Bremner1978) and nitrifier denitrification (Poth and Focht 1985; Wrage et al. 2001). These processes may occur simultaneously in different microsites of the same soil

(Stevens et al. 1997) but there is often uncertainty associated with which process is predominantly contributing to emissions from a particular soil.

A wide range of heterotrophic bacteria and fungi are able to reduce NO_3^- and NO_2^- to N_2O or N_2 during denitrification under anaerobic conditions (Knowles1982; Shoun et al. 1992). This process is often considered to be the main N_2O producing process in soils in as much as many studies have shown N_2O emissions after N application to increase with increasing soil water content and most rapidly above 60% water-filled pore space (WFPS) (e.g. Dobbie et al.1999; Abbasi and Adams2000; Skiba and Ball 2002). However, there is increasing evidence that aerobic denitrification may be significant in environments where O_2 is not limiting (Patureau et al. 2000) because many bacteria isolated from soils and sediment (including Pseudomonas, Aeromonas and Moraxellagenera) are capable of nitrate respiration in the presence of O_2 (Carter et al. 1995; Patureau et al.2000).

N_2O production in soil during autotrophic nitrification is traditionally considered to be minor in comparison with denitrification. The oxidation of NH_3 to NO_2^- by ammonia oxidisers and oxidation of NO_2^- to NO_3^- by nitrite oxidisers is optimal in aerobic conditions since this oxidation requires O_2 as the terminal electron acceptor. However, significant N_2O production during nitrification has been measured in cultures of nitrifiers under reduced O_2 potential (Goreau et al.1980) and in soils up to 60% WFPS (Linn and Doran1984; Abbasi and Adams2000). There is also evidence that ammonia oxidisers are able to reduce NO_2^- to N_2O or N_2 under short-term O_2 limitation (nitrifier denitrification) (Poth and Focht1985; Wrage et al. 2001).

Thus, the contribution of autotrophic nitrification to N_2O emissions from soils is not confined to strictly aerobic conditions and its contribution may have previously been underestimated. Furthermore, it is now known that the ability to nitrify extends beyond the closely related autotrophic nitrifiers. The ability of some heterotrophic microorganisms, such as Alcaligenes faecalis, to nitrify organic and inorganic N compounds and produce N_2O has been demonstrated in culture (Papen et al.1989; Anderson et al.1993). To date, evidence for heterotrophic nitrification in soils is limited to acidic and organic rich forest soils where autotrophic nitrification can be inhibited (Robertson and Tiedje1987; Pedersen et al.1999), and the contribution of heterotrophic nitrification to N_2O emissions from fertilised arable soils where inorganic $NH_4^+$is the most abundant source of N is unknown.

Accurate quantification of current emissions and prediction of future emissions is an important step toward developing counter measures to reduce emissions.

Accurate assessments would allow us to clarify the relationship between gas emissions and human activities (e.g., management of fertilizer, manure, residues and water in croplands), allowing us to estimate more accurate emission factors (EFs, which quantify gas flux per unit of activity; IPCC2006).

That's why if we consider the importance of N_2O as a GHG and how much agricultural soils contribute to originate it and also to explore the role of mineral fertilisation practices, soil water content manipulation in this process, field and experimental examinations of soil gas emission have particular importance.

Hence the main objective of the present study was to measure N_2O emission on temporal variability from agricultural soils, to identify the effect of a nitrogen fertilizer (NH_4NO_3) and also the effect of vegetation on soil N_2O emission moreover on enzyme activity of microbial populations and the dominance of agriculture as a source of N_2O provides the justification for including those questions focusing on this sector.

MATERIALS AND METHODS

Selection of the site

In our experiment we choose a cropland called Kartal (47.658°N, 19.532°E) which situated in Mid-Hungary and has continental climate. This planned study site has running EC stations, close to the headquarters of the Gödöllő Experimental Farm Ltd. due to the easy accessibility. Crop rotation: 2013-2014 winter wheat, 2015 sunflower, 2015-2016 winter wheat, 2016-2017 rapeseed. 2017-2018 wheat.

Lab measurement

Soil N2O emission flux measurement

From the study site we brought soil samples from the top 15 cm layer to the lab and we put it into tubes of 20 cm height and 10 cm diameter. The tubes were filled to 15 cm with the soil (about 1300 g of soil) and we used the remaining space as chambers for the emission measurements. The experiment was divided into two periods, the first contained a series of 27 pots and the second contained 30 pots: bare soil (9 pots) and the rest were planted with wheat plants. NH4NO3 fertilizer was applied on the surface of the soil: first series: 0 kg/ha, 50 kg/ha and 100 kg/ha treatments, second series: 0 kg/ha, 75 kg/ha and 150 kg/ha treatments, at the beginning of the study period. The pots were kept under favorable conditions (12 hours of light , 20-25v% soil water content, 20°C air temperature).The sampling for N2O efflux of the soil samples and additional measurements were conducted each week during a 5 weeks long study period. Closed chamber technique was used for measuring the emission of the greenhouse gas (GHG).
Concerning the measurement of N2O we took three air samples from each pots by syringe (at 0, 10 and 20 minute), the N2O concentration of the samples was measured by GC ECD technique.

Microbial investigation

For the activity of microbial populations and the estimation of overall microbial activity in our soil samples we used the fluorescein diacetate (FDA) hydrolysis assay.

Field measurement

Soil N2O emission flux measurement

N2O fluxes were determined by small static (closed) chambers according to Christensen et al. (1990). A total of 10 parallel chambers were used at the site to measure the N2O efflux on temporel variability.
Chambers with circular rims were placed permanently,~1 m apart in a transect. The rims were pushed 4 cm into the soil and were left permanently there to avoid the sudden emission peaks after installation. The area and volume of the chambers are 81.71 cm2 and 449 cm3, respectively.
The rims were covered and closed by the upper part of the chambers only for the duration of sampling. After closure, samples were taken at t= 0, 10 and 20 min with a syringe. A total of 10 ml of samples were injected into 10 ml evacuated tubes. The frequency of sampling was

generally bi-weekly between November 2017 and April 2018 with exception when the soil was frozen or covered by snow.

N2O flux calculation

The concentration of N2O both for the field and lab measurement was measured by gas chromatography (HP 5890) electron capture detector . Emission fluxes were calculated from the accumulation of N2O gas in the chamber as follows:

$$F = \frac{\Delta C \times 2 \times \mathrm{AN} \times \mathrm{Vch} \times \mathrm{f}}{Vm \times Ach \times t}$$ (L. Horvath et al., 2010)

Where F is the flux [$\mu g N m^{-2} h^{-1}$], ΔC is the accumulation in mixing ratio in the chamber during sampling (20 min) [ppb], AN is the atomic weight of N, Vch is the volume of the chambers [m^3], f is the factor taking into account the residual pressure in the evacuated tubes (1.233), Vm is the molar volume [L] (Vm=24L att=20° C laboratory temperature during measurements), Ach is the surface of soil covered by the chambers [m^2], t is the sampling time [20 min]. The standard reference gas used was 313 ppb N_2O in N_2.

RESULTS AND DESCUSION

Lab measurement

N2O emission

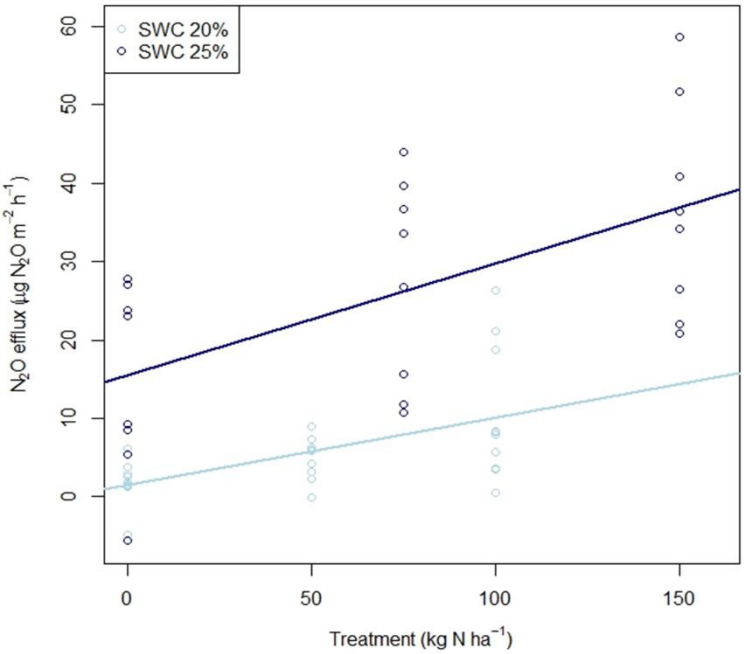

Figure 1: N_2O efflux of different treatments and at two different soil moisture levels

The equation and statistics for the n2o_swc:

*swc20: N_2O=1.54+0.085*SWC, r^2=0.31, p<0.05*

*swc25: N_2O=15.44+0.14*SWC, r^2=0.34, p<0.05*

Source: own edition (2018)

We found that the soil N2O emission was significantly higher at the higher soil moisture level (25%) and it was affected by the increasing fertilizer amount. The N2O emission potential exponentially increase in anoxic conditions where N2O originates predominantly from denitrification due to the decreasement of O2 availability (Pihlatie et al. 2004; Butterbach-Bahl et al. 2013). Therefore, the quantitatively important process in cropland N2O emission is denitrification, although nitrification might also contribute to baseline emissions.

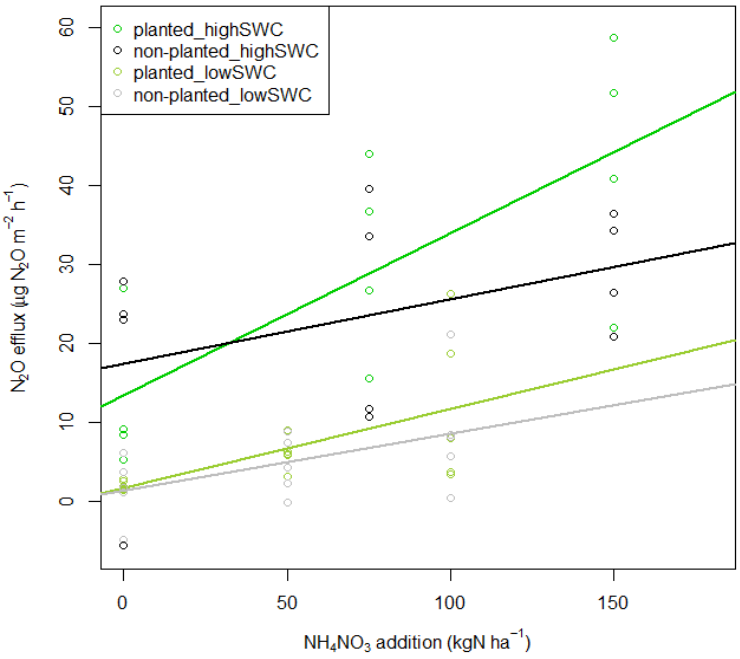

Figure 2: N_2O efflux at different treatment from planted and not planted soils.
*High SWC, planted: N2O efflux= 13.45+NH4NO3 addition*0.21, R2= 0.55, p<0.05*
*High SWC non-planted: N2O efflux= 17.42+NH4NO3 addition*0.08, R2= 0.16, n.s. (not significant)*
*Low SWC, planted: N2O efflux= 1.71+NH4NO3 addition*0.1, R2= 0.36, p<0.05*
*Low SWC non-planted: N2O efflux= 1.37+NH4NO3 addition*0.07, R2= 0.26, p<0.05*
Source: own edition (2018)

Higher efflux was observed for the N2O in planted soil. Planted soil had 1.3 times higher N2O emission than unplanted soil. Lot of studies provided evidence that the presence of plants generally stimulates N2O emission. Denitrification rates were increased in the presence of plants due to the oxygen consumption resulting in higher soil N2O emission.
Stimulatory effects have been observed across a variety of plant species, including barley, and wheat (Hayashi et al. 2015). These studies collectively indicated that plant effects on denitrification are twofold. Firstly, increasing O2 demand by roots and heterotrophs makes the rhizosphere more prone to denitrification. Secondly, the presence of plants provides easily decomposable organic matter to support microbiological processes like denitrification by rhizosphere organisms once the O2 is depleted.

Microbial populations activity

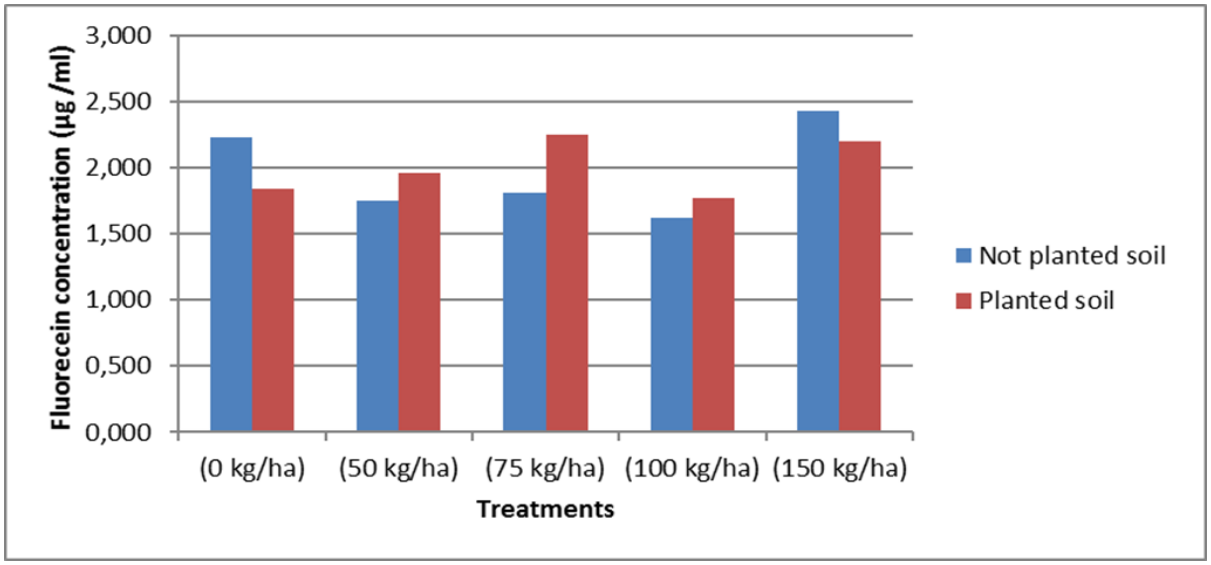

Figure 3: The amount of Fluorecein concentration (µg /ml) at different treatments).
Source: own edition (2018)

Soil enzymatic activity based on FDA measurements showed no significant differences between the treatments, therefore our further aim to use another test to measure the activities of some main groups, e.g.: nitrifiers, denitrifiers. Furthermore, we plan to use more specific methods like PCR to explain our result and to identify the origin of the greenhouse gas efflux.

Field measurement (N2O efflux)

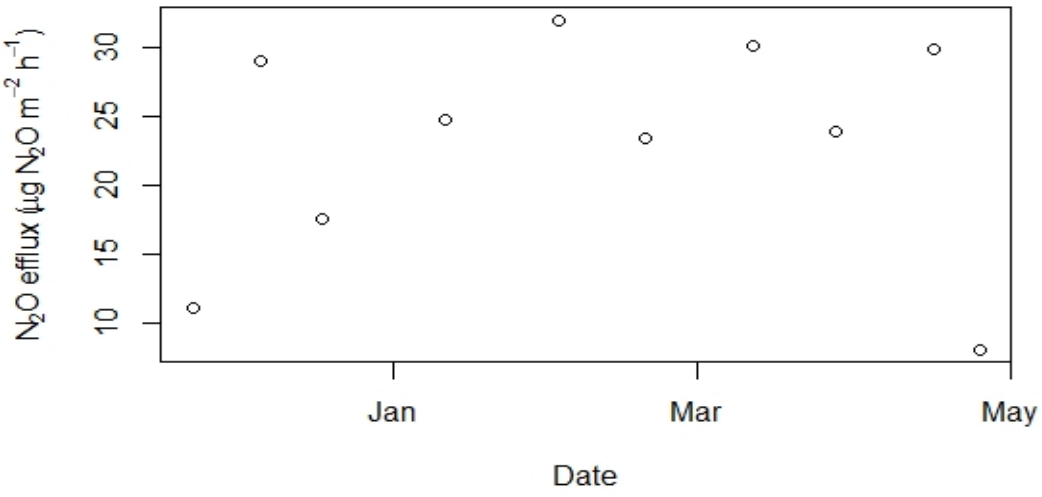

Figure 04: N_2O efflux from the field
Source: own edition (2018)

We found that the value of the N2O emmision from the field was variable, this variation caused by the changement of the soil water content availibility because the main drivers of the N2O emmision were the soil water content and the addition of the fertilizer that's why we observed the highest N2O emission was measured in the autumn periode where there is an addition of the fertilizer to the field.

CONCLUSIONS.

According to our results and we found a positive effect of soil moisture and also of plants on the N2O efflux and there is a linear regression bettween the addition of the N fertilizer and the N2O efflux. Our further aims are to continue both field and lab measurements for the gas and to study the effect of fertilization and plants in more details.
Croplands have significant GHG emission and there is a strong need to find correlations between the different biological processes of the soil for mitigating GHG emission of the agriculture and for biogeochemical modelling approaches.

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REFERENCES

1. Abbasi MK, Adams WA (2000) Gaseous N emission during simultaneous nitrification denitrification associated with mineral N fertilisation to a grassland soil under field conditions. Soil Biol Biochem 32:1251–1259
2. Anderson IC, Poth M, Homstead J, Burdige D (1993) A comparison of NO and N2O production by the autotrophic nitrifierNitrosomonas europaea and the heterotrophic nitrifierAlcaligenes faecalis. Appl Environ Microbiol 59:3525–3533
3. Blackmer AM, Bremner JM (1978) Inhibitory effect of nitrate on reduction of N2OtoN2 by soil microorganisms. Soil Biol Biochem 10:187–191
4. Butterbach-Bahl K, Baggs EM, Dannenmann M, Kiese R, Zechmeister-Boltenstern S 2013: Nitrous oxide emissions from soils: how well do we understand the processes and their controls?Phil. Trans. R. Soc. B Biol. Sci., 368(1621) 20130122. doi:10.1098/rstb.2013.0122
5. Carter JP, Hsiao YH, Spiro S, Richardson DJ (1995) Soil and sediment bacteria capable of aerobic nitrate respiration. Appl Environ Microbiol 61:2852–2858
6. CERRI, C. C. et al. Brazilian greenhouse gas emissions: the importance of agriculture and livestock. Scientia Agricola, Piracicaba, v. 66, n. 6, p. 831-843, 2009.
7. Christensen, S., Simkins, S., Tiedje, J.M., 1990. Spatial variation in denitrification: dependency of activity centers on the soil environment. Soil Sci. Soc. Am. J. 54, 1608–1613
8. DENMAN, K. L. et al. Couplings between changes in the climate system and biogeochemistry. In: SOLOMON, S. et al. (Eds.). Climate change 2007: the physical science basis. Cambridge: Cambridge University Press, 2007. p. 499-588
9. Dobbie KE, McTaggart IP, Smith KA (1999) Nitrous oxide emissions from intensive agricultural systems: variations between crops and seasons, key driving variables, and mean emission factors. J Geophys Res D21:26891–26899
10. Goreau TJ, Kaplan WA, Wofsy SC, McElroy MB, Valois FW, Watson SW (1980) Production of NO2− and N2O by nitrifying bacteria at reduced concentrations of oxygen. Appl Environ Microbiol 40:526–532
11. K, Hayashi., Takeshi Tokida., Masako Kajiura., Yosuke Yanai., Midori Yano., 2015. Cropland soil–plant systems control production and consumption of methane and nitrous oxide and their emissions to the atmosphere, Soil Science and Plant Nutrition., 61, 2-33.
12. L. Horvath., B. Grosz., A. Machon., Z. Tuba., Z. Nagy., S.Z. Czobel., J. Balogh., E. Peli., S.Z. Foti., T. Weidinger, K. Pinter., E. Fuhrer.,2010. Estimation of nitrous oxide

emission from Hungarian semi-arid sandy and loess grasslands; effect of soil parameters, grazing, irrigation and use of fertilizer, Agriculture, Ecosystems and Environment 139, 255–263.
13. IPCC 2006: Volume 4 Agriculture, Forestry and Other Land Use. 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Eds. Eggleston HS, Buendia L, Miwa K, Ngara T, Tanabe K, Institute for Global Environmental Strategies, Japan.
14. IPCC, 2014. Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzer land, pp. 151.
15. Knowles R (1982) Denitrification. Microbiol Rev 46:43–70
16. Linn DM, Doran JW (1984) Effect of water-filled pore space on carbon dioxide and nitrous oxide production in tilled and nontilled soils. Soil Sci Soc Am J 48:1267–1272
17. McNear Jr DH 2013: The rhizosphere–roots, soil and everything in between. Nat. Educ. Knowledge, 4,1.
18. Papen H, Vonberg R, Hinkel I, Thoene B, Rennenberg H (1989) Heterotrophic nitrification byAlcaligenes faecalis—NO2 −,NO3−,N2O and NO production in exponentially growing cultures. Appl Environ Microbiol 55:2068–2072
19. Patureau D, Zumstein E, Delgenes JP, Moletta R (2000) Aerobic denitrifiers isolated from diverse natural and managed ecosystems. Microb Ecol 39:145–152
20. Pedersen H, Dunkin KA, Firestone MK (1999) The relative importance of autotrophic and heterotrophic nitrification in a conifer forest soil as measured by 15 N tracer and pool dilution techniques. Biogeochemistry 44:135–150
21. Philippot L, Raaijmakers JM, Lemanceau P, van der Putten WH 2013: Going back to the roots: the microbial ecology of the rhizosphere.Nat. Rev. Microbiol., 11, 789–799. doi:10.1038/nrmicro3109
22. Pihlatie M, Syväsalo E, Simojoki A, Esala M, Regina K 2004: Contribution of nitrification and denitrification to N2O production in peat, clay and loamy sand soils under different soil moisture conditions. Nutr. Cycl. Agroecosyst., 70, 135–141. doi:10.1023/B:FRES.0000048475.81211.3c
23. Poth M, Focht DD (1985) 15 N kinetic analysis of N2O production by Nitrosomonas europaea—an examination of nitrifier denitrification. Appl Environ Microbiol 49:1134–1141
24. Robertson GP, Tiedje JM (1987) Nitrous oxide sources in aerobic soils: nitrification, denitrification and other biological processes. Soil Biol Biochem 19:187–193
25. Shoun H, Kim D-H, Uchiyama H, Sugiyama J (1992) Denitrification by fungi. FEMS Microbiol Lett 94:277–281
26. Skiba U, Ball B (2002) The effect of soil texture and soil drainage on emissions of nitric oxide and nitrous oxide. Soil Use Manage 18:56–60
27. Stevens RJ, Laughlin RJ, Burns LC, Arah JRM, Hood RC (1997) Measuring the contributions of nitrification and denitrification to the flux of nitrous oxide from soil. Soil Biol Biochem 29:139–151
28. Wang,Y.Y.,Hu,C.S.,Ming,H.,Zhang,Y.M.,Li,X.X.,Dong,W.X.,Oenema,O.,2013.Concentration profiles of CH4, CO2 and N2O in soils of a wheat–maize rotation ecosystem in North China Plain,measured weekly over a whole year, Agric. Ecosyst. Environ., 164, 260–272.
29. Wrage N, Velthof GL, van Beusichem ML, Oenema O (2001) Role of nitrifier denitrification in the production of nitrous oxide. Soil Biol Biochem 33:1723–1732

THE CONCEPT OF ROOFTOP AGRICULTURE, WHAT HINDERS ITS DEVELOPMENT IN UKRAINE?

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ABSTRACT

The pilot projects of the developed countries show that urban agriculture and rooftop agriculture (RTA) specifically, have plenty of benefits and might be an efficient way to reduce an environmental damage due to the elimination of food transportation, to increase resilience and food security a city, mitigate the effects of climate change etc. Thus, urban agriculture is multifunctional and produces more than just food. It also plays a role in waste recycling, community building, education and learning, landscaping and enchanting of environment. However, despite all mentioned benefits, rooftop agriculture remains new and hence underdeveloped concept in the countries of Eastern Europe and in Ukraine specifically. Therefore, the presented study addresses the issue of determining the main possible constraints, which hinder the development and dissemination of the rooftop agricultural projects in Ukraine. The research showed that most of the negative effects that hinder the development of urban agriculture are related to political and legislative problems. Therefore, we assume that by slight modification of several legislative documents and creation a local "environmental development" offices will contribute to the elimination of most of these predicaments that are currently limit the growth of RTA projects in Ukraine.

Keywords: *Urban agriculture, rooftop farming, agriculture, sustainable development*

INTRODUCTION

According to a UN DESA report, "World Population Prospects: The 2015 Revision," the current world population of 7.3 billion will reach 8.5 billion in 2030, 9.7 billion in 2050, and 11.2 billion in 2100. At the same time, China and India will remain the two largest countries in the world, each with more than 1 billion people, each with growing megacities and representing 19 and 18 % of the world's population, respectively.

Moreover, according to Despommier by the year 2050, the earth's human population will have increased by around three billion and 80% will live in urban centres [7]. Therefore, the relevance of increasing of food production in terms of growing world population is unquestionable among the researchers.

Taking into account fact that urban population having surpassed the rural one [3], growing urban population will might make big cities more vulnerable to the fluctuation of food availability and less food secure in a long run.

Therefore, in order to eliminate such risks, there is a growing need for developing new approaches to agriculture and farming. One of the concepts, which can contribute to the elimination of before mentioned risks, could be an urban agriculture (UA) which includes TRA.

The high value of the RTA concept could be illustrated by the fact that, one of the greatest unused resources or capacities of cities are flat roofs, especially in denser and inner-city areas where other growing spaces may be lacking or polluted and city space is generally quite expensive.

For example, according to Amsterdam Rooftop Solutions, in the Dutch capital alone the available rooftop space is 12 km2 (www.smart-circle.org [9]). Moreover, MacRae et al. (2010) identified [10] the need for 1243 ha of rooftop growing space to meet the target of providing 10% of Toronto's fresh vegetable supply or about 25% of the rooftop space theoretically identified earlier by researchers [12].

Therefore, plenty of research shows that urban agricultural practices can be increasingly beneficial for the sustainable development of big cities in terms of the trend of constant growth of the urban population.

However, despite the fact that in the developed countries the concept of UA and RTF had proved its efficiency and becoming more and more popular among researchers, local government and the society, countries of Eastern Europe, such as Ukraine, for example, facing lack of theoretical and practical research regarding this topic. Following fact makes this article important in terms of identifying the possible constraints which hinder the research and practical implementation of RTA projects into real life.

OVERVIEW OF ROOFTOP AGRICULTURE

Rooftop agriculture has a large variety of stakeholders which, apply a high diversity of production systems and technologies. In this part we will give a brief overview of the various types of rooftop agriculture practices that have been developed over the last decade in cities around the world, illustrating by the large variety in growing spaces used and by the different types of stakeholders involved (including individual households, community groups, small entrepreneurs, nongovernmental organisations, educational institutes, larger businesses, real estate companies) and the different aim that may lie behind the installation of a rooftop garden or farm, ranging from bringing a neighbourhood together through a productive social space, to increasing food security for a financially challenged family or community, to generating a environmental and financial return that can be sustained over time.

Rooftop agriculture has a great variety of forms and technologies which they use (Figure 1), from growing vegetables and herbs in bins or containers on a terrace to more farm-like expanses that use an engineered lightweight soil-applied directly on top of a soil-ready roofing surface, to using simple or more advanced hydroponic systems in the open air or in greenhouses. Moreover, some roofs are fairly closed off to visitors while others are purposely designed to be accessible to the public. Figure 1 gives a short classification of the diversity among the types of rooftop agriculture.

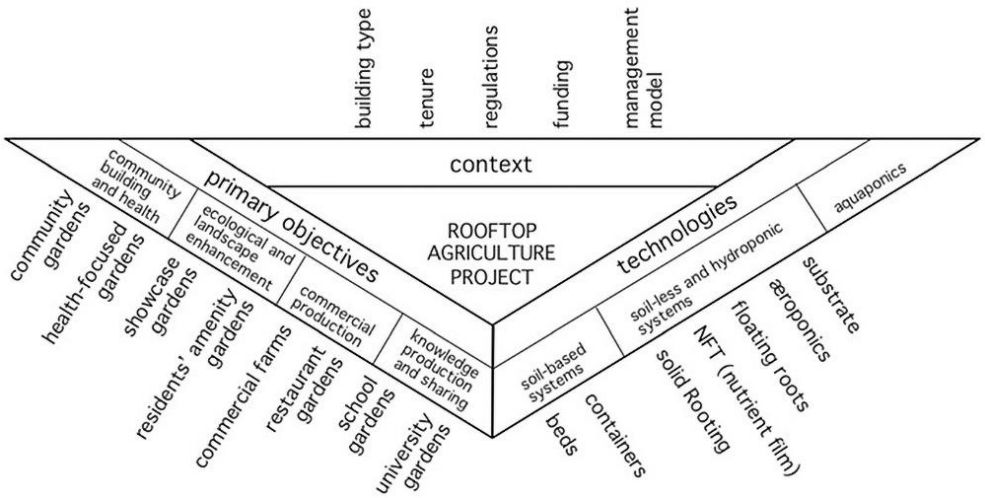

Figure 1. A classification of rooftop agriculture types

[Source: A Panorama of Rooftop Agriculture Types Joe Nasr, June Komisar, and Henk de Zeeuw (2017) [1]]

Therefore, it will be given short description each main RTA projects types regarding their primary objective.

Community Building and Health

Some rooftop agriculture projects are developed to meet social functions as their main objective. These projects contribute to such as food literacy, eco-education and community building initiatives, providing jobs and meaningful work for the disadvantaged and enhancing their access to nutritious food, and more. In such projects, food production is mainly a means to a social end and productivity or profitability is not a primary aim. Produce may be distributed among the participants or sold to enable the sustainability of the garden but the main goal is to create a stronger, healthier community [1].
In other words, the rooftop is starting to be seen as a potential community space, serving as a platform for many community-building activities, including outreach, education, socializing, and other purposes. At the same time, other social housing projects emphasise rooftop gardens that connect to particular populations with special needs or vulnerabilities.
In some cases, health is the primary focus for rooftop gardens, especially for gardens that are placed on buildings used specifically for health-related purposes. The main objective nowadays is more connected to horticultural therapy than to the production of medicinal herbs – especially as studies have increasingly shown the strong relationship between healing and greenery.
Finally, gardening is starting to be seen as an amenity in work environments. Providing workers with areas to grow food to supplement their income has an older history and is still applied, especially in developing countries.

Commercial Production

The next type of RTA projects is forms of rooftop agriculture that produce for the market in order to generate income as their main objective. The scale of the farms as well as the technologies applied may vary broadly. At the same time, such farms may have additional secondary functions (e.g. education, events, green building certification, etc.). However, despite the variety of other functions may be present, the profitability of the activity is an overarching objective with these cases. This type combines small, medium and large enterprises which aim is obtaining profit as well as another special type of commercial rooftop gardens, which is the farm-to-table model, for example, it can be a restaurant, hotel or shop, which deploy RTA to satisfy its own needs [1].

Ecological and Landscape Enhancement

A number of rooftop agriculture projects are created as part of the eco-design of the building to contribute to its sustainability (some even obtained certification for it) or as an attractive green context for a hotel, restaurant, or other public space. The productive side of the garden is secondary to its ecological or landscaping function, although products may be used in a hotel restaurant or enterprise canteen, or used by its staff who take home some fresh food. Across these cases, environmental quality – in terms of ecology and/or aesthetics – is fundamental [1].

Knowledge Production

In today's cities, given the limited access to space, the use of rooftop spaces for generating and sharing knowledge about food growing is becoming increasingly common. Whether a school lacking a yard to teach children where food comes from, or a university seeking to provide a

laboratory for research on growing conditions in cities, or a non-profit organization wishing to provide outreach to improve cultivation practices, the roof is often used as a place for knowledge production. Thus, this type of RTA projects combines rooftop farms for the research as well as for educational purposes [1].
Overall, there is a great variety of types of rooftop agriculture that have been created until now, with different stakeholders and different objectives. They make use of many varied opportunities to create spaces for urban rooftop agriculture. Moreover, many rooftop gardens and farms have one or more secondary objectives in addition to their main one such as production plus education, building sustainability or edible landscape plus food for the customers, production for the market plus social aims, engineering plus education. Hence, multi-functionality is the norm in rooftop agriculture.
Talking about Ukrainian RTA development, we can state that, unfortunately, there is a limited number of successful implementation of such projects. In the capital of Ukraine, Kyiv, there are few examples of rooftop gardens, which are predominantly aimed at adding value to the real estate through the landscape and ecological enhancement of the rooftop. At the same time, there are few examples of using roofs by cafes and restaurants, where plants ate used as a way to improve landscape attractiveness. However, we could not find any real examples of roof utilising with agricultural production and/or educational purposes.

BENEFITS OF ROOFTOP FARMS

According to the "The 2030 Agenda for Sustainable Development" by the UN, in order to contribute to the sustainable development of the megapolis, urban agriculture should be advantageous in three main spheres: environmental, economic and social. Therefore, in order to be sure that the concept of urban agriculture might possibly contribute to the establishment of the sustainable development it will be evaluated the possible influence of RTA on the each of the main sphere of sustainable development.

Social sphere

Advantages:

- *Food security*. Food security can be enhanced as UA provides new areas for food production. Users of private and community gardens highlight increased access to healthy and local food, lowering their food expenses [5]. However, the actual production quantity can be limited due to a lack of agricultural knowledge among participants or limited space in the gardens.
- *Health improvement*. The health of community members, including mental and physical health, can be enhanced through the UA. Because of engagement in gardens, can improve participants' diets by increasing vegetable and fruit consumption [6].
- *Environmental resilience*. Urban farms and gardens also form a part of a city's green infrastructure and, as such, they can be part of a city's strategy for environmental and social resilience [11]. UA can reduce urban heat island effects and absorb rainwater, thereby reducing combined sewer overflow, and, through the filtering effects of vegetation, can improve local air quality.
- *Education/research*. Some projects combine food production with educational and training programs. The provision of environmental services depends on crop management and agrobiodiversity.
- *Aesthetic.* This type of RTA is mostly used to add value to existing food businesses (e.g., restaurants, cafes). It has benefits similar to commercial projects.

Disadvantages:

- *Access to the roof*. RTA may also be less physically accessible to community members that are in-ground farms and gardens. Moreover, community gardens on public land are often required to hold open hours for non-gardeners to enjoy the space

Economic sphere

Advantages:

- *Commercial.* RTA refers to for-profit projects. By producing and selling food products, commercial RTA contributes to local community development in terms of job creation and economic growth. Due to its high productivity, it can contribute to food security and access to healthy food, although product prices determine the affordability and thereby the target consumers (i.e., low-income; middle/upper income) [2].
- *Reducing heating and cooling costs*. In the short-term, savings can be achieved in heating and cooling costs because the layer of vegetation provides insulation to the building. The green roof acts as thermal mass keeping the internal temperature of the building relatively constant. It keeps the building cool in the hotter months and warm in the cooler months minimizing the dependence on HVAC systems [11].
- *A minimisation of logistic costs*. Due to the fact that TRA conceptually concentrated inside cities this makes long-distance transportation of crops unnecessary, and thus, decrease the costs of production and environmental damage caused by transportation.

Disadvantages:

- *Costs and access to funding*. The costs of building and maintaining intensive rooftop farms can be prohibitive and outweigh the cost of the construction of the same structure out of the city.
- *Inefficiency in northern climates*. Construction of the roof greenhouses may be economically and environmentally inefficient in northern climates. [4].

Environment sphere

Advantages:

- *Biodiversity*. Rooftop farming can contribute to urban biodiversity in terms of providing habitats and creating an urban green network. In addition, the cultivation of plants on roofs can provide places where wild animals and plants can survive and reproduce [8].
- *Energy efficiency*. The implementation of gardens on the roofs of buildings can have a positive global impact effect from an energetic perspective. At the city scale, the introduction of new spaces for vegetation can reduce the Urban Heat Island (UHI) effect [13].
- *Efficient water utilisation*. Current practices reduce water consumption by using rainwater harvesting systems and the building's greywater for irrigation purposes. These two sustainable strategies are of particular interest in urban agriculture since using drinking water for food production can be prohibited by law and can result in an expensive input [15].
- *Climate change mitigation*. The use of non-renewable energy sources in transportation is one of the leading causes of greenhouse gas emissions, which contribute to climate change. The current environmental situation urges society to minimize the causes of climate change. For example, in the last COP21 in Paris (France) some "climate change

mitigation goals" were established. Within the food industry, globalization and the development of transportation technologies have led to the enlargement of distances between production and consumption [2].

Disadvantages:

- *Inefficiency in northern climates*. Construction of the roof greenhouses may be economically and environmentally inefficient in northern climates. [4].

Overall, it can be summarised that roof agriculture has both advantages and disadvantages in terms of sustainable development efficiency. However, in a favourable conditions, rooftop agriculture can be much more environmentally and socially beneficial for the big cities than conventional agriculture. Nevertheless, each RTA project should be evaluated individually because of a big variety of factors, which ultimately might influence the economic, social and environmental output of each project.

CONSTRAINTS OF RTA DEVELOPMENT IN UKRAINE

Having reviewed the potential efficiency of rooftop farming in terms of sustainable development let us evaluate possible constraints, which might hinder the development of RTA projects in Ukrainian cities.
In order to make our research more comprehensive, PEST analysis will be used to identify the specific problems of every major sphere (political, economic, social, technological), which might inhibit the spreading of RTA projects in Ukraine. Finally, it will be given a suggestions and recommendations on how to eliminate such problems in future.

Political factors

The absence of a specific policy related to RTA projects. Currently, there is no direct and implicit law or regulations, which support or restrict the activity of rooftop agriculture in Ukraine. However, there are numbers of regulations, which might influence the development of RTA projects explicitly. For example, according to the "National building safety standards" of Ukraine [14] it is not allowed to create permanent constructions on the roofs without getting an allowance from the specific government institution. Therefore, due to the bureaucracy, this process can take a long time, which can discourage potential investors of RTA projects.
Living multi-flat houses do not always have an official legal representative. In order to be successfully implemented, RTA projects need to be agreed among all of the stakeholders, which include not only local government but also people, which live or work in a house, on which might be constructed roof farm. Therefore, projects need to be officially accepted by the official representative of a house. However, currently, not all multi-flat houses in Ukraine have an official representative due to the transformation processes Ukrainian legislative system in this sphere.
An absence of financial government support. Due to the complicated economic situation, local authorities have very limited financial resources to co-finance public projects like RTA. Currently, energy efficiency projects are more popular among the local government due to the scarce of energy resources.

Economic factors

High initial investments. The construction of an intensive rooftop farm is a cost-intensive process. There is some evidence that the construction of the rooftop greenhouse might cost up to 2 times as much as the construction of a conventional greenhouse [2]. Even though, that the final product might be cheaper than from the traditional greenhouse. This initial investment expensiveness might discourage the potential investors of RTA projects, which are aimed at an economic efficiency of the project.
High interests rate. The interest rates in Ukrainian banks might be high. Currently, the interest rates for the enterprises estimated as around 20% annually, which make the achievement of economic efficiency of RTA projects even more complicated.
Economic efficiency needs further research. As it was mentioned earlier, the high economic output might be questionable in the cities, which are located in northern climates. This makes the necessity of the more detailed evaluation of the possible economic effects of commercial RTA projects in the climate conditions of Ukraine. However, it is complicated to make accurate calculations based only on the theoretical data without any practical realisation of a rooftop farm.

Social factors

Low awareness about RTA. The concept of rooftop farming is completely new to the most part of the Ukrainian population, which mean that society might be unaware of multiple possible benefits of RTA for the wellbeing of the urban population. This fact makes important organising the informational campaign to promote the concept of urban agriculture.
Lack of communication between stakeholders. As it was mentioned, implementation of the RTA projects involves a big variety of stakeholders (including individual households, community groups, small entrepreneurs, nongovernmental organisations, educational institutes, larger businesses, real estate companies etc.), all of which participate in the project, to the certain extent. Therefore, for achieving good results it is crucially important to enable an effective communication among stakeholders, which can be complicated without the support of the local government.
RTA might seem too futuristic for the conservative citizens. Due to the fact, that the concept of RTA is new to Ukrainian citizens, some of them might be afraid of the potential safety and other risks associated with rooftop farming.

Technological factors

The absence of previous construction experience. Due to the fact, that the concept of RTA projects might be new to the local construction companies and equipment producers, the possibility of fast and quality installation of all necessary production facilities might be questionable. Moreover, there is a high probability that for implementation of the RTA project it will be necessary to import some production equipment from abroad and/or use foreign engineering services.
Overall, it could be mentioned that there are various types of issues, which may hinder the development of the RTA projects in Ukraine. However, most of them are related to political and legislative problems. Therefore, we assume that by slight modification of several legislative documents and organising of the information campaign will eliminate most of the predicaments that are currently limit the growth of RTA projects in Ukraine.

SUGGESTIONS

Having considered all factors, which might influence the dissemination of rooftop farms in Ukraine we can suggest several steps, that might eliminate these negative factors and contribute to the further development of the RTA projects in Ukraine.

- The government should support at least one RTA project, which can be used for a social and educational purpose. At the same time, this pilot project will allow researchers to study the economic and environmental efficiency of rooftop farms in terms of Ukrainian climatic conditions on a practical basis. For example, such project could probably be made on the roof of agricultural university of Kyiv (NULES), which will allow using rooftop farm in educational as well as scientific purposes.
- The government should decrease the amount of unnecessary bureaucracy regarded to the safety regulations and city planning, in order to allow local authorities to alleviate the procedure of safety inspection and ultimately to accelerate the process of obtaining necessary documents for the RTA projects implementation.
- Local authorities might create specific “city green office”, which might possibly co-finance and help potential investors to implement all kinds of environmental projects on the local level. Moreover, this office might develop the informational campaign in order to promote advantages and benefits of implementation of environmental projects on the local level. Finally, the last but not the least, this office could work as an intermediary among all stakeholders of environmental projects (figure 2). This will significantly alleviate and accelerate the implementation of all kinds of environmental projects including RTA.

Figure 2 Communication scheme among the stakeholders of RTA project
Source: own edition (2018)

CONCLUSIONS.

This article provides an overview and classify the main types of RTA projects. It can be concluded that most of rooftop gardens and farms have one or more secondary objectives in addition to their main one. Thus, multi-functionality is the norm in rooftop agriculture.
Secondly, it was given an overview of the potential positive and negative consequences of RTA projects in terms of sustainable development, which can be applicable to Ukrainian circumstances. Hence, it was evaluated three main spheres, which can be influenced by rooftop farms: economic, social and environmental. It can be concluded, that in a favourable conditions

RTA can be much more environmentally and socially beneficial for the big cities than the conventional agriculture. However, each RTA project should be evaluated individually because of a big variety of factors, which ultimately might influence the efficiency of each project.
Finally, it was analysed all the possible factors, which can have a negative effect on the development of RTA projects in Ukraine. Most of these negative effects are related to political and legislative problems. Therefore, we assume that by slight modification of several legislative documents and organising of the information campaign will eliminate most of the predicaments that are currently limit the growth of RTA projects in Ukraine.

REFERENCES

1. A Panorama of Rooftop Agriculture (2017) Types Joe Nasr, June Komisar, and Henk de Zeeuw
2. An environmental and economic life cycle assessment of rooftop greenhouse (RTG) implementation in Barcelona, Spain. Assessing new forms of urban agriculture from the greenhouse structure to the final product level (2014))
3. Batty M (2015) Cities in a completely urbanised world. Environ Plan B abstract 42:381–383
4. Benjamin Goldstein a, *, Michael Hauschild a, John Fernandez b, Morten Birkved Testing the environmental performance of urban agriculture as a food supply in northern climates (2016)
5. Carney M (2011) Compounding crises of economic recession and food insecurity: a comparative study of three low-income communities in Santa Barbara County. Agric Hum Values 29(2):185–201
6. Centrone SM, Humphries D, Kline R (2014) Investigation of an urban farm intervention for a low-income Hispanic population with multiple risk factors for diabetes
7. Despommier D (2010) The vertical farm: feeding the world in the 21st century. St. Martin's Press, New York
8. Francesca Bretzel, Francesca Vannucchi, Stefano Benvenuti, and Heather Rumble Biodiversity of Flora and Fauna City Resilience to Climate Change Teodoro Georgiadis, Ana Iglesias, and Pedro Iglesi
9. http://www.smart-circle.org/smartcity/blog/smart-city-event-2015-smart-sightseeing/
10. MacRae R, Gallant E, Patel S, Michalak M, Bunch M, Schaffner S (2010) Could Toronto provide 10% of its fresh vegetable requirements from within its own boundaries? Matching consumption requirements with growing spaces. J Agric Food Syst Community Dev 1(2)
11. McPhearson T, Hamstead Z, Kremer P (2014) Urban ecosystem services for resilience planning and management in New York City
12. Nasr J, McRae R, Kuhns J (2010) Scaling up urban agriculture in Toronto-building the infrastructure. Metcalf Food Solutions, Toronto
13. Resource Efficiency and Waste Avoidance Esther Sanyé-Mengual, Joan Rieradevall, and Juan Ignacio Montero
14. Thomaier S, Specht K, Henckel D et al (2015) Farming in and on urban buildings: present practice and specific novelties of Zero-Acreage Farming (ZFarming)
15. ПЛАНУВАННЯ І ЗАБУДОВА МІСЬКИХ І СІЛЬСЬКИХ ПОСЕЛЕНЬ ДБН 360-92

THE SOURCES OF FINANCE TO SMALL AND MEDIUM ENTERPRISES'S IN GHANA

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ABSTRACT

It is believed that access to financial resources is a major concern for small and medium enterprises in Ghana. Hence, small and medium businesses face a major challenge in their quest for growth and development.
A major barrier to rapid development of the SME sector is a shortage of both debt and equity financing. This paper provides a review of SME financing in Ghana. Specifically, the paper covers the following, a review of the various schemes of financing and initiatives and funding mechanisms of SMEs.
The study sought to evaluate the funding arrangements or sources available to small and medium enterprises in the Ghana. A descriptive survey design was used for the study, and data were obtained from 20 operators and 20 financiers of small and medium enterprises, using questionnaires.
The study established that personal savings was the main source of start-up fund for the small and medium enterprises. Further, inadequate working capital and low patronage of services were the main challenges faced by the small and medium enterprises.
Even though there are various forms of formal financing available to SMEs, In Ghana the formal financial institutions led by the commercial banks and other traditional sources of credit have always considered SMEs as a greater risk than larger companies, and respond by adopting anti-risk measures like charging higher interest rates or demanding landed collateral security. This makes it more and more difficult or almost impossible for many SMEs to effectively borrow from banks where the price of credit is too high.
In spite of the numerous sources of start-up fund available to small and medium enterprises in Ghana, these businesses principally relied on personal savings as their mainstay. Therefore, it is recommended that the Government of Ghana should encourage small and medium enterprises in Ghana and more government financial schemes.

Keywords: *Debt and Equity Financing, Small and Medium Enterprises, Personal Savings. Working Capital*

INTRODUCTION

Background of the Study

Small and medium-sized enterprises (SMEs) are the backbone of economies in advanced industrialized countries, as well as emerging and developing countries, as they are a key source of economic growth, innovativeness, and poverty reduction. SMEs constitute the dominant form of business organization, accounting for over 95% and up to 99% of enterprises depending on the country (Aryeteey, 2008).
Small and medium sized enterprises in both developing and play important roles in the process of industrialization and economic growth, by significantly contributing to employment generation, income generation and catalyzing development in urban and rural areas.

In spite of the significant role SMEs play in socio-economic development of developing countries in general and Ghana specifically, the sector continues to be plagued with a myriad of challenges such unstable government policies, gross under capitalization, high operating costs, lack of clear cut government support and assistance, and difficulty in assessing credit from financial institutions and banks (Aryeteey, 2008).

Having access to finance gives SMEs the chance to develop their business and to acquire better technologies for production, therefore ensuring their competiveness. However, there is a huge challenge for SMEs globally when it comes to sourcing for initial and expansion capital funds from traditional commercial banks. The situation is even dire in developing countries and in Ghana in particular where, access to and cost of credit is so prohibitive.

In Ghana the formal financial institutions led by the commercial banks and other traditional sources of credit have always considered SMEs as a greater risk than larger companies, and respond by adopting anti-risk measures like charging higher interest rates or demanding landed collateral security. This makes it more and more difficult or almost impossible for many SMEs to effectively borrow from banks where the price of credit is too high. If entrepreneurs cannot gain access to finance through the regular system or more 'bigger' banks, they may find it extremely difficult to start up a business or may simply go out of business, which represents a potential loss to the economy. The alternative left for such entrepreneurs may be to abandoned the formal system altogether and operate in the informal economy.

Research Objectives

The general objective of this study is to determine the sources of finance available to small scale and medium size enterprises.

The specific objectives of the study include:

i. To determine the sources of finance of the SMEs in Ghana.
ii. To examine the type of products and services of financial institutions offer o SMES in Ghana.
iii. To assess the challenges of SME in lending practices by financial institutions.
iv. To make recommendations on improving lending to SMEs by financial institutions.

Research Questions

The specific objectives of the study include:

i. What are the sources of finance of the SMEs in Ghana?
ii. What are the types of products and services of financial institutions offer to SMES in Ghana?
iii. What are the challenges of SME in lending practices by financial institutions?
iv. Are there recommendations on improving lending to SMEs by financial institutions?

Significance of the Study

It is undeniable fact that SMEs play a major role in the socio-economic development of the country in promoting economic growth and poverty reduction. Extensive research has been carried out in this area of SME financing because of the peculiar role they play in the economy. Accessing financing through the informal or formal sector has always been a challenge for most SME operators. In the light of the difficulties encountered by entrepreneurs in obtaining credits from especially the commercial banks as indicated by several studies, it would be interesting to investigate how the recent upsurge in financial intermediaries in Ghana; particularly the non-bank financial institutions have served as an alternative source of funding for SME business

operations and to what extent they have helped bridged the financing gap for many SMEs. The study is important as it is going to provide valuable information on how SMES are financed in Ghana.

Limitations of the Study

In an attempt to undertake this research work, certain problems were encountered which are worth mentioning.
The first constraint was financial aspect, being the cost of transportation, printing, typing and other related costs. Also, there was a problem of easy accessibility and availability of books. It was very difficult coming by information. However, the researcher was able to get some information.
Some of the problems encountered in data collections were the inability of the respondents to complete or provide full information on some questions posed, especially the few opened ended questions. The low level of literacy among some respondents might have accounted for this trend and thus made the administration of the questionnaire time consuming

Organization of the Study

The study is presented in five chapters:
Chapter 1 shows briefly, background and general introduction to the study, objectives and the questions of the study. Chapter 2 takes a look at the theoretical framework and review of literature relevant to objectives and topic of the study, particularly the financial sector in Ghana. The role and the importance of SMEs in Ghana's economy, the formal financial sector of the Ghanaian economy.
Chapter 3 gives an explanation of the research process and the methodology employed for collecting and analyzing data. Chapter 4 deals with analyses and discussion of the data and a presentation of research findings. Chapter 5 presents a summary as well as conclusions and recommendations of the study.

LITERATURE REVIEW

Introduction

Small enterprises and most the poor population in sub-Saharan Africa have very limited access to deposit and credit facilities and other financial services provided by formal financial institutions. For example, in Ghana only about 5-6% of the population has access to the banking sector (Basu et al 2004). Banks are generally reluctant to give credit, especially to those starting a business without proper collateral. Small businesses are being denied credit due to insufficient guarantee or perceived risks. So there are limited options when it comes to sources of finance of SMES.
Traditionally, commercial banks have shunned the microfinance sector, allowing it to be dominated by the 'Alternative Financial Institutions' which consist of small savings and loans companies and susu collectors. Most of SMES funded by these alternatives.

Meaning and Definition of Small and Medium Scale Enterprise

Different authors have usually given different definitions to this category of business.
The most commonly used and now accepted criteria for defining SMEs are the number of employees and the asset value.

The European Commission (EC) defines SMEs largely in term of the number of employees as follows:

1. Firms with 0 to 9 employees–micro enterprises;
2. 10 to 99 employees–small enterprises;
3. 100 to 499 employees–medium enterprises.

Thus, the SME sector is comprised of enterprises (except agriculture, hunting, forestry and fishing) which employ less than 500 workers. In effect, the EC definitions are based solely on employment rather than a multiplicity of criteria. Secondly, the use of 100 employees as the small firm's upper limit is more appropriate, given the increase in productivity over the last two decades (Storey, 1994).

Finally, the EC definition did not assume the SME group is homogenous; that is, the definition makes a distinction between micro, small and medium-sized enterprises.

Weston and Copeland (1998) hold that definitions of size of enterprises suffer from a lack of universal applicability. In their view, this is because enterprises may be conceived of in varying terms. Size has been defined in different contexts, in terms of the number of employees, annual turnover, industry of enterprise, ownership of enterprise, and value of fixed assets.

For example, (Aryeteey, 2008) considers small and medium businesses as privately held firms with 1 – 9 and 10 – 99 people employed, respectively.

The Ghanaian definition

There have been various definitions given for small scale enterprises in Ghana but the most commonly used criterion is the number of employees of the enterprise (Kayanula and Quartey, 2000). In applying this definition, confusion often arises in respect of the arbitrariness and cut off points used by the various official sources. In its industrial statistics, the Ghana Statistical Service (GSS) considers firms with fewer than 10employees as small scale enterprises and their counterparts with more than 10 employees as medium and large size enterprises. Ironically, the GSS in its national accounts considered companies with up to 9 employees as SMEs (Kayanula and Quartey, 2000).

The value of fixed assets in the firm has also been used as an alternative criterion for defining SMEs. However, the National Board for Small Scale Industries (NBSSI) in

Ghana applies both the International Research Journal of Finance and Economics – Issue

"Fixed asset and number of employees" criteria. It defines a small scale enterprise as a firm with not more than 9 workers, and has plant and machinery (Excluding land, buildings and vehicles) not exceeding 1,000 Ghana Cedis. The Ghana Enterprise Development Commission (GEDC), on the other hand, uses a 1,000 Ghana Cedis upper limit definitions for plant and machinery.

It is important to caution that the process of valuing fixed asset poses a problem. Secondly, the continuous depreciation of the local currency as against major tradition currencies often makes such definitions outdate (Kayanula and Quartey, 2000).

In defining small scale enterprises in Ghana (Steel and Webster 1991, Osei et el 1993) used an employment cut off point of 30 employees. (Osei et el 1993), however, classified small scale enterprises into three categories, these are:

i. Micro–employing less than 6 people;
ii. Very small–employing 6 to 9 people;
iii. Small–between 10 and 29 employees.

A more recent definition is the one given by the Regional Project on Enterprise Development Ghana manufacturing survey paper. The survey report classified firms into:

i. Micro enterprise, less than 5 employees;
ii. Small enterprise, 5-29 employees;
iii. Medium enterprise, 30–99 employees
iv. (iv)Large enterprise, 100 and more employees.

Characteristics of SMEs in Ghana

SMEs in Ghana can be categorized into urban and rural enterprises. The former can be sub divided into organized and unorganized enterprises; the organized ones tend to have paid employees with a registered office whereas the unorganized category is made up of artisans who work in open spaces, temporary wooden structures, or at home and employ little or in some cases no salaried worker, they rely mostly on family members or apprentices.

Rural enterprises are largely made up of family groups, individual artisans, women engaged in food production from local crops. The major activities within this sector include; manufacturing of soap and mining, making of bricks and cement, beverages, food processing, bakeries, wood furniture, agro processing, chemical based products and mechanism (Osei et al 1993; World Bank 1992).

It is interesting to note small scale enterprise make better use of scarce results than large scale enterprise. Research in Ghana and many other countries have shown that capital productivity is often higher in SMEs than is the case with the large scale enterprise (LSEs) (Steel 1977; Child 1971). The reason for this is not difficult to see; SME's are labour intensive with very small amount of capital invested.

Thus it has been argued that promoting the SME sector in developing countries will create more employment opportunities, lead to a more equitable distribution of income and will ensure productivity with better technology (Steel and Webster 1991).

Importance and Significance of SMEs

Small and medium enterprises contribute greatly to the social and economic development of Ghana. Amongst the several benefits that SMEs bring to the national economy in general society as a whole are the following:

1. SMEs have been recognized as the engines through which the growth objectives of developing countries can be achieved. They are potential sources of employment and income in many developing countries, (OECD, 1997). In Ghana they employ an estimated 70-80% of the active labour force, and close to 99% in the rural agricultural sector.
2. SME's seem to have advantages over their large-scale competitors in that they are able to adapt more easily to market conditions, given their broadly skilled technologies. They are able to withstand adverse economic conditions because of their flexible nature.
3. They also improve the efficiency of domestic markets and make productive use of scarce resource, thus facilitating long-term economic growth (Kayanula and Quartey, 2000).
4. SME's are more labour intensive than larger firms and therefore have lower capital cost associated with job creation.
5. SME's contribute to a national product by either manufacturing goods of value, or through the provision of services to both consumers and/or other enterprises. This

encompasses the provision of products and, to a lesser extent, services to foreign clients, thereby contributing to overall export performance.

6. SME's provide job opportunities for the people especially the youth within the area in which they operate and therefore minimize social and upheavals and unrest especially among the youth.
7. SME's are likely to succeed in smaller urban centres and rural areas. This helps to slow the flow of migration to large cities.

Sources Finance for Small and Medium Enterprises.

One way of categorizing the sources of finance for a start-up is to divide them into sources which are from within the business (internal) and from outside providers (external).

Internal Sources of Funds

The main internal sources of finance for a start-up are as follows:

Personal Sources – These are the most important source of finance for a start-up. This can be personal savings or other cash balances that have been accumulated. It can be personal debt facilities which are made available to the business. In particular savings and other "nest-eggs are a form of savings where entrepreneurs will often invest personal cash balances into a start-up. This is a cheap form of finance and it is readily available.
Often the decision to start a business is prompted by a change in the personal circumstance of the entrepreneurs – e.g. redundancy or an inheritance. Investing personal savings maximizes the control the entrepreneurs keep over the business. It is also strong signal of commitment to outside investors or providers of finance. Re-mortgaging is the most popular way of raising loan related capital for a start-up. The way this works is simple. The entrepreneurs take out a second or large mortgage on private property then invest some or all of this money into the business. The use of mortgaging like this provides access to relatively low-cost finance, although the risk is that, if the business fails, then the property will be lost too.

Borrowing from Family and Friends - Friends and family who are supportive of the business idea provide money either directly to the entrepreneur or into the business.
This can be quicker and cheaper to arrange (certainly compared with a typical or standard bank loan) and the interest and repayment terms may be more flexible than a bank loan.
However, borrowing in this way can add to the stressed face by the entrepreneur, particularly if the business faces difficulties.

Retained Profits – This is the cash that is generated by the business when it trades profitably – another important source of finance for any business, large or small. For example, a start-up sells the first batch of stock for say GH¢12,000.00 cash which it had bought for GH¢10,000.00. This means that retained profits are GH¢2,000.00 which can be used to finance further expansion to pay for other trading cost and expenses.

Share Capital Invested by the Entrepreneur – the founding entrepreneur may decide to invest in the share capital of a company, founded for the purpose of forming the start up. This is a common method of financing a start-up. The founder provides all the share capital of the company, retaining 100% control over the business. The entrepreneur maybe using a variety of personal sources to invest in shares. Once the investment has been made, it is the company that

owns the money provided. The shareholder obtains a return on this investment through dividends (payments out of profits) and/or the value of the business when it is eventually sold.

External Sources of Funds

The commonest form of external funds available to businesses is loan capital or debt. This can take several forms, but the most common are a bank loan or bank overdraft.

A bank loan – provides a longer-term kind of finance or a start-up, with the bank stating the fixed period over which the loan is provided (e.g. 5 years), the rate of interest and the timing and amount of repayments.
The bank will usually require that the start-up provide some security for the loan, although this security normally comes in the form of personal guarantees provided by the entrepreneurs.
Bank loans are good for financing investment in fixed assets and are general at a lower rate of interest than a bank overdraft. However, they do not provide much flexibility. Bank overdraft is a more short term kind of finance which is also widely used by start-up and small businesses. An overdraft is really a loan facility the bank less the business "owe it money" when the bank balance goes below zero, in return for changing a high rate of interest. As a result, an overdraft is flexible source finance in the sense that it is only used when needed. Bank overdrafts are excellent for helping a business handle seasonal fluctuations in cash flow or when the business runs into short term cash flow problems.

Business Angels are the other main kind of external investor in a start-up company.
Business angels are professional investors who typical invest several thousands of cash funds. They prefer to invest in businesses with high growth prospects. Angels tend to have made their money by setting up and selling their own business –in other words they have proven entrepreneurial expertise. In addition to their money, angels often make their own skills, experience and contacts available to the company. Getting the backing of an angel can be a significant advantage to a start-up, although the entrepreneur needs to accept a loss of control over the business.

Venture Capital – is a specific kind of share investment that is made by funds managed by professional investors. Venture capitalists rarely invest in genuine start-ups or small businesses (their minimum investment is usually over £1m, often much more). They prefer to invest in businesses which have established themselves. Another term you may hear is "private equity" – this is just another term for venture capital. A start-up is much more likely to receive investment from a business angel than a venture capitalist.

METHODOLOGY

This chapter explains how questions of the research were answered, methods that were employed in the study, the target population, sample size and sampling techniques as well as the various and appropriate sources of data and how the data were collected.

Target Population

The population for this study included sampled 20 SME's operating in Ghana and 20 financial institutions in Ghana. The SME's were engaged in various activities including manufacturing, wholesaling, retail trade, services, transport, agribusiness, construction etc.

Sample Size

A total of 20 SME entrepreneurs operating in Ghana were contacted and selected for the research work. In all 18 out of the 20 questionnaires distributed were retrieved and used for the analysis. The SME operators were not necessarily clients of the specific financial institution 20 were sampled for the interview.

Data Sources

Information from both primary and secondary sources was collected. The primary sources of data were obtained through questionnaire administered to respondents.
Questionnaires were administered to SME operators across Ghana, municipal .Another set of questionnaire administered to the financial institution.
In addition to the questionnaires, interviews were also conducted.

Methods and Procedures Used For Obtaining Data

Purposive sampling was employed in this study as the researchers were constrained by resources and time.

Data Collection

Data for the research was collected mainly through the administration of well-structured questions to obtain adequate information to tackle the objectives set for the research.
Most of the questions were the closed-ended type designed to obtain accurate responses and make it easier for respondents to fill. Two types of questionnaire were administered.
One was administered to the SME operators and the other to the Savings and Loans Companies.

Data Analysis

Data collected from the field were analyzed using simple statistical tools including descriptive statistics. Microsoft Excel software was used to generate statistical data including percentages, bar charts and pie charts.

RESULTS AND DISCUSSION

This chapter focuses on the presentation of data analyzed. The discussion focuses on the analysis of data collected from the field results. The highlights include the demographic characteristics of SME operators, the business experiences, and their degree of awareness of the formal financial institutions. It will also discuss the type of financial products offered by financial institution, an analysis of the lending process for SME loans and the challenges in lending to SME's.

General Characteristics of SME Entrepreneurs in Ghana

The demographic characteristics discussed here include the age, gender, educational level and literacy status of entrepreneurs.
From Table 1, we can say that most the SME's in Ghana are dominated by people in their youthful age. Majority of respondents, about 50 percent were in their youthful age

Between 18 – 40 years old; 25% were in the 41 – 50 year range and only 25 were above 50 years. This indicates that entrepreneurship requires some amount of youthfulness and energy to be able to handle the difficult task in building businesses.

Table 1. Age of SME Operators Surveyed Ghana.

18 to 40 years	40 to 50 years	50 and above
10 respondents making up for 50 percent	5 respondents making up for 25 percent	5 respondents making up for 25 percent

Source: field study, October 2018

Most of the SME operators also happened to be males, who constituted about 75% of the Respondents and females formed 25%. The SME sector in Ghana, from our Research findings was dominated by males.

Table 2. Educational Background of Respondents

One (1) respondent	Nine (9)respondents	One (1) respondent	Six (6) respondents	Three (3) respondents
Basic school certificate (5%),	Secondary school education (45%),	Tertiary education (5%)	Vocational and technical (30%),	Post-graduate (15%).

Source: field study, October 2018

The educational training ranged from the basic school certificate (5%), secondary (45%), vocational and technical (30%), tertiary education (5%) and post-graduate (15%). Thus while majority had some level of education, there were still a sizeable illiterate business operators. The illiteracy level can have an effect on the performance, management and financial management skill of entrepreneur and also loan acquisition from banks.

4.3 Business Operating Experience/ownership of SME

From Table 3, it can be seen that majority of SME operators surveyed were sole proprietors (75%), followed by partnerships (10%) and the limited liability companies (5%). This result is typical of most SME in Ghana, where sole-proprietorship dominates.

Table 3. Ownership Structure/Legal Status

Sole Proprietorship	15 respondents	75%
Partnership	4 respondents	20%
Limited Liability	1 respondent	5%
Total	20	100%

Source: Field study, October 2018

Our research findings also showed that most of the respondents who had 2-5 years business or working experience were in the majority (50 %), followed by 6-10 years of operation (25%) and 11-20 years (15%). Only 10% of the respondents indicated they had operated as SME's entrepreneurs for more than 20 years.

Sources of Finance for SME's in Ghana

Finance is very important for SME businesses all over the world. However this has always been a challenge for most SME's especially in the developing countries. As a result many operators depend almost entirely on their own sources throughout the lifespan of the business, which makes them show slowed growth and sometimes total collapse. Research findings from the field as shown in Table 4.4, indicated that majority of SME operators in Ashanti Region (50%) used their personally savings as the major source of financing their businesses at the start-up stages, 10% depended on credit unions, 10% depended on banks and micro-finance institutions, whiles 25 % looked up to family members for support. Only 5% indicated that they looked for financial help from money lenders.

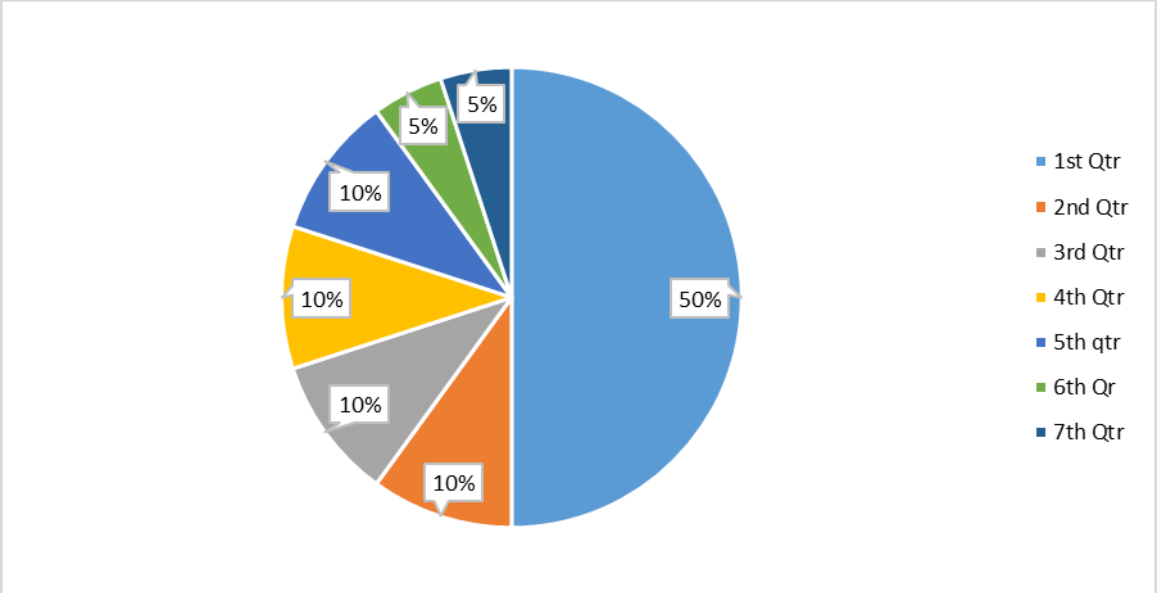

Figure 1. Various Sources of Funds of SMEs

Source: Field study, October 2018

Apart from personal sources of finance, we tried to find out the other sources that SME operators went to seek for funds. As deposited in Figure 4.6, it was realized that the other most important sources of funds for most SME operators were the micro-finance institutions including savings and loans companies, Credit Unions, Susu Companies and NGO's.

SUMMARYOF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

This part of research consists of conclusions and recommendations. The findings were those important issues about SME financing that were discovered through the analysis of the field data captured through the questionnaires administered. The conclusion deals with a summary of the entire research work. The recommendation was based on objectives set for this research and issues that were identified during the field work.

Summary of findings

In spite of the large employment and job creation capabilities, SME's are saddled with difficulties of financial crisis. It is the financing options that prompted this research. Fund has been hampering the operations of SME's .leaving some of them completely out of business or stagnant in growth.

Generally it can be stated that SME's are very important to the economic and social development of Ghana.
SME's in Ghana are dominated by sole proprietors, most operators are males and are in the youthful age of 18-40.
Most of the SME operators have between 2-10 years of business experience; more than 60% had registered their businesses and therefore are considered to be relatively formal.
The main source of finance for most SME in Ghana was personal finance. The alternative sources of funding for most operators were the S&L
Companies that provided similar products as those offered by the micro-finance institutions. They also depended on the credit unions as a good source of credit.
The major products offered by the Financial institutions were similar to those the traditional banks. They included ordinary savings, current and fixed deposits accounts. They also provided micro-finance and susu savings accounts of various kinds.

Recommendation

Based on the conclusions drawn from the research work, we make the following recommendation for the use of SME operators and financial institutions, policy makers and government.
SME's should be assisted to explore other sources of funding like the S&L
Companies where loan products and services tend to be relatively flexible.
Other sources of credit, like government finance schemes, where collateral security is not a major demand, should also be explored by SME's
To minimize risk and loan default from SMEs, it is recommended that financial institutions consider providing group lending to SMEs who agree to do so.

REFERENCES

1. Aryeetey, E., (1994), Financial Integration and Development in Sub-Saharan Africa: A Study of Informal Finance in Ghana, Overseas Development Institute, Working Paper 78, London.
2. Bank of Ghana, 2007. Bank of Ghana, (2007), A Note on Microfinance in Ghana, Working Paper WP/BOG-2007.
3. Basu et al (2000) identified the following factors that influence the decision to save.
4. Kayanula, D. and P. Quartey, (2000). "The Policy Environment for Promoting, Small and Medium-Sized Enterprises in Ghana and Malawi", Finance andDevelopment Research
5. Programme, Working Paper Series, Paper No. 15, IDPM, University of Manchester
6. Osei, T., (1993) the Non-Bank Financial Sector, the Ghanaian Banker.
7. Steel, W., Andah, D., (2003) Rural and Microfinance Regulation in Ghana: Implications for Development and Performance of the Industry, Africa Region Working Paper, and NO. 49 Washington; World Bank.
8. Steel, W. F. and L. M. Webster, (1991). "Small Enterprises in Ghana: Responses to Adjustment Industry", the World Bank Industry and Energy Department, Washington DC.
9. World Bank, 1999. World Bank–Africa Region, Studies in Rural and Micro Finance, Financial services for Women Entrepreneurs in the Informal Sector of Ghana, World Bank New York.

DIVERSITY MANAGEMENT AND THE EFFECT OF INCLUSIVE LEADERSHIP ON EMPLOYEES' PERFORMANCE

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ABSTRACT

Diversity and Inclusion is the most known concept in multinational Organizations in the world. Organizations continue to be challenged and enriched by the diversity of their workforces. Scholars are increasingly focusing on inclusion to enhance work environments by offering support for a diverse workforce. Moreover, inclusive leadership plays the main factor in implementing a successful inclusion policy in the workplace. Little is known about how leader's inclusiveness affect the performance, belongingness, engagement or even trust of the individuals in the organization. Therefore, the objective of this research is twofold First, demonstrating the role of Diversity and Inclusion in the workplace. Second, how the inclusive leadership lead to enforcement of the individuals performance through including their different and unique efforts to the main goal of the organization.

Keywords: *Diversity, Inclusion, D&I, Inclusive leadership, Creativity, Performance*

INTRODUCTION

Diversity matters nowadays because we increasingly live in a global world that has become deeply interconnected. It should come as no surprise that more diverse companies and institutions are achieving better performance. Most organisations have work to do in taking full advantage of the opportunity that a more diverse leadership team represents, and, in particular, more work to do on the talent pipeline: attracting, developing, mentoring, sponsoring, and retaining the next generations of global leaders at all levels of the organisation. Given the increasing returns that diversity is expected to bring, it is better to invest now, as winners will pull further ahead and laggards will fall further behind.

HYPOTHESIS:

This research paper focused on the previous studies to confirm its hypothesis and the researcher come up with the main three following hypothesis:

- H1: There is a positive effect in the implementation of Diversity and Inclusion in the workplace
- H2: There is a significant positive role between Diversity and team creativity
- H3: Inclusive leadership has a positive effect on the Organization individuals and teams performance.

LITERATURE REVIEW:

(Lynn M.Shore et. Al (2018) reviewed and synthesized theoretically through their article the inclusion literature and provides a model of inclusion that integrates existing literature to offer greater clarity, as well as suggestions for moving the literature forward. They reviewed the

inclusion literature consisting of the various foci (work group, organization, leader, organizational practices, and climate) and associated definitions and how it has developed. they then describe themes in the inclusion literature and propose a model of inclusion. The main concept was (The model of inclusive organization Figure- 1) which they built it up on Ferdman's (2014) thematic depiction of the inclusion literature. An inclusive organization is one in which the inclusion practices and processes that form the core in Figure. 1 are systematically shown at all organizational levels and manifested in all aspects of inclusion (inclusive climate, inclusion practices, perceived organizational inclusion, leader inclusion, and work group inclusion). they discussed that organizations have two probable processes that contribute to the goal of recognized organizational inclusion, management prevention orientation and management promotion orientation. With a prevention orientation, managers focus on preventing exclusion as a means of endeavor to the safety and security of the organization. Through a commitment to conformity of laws by applying relevant practices. On the other hand, with a Promotion orientation, managers fight for growth and accomplishment in the pursuit of the goal of an inclusionary organization. (1)

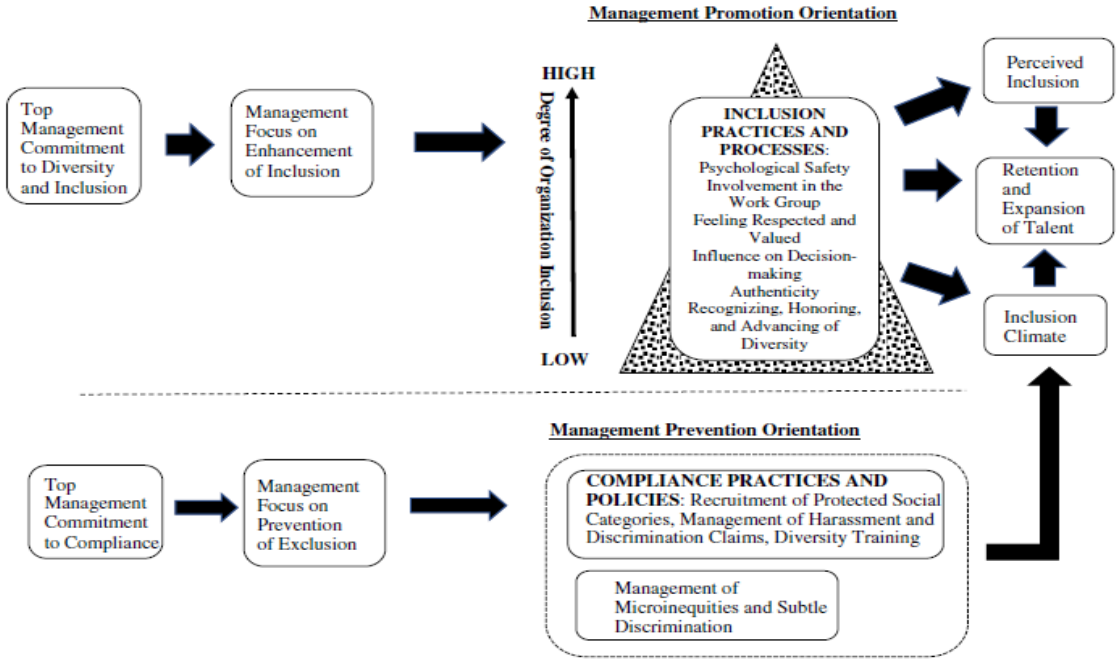

Figure 1

Finally, they end by discussing about their model of inclusive organization which needs more theoretical and practical implications to test it worldwide and evaluating the results.

(Claudia Buengeler et.al (2018) develop a theoretical framework about how leaders help shape the impact of HR diversity practices on employee inclusion. they expanded this view by suggesting that leaders can respond to HR's (diversity) practices with various levels of alignment (or misalignment), and clarified the respective implications for felt inclusion. Informed by literature on multiple identities at work, they come up with four potential responses of leaders to HR's diversity practices—deletion, compartmentalization, aggregation, and integration. They demonstrated how these responses shape the effects of diversity practices on employee inclusion, and in doing so, moreover, they questioned a commonly held assumption that leaders' full alignment with HR's diversity practices is the most conducive for employees'

felt inclusion. their framework has important implications for theory and practice, as it specifies the role of leaders in leveraging the inclusive potential of HR diversity practices. (2)

(Kearney, E., & Gebert, D. (2009) In a sample of 62 research and development (R&D) teams, they tested transformational leadership as a moderator of the relationship of age, nationality, and educational background diversity with team outcomes. When levels of transformational leadership were high, nationality and educational diversity were positively related to team leaders' linear of team performance. These relationships were nonsignificant when transformational leadership was low. Age diversity was not related to team performance when transformational leadership was high, and it was negatively related to team performance when transformational leadership was low. Two mediated moderation effects help explain these findings. Transformational leadership moderated the relationship of the 3 examined diversity dimensions with the refinement of task-relevant information, which in turn was positively associated with team performance. Moreover, transformational leadership moderated the relationship of the 3 diversity types with collective team identification, which in turn was positively related to the clarifying of task-relevant information. They also talk about the theoretical and practical implications of these results. Overall, their study suggests that transformational leadership can foster the utilization of the probable benefits related to both demographic and informational/cognitive group diversity. (3)

(Stephen Bear et. al (2010) did article about "The Impact of Board Diversity and Gender Composition on Corporate Social Responsibility and Firm Reputation" which they examined how the diversity of board resources and the number of women on boards affect firms' corporate social responsibility (CSR) ratings, and how, in turn, CSR influences corporate reputation. In addition, this article examines whether CSR ratings mediate the relationships among board resource diversity, gender composition, and corporate reputation. The OLS regression results using lagged data for independent and control variables were statistically significant for the gender composition hypotheses, but not for the resource diversity-based hypotheses. CSR ratings had a positive impact on reputation and mediated the relationship between the number of women on the board and corporate reputation. (4)

(Thierry Verdier and Yves Zenou (2018) studied in their paper the population dynamics of cultural traits in a model of intergenerational cultural transmission with a perfectly-forward looking cultural leader. they discussed that there exists a threshold size in terms of population above which the cultural leader becomes active. The researchers also showed that a policy affecting some key parameters (such as the cost of providing the religious good) has a different impact in the short run and in the long run due to over-reactions or under-reactions of the different cultural groups. Finally, they studied the cultural competition between two forward-looking cultural leaders with opposite objectives. They showed that the steady-state cultural equilibrium depends on the time preference structure of the two leaders. (5)

(Donya Ahmadi (2018) presented in her article presents an analysis of how the concept of diversity used within policy euphemizes systemic discrimination and inequality based on race, class and gender. It serves to reveal the mismatch between policy rhetoric on diversity and its materialization in the daily lives of the inhabitants of a low-income Toronto inner-suburb, by juxtaposing policy discourses with inhabitants' everyday experiences. By illustrating how inhabitants reproduce negative essentialised stereotypes based on diversity markers, the article argues that talking diversity as an alternative to or an escape from problematizing the intertwined systems of race, class and gender oppression, could potentially serve to perpetuate them. (6)

(Xiao-Hua (Frank)Wang et. al (2016) tested an integrated model for the relationship between cognitive diversity and team creativity. Their model involved team intrinsic motivation as a mediator and transformational leadership as a moderator. The Hierarchical Linear Modeling results using 62 teams revealed that transformational leadership moderated cognitive diversity's direct effect on team intrinsic motivation and indirect effect on team creativity via team intrinsic motivation, such that the effects were positive when transformational leadership was high, but negative when transformational leadership was low. (7)

(Hülya GündüzÇekmecelioğlu and Gönül KayaÖzbağ (2016) analyzed the relationship between transformational leadership and individual creativity by focusing on four dimensions of transformational leadership in a sample of 275 respondents. Understanding the relationship between transformational leadership and creativity helps leaders to develop and cultivate employees' capacity for creativity. Results indicated a direct and positive link between intellectual stimulation and individual creativity. The results also indicate a positive link among inspirational motivation, idealized influence and individual creativity.

Their method:

The authors collected data from 62 R&D teams in 14 organizations in South Korea, including three pharmaceutical companies, six electronic companies, one chemical company, one information technology company, and three manufacturing companies. The third author obtained the participation of these 14 organizations, based on their inclusion in a list of companies that cooperate with his university. All R&D teams in the organizations participated in this survey.
Of the 478 member–team leader pair surveys distributed, 351 were returned by 68 teams, representing a response rate of 73.6%. Six teams returned the response of only two or less team members or missing values were eliminated, resulting in 346 member–team leader pair surveys across 62 teams for data analysis. A total of 29% of the employees were female. The average age of the employees was 32.6 years (SD = 6.1), and the average team tenure was 3.4 years (SD = 4.0). The team leaders had an average age of 43.6 years (SD = 4.9) and an average team tenure of 8.5 years (SD = 6.9). A total of 11% of the team leaders were female.

Their results of the hypothesis were the following:

- H1: cognitive diversity was positively related to team creativity ($\gamma = .30$, $p > .05$)
- H2: cognitive diversity was positively associated with team intrinsic motivation ($\gamma = .33$, $p > .05$)
- H3: First, as shown above, cognitive diversity was significantly related to team intrinsic motivation. Second, when both team intrinsic motivation and cognitive diversity were included in the regression, only team intrinsic motivation was significant ($\gamma = .34$, $p > .05$)
- H4: In Table 2 illustrates that the interaction term of cognitive diversity and transformational leadership is significant ($\gamma = .42$, $p > .01$). As shown in Fig. 2, simple slope results indicated that the relation between cognitive diversity and team intrinsic motivation is negative and significant when transformational leadership is low ($\gamma = -.31$, $p > .05$), but positive and significant when transformational leadership is high ($\gamma = .27$, $p > .05$). Thus, H4 was supported.
- H5: the results of the simple slope test indicated that the indirect effect of cognitive diversity on team creativity via team intrinsic motivation is positive and significant when transformational leadership is high ($\gamma = .09$, $p > .05$), but negative and significant when transformational leadership is low ($\gamma = -.10$, $p > .05$). (8)

Diversity as indicator: Some revealing details

A number of trends in the countries and industries reviewed suggest that the relationship between diversity and performance is likely to grow in importance. For instance:

- Demographics: In the United Kingdom approximately 30 percent of births in 2011 were to parents of non-European ancestry. (9)
- Talent shortage: In Europe the acquisition of talent has been identified as a significant management challenge for the next five years. The ethnic composition of the UK labour force is now about 10 percent non-white, up from 6 percent in 1991. However, little more than 20 percent of UK companies attain 10 percent ethnic diversity on their top management teams. (10)
- Purchasing power: As customers, women are involved in 80 percent of consumer goods purchases in the UK. Gay and lesbian households increasingly represent a mainstream and sizable consumer segment. (11)
- Legal requirements: Regulators in some European countries have introduced diversity targets for boards, such as those set out in the UK Equality Act 2010.

As a result of these trends, the relationship between diversity and performance will become more pronounced throughout these markets, and not just in particular segments.

(Mike Fetzer (2018) focused on his article "Inclusive Leadership Boosts Organizational Performance" that inclusive leadership increases an inclusive culture, as well as the notion that diversity does not always lead to inclusion. Through a survey of employees from 156 of the 250 organizations on the Forbes "America's Best Employers for Diversity" list, he found that inclusive leadership highly correlated with inclusive culture. (12)

(Hudie Xiang (2017) paper studied the impact of inclusive leadership on employee's innovation performance. It is found that inclusive leadership can indirectly improve employee's innovation performance by enhancing their psychological capital. According to organizational support theory, when employees perceive the organization's support for their work, employees will act in favor of the organization. Inclusive leadership allows employees to feel the organization's support for their work, and their psychological capital will increase, thereby improving their innovative performance.
The leader-member exchange moderates the relationship between inclusive leadership and psychological capital. Employees with high quality leader-member exchange will have higher levels of psychological capital, and furthermore, employees' innovative performance will be higher. The results show that there is a significant positive correlation between inclusive leadership and employee innovation performance. Inclusive leadership provides support to employees in the organization, creating a good environment for their innovation. When employees perceive the support of the organization, their psychological capital will increase, which will improve their innovative performance. (13)

(Chow and Irene (2018) Their paper's aim were to identify the mechanisms through which cognitive diversity affects creativity. It explored how and in what ways cognitive diversity affects team members by examining the mediating roles of team learning and inclusion. Design/methodology/approach Questionnaire survey data were collected from matched supervisor and employee pairs from a direct sales company in the health-care industry in China. The final sample consisted of 216 employees from 48 teams, with a response rate of 90 per cent. Each employee's immediate supervisor rated his or her creativity and in-role performance.

Findings The empirical results indicate that team learning and inclusion mediate the effect of cognitive diversity on creativity.
Research limitations/implications: This study was conducted in a single organisation in China and used subjective self-reported measures. Practical implications The results suggest that diversity training reduces the negative consequences of team diversity and offer practical insights into the effectiveness of diversity management and the ways to create a diverse and inclusive workplace. The study could help human resource professionals to identify human resources strategies which stimulate an inclusive environment and leverage the benefits associated with higher levels of diversity. Social implications The findings have significant implications for developing and maintaining social harmony. (14)

(Jakob Lauring and Anders Klitmøller (2015) tested the general hypothesis that inclusive language use by managers and employees in formal and informal situations will increase the creativity and performance in multicultural organizations. By use of responses from 676 individuals employed in privately owned multicultural companies, the researchers found that management common language communication was strongly associated with performance but not with creativity. Openness to language diversity among employees, however, had strong relations with both creativity and performance. This indicates that management communication may provide information and a shared identity that can increase the performance of an organization. But, in order to increase creativity, there is a need to a facilitate inclusive teams processes. The findings suggested new insights into the theoretical idea that diversity leads to creativity and performance if communication is managed in a right manner. (15)

(Sonya Stinson (2018) studies in her article " How hiring with diversity in mind leads to a smarter team?" on Forbes website, three reasons to answer question which they are crucial for improving business outcomes. First, Unleashing Creative thinking, If you want your brainstorming team to think outside the box, it helps to include the perspectives of people who don't fit within a small set of identities and life encounters. Second, Removing the Blinders of Biases, diversity within a group may make all members more aware of their own potential biases and encourage them to make a conscious effort to suppress those attitudes. The bias-busting effects of diversity are enhanced when team members from different backgrounds not only have a seat at the table but are also encouraged to make their voices heard. Third, Making better decisions, however, all-male teams made better decisions than individuals 58 percent of the time. The improvement score increased to 73 percent for work teams with gender diversity and 87 percent for teams that included members of different ages and geographic locations. (16)

Key steps for Successful Diversity Programs:

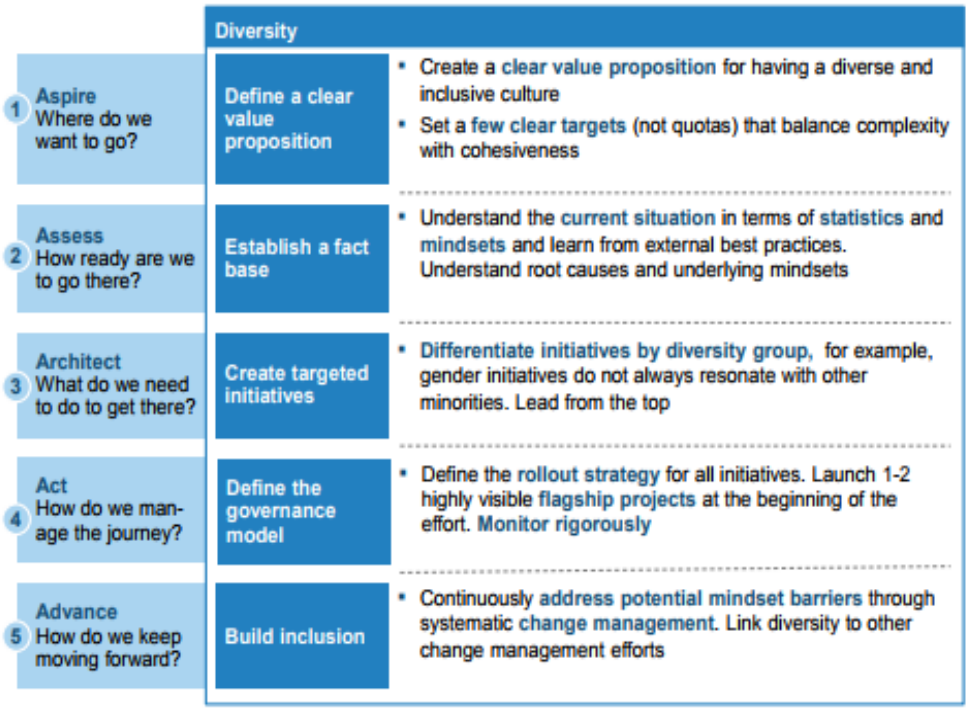

Figure 2

SOURCE: Scott Keller and Colin Price, Beyond Performance: How great organizations build ultimate competitive advantage, Wiley, 2011

MATERIAL AND METHODS:

To write this paper the researcher used the cited previous researches which most of them were in 2018 and some related articles related to D&I and Inclusive leadership.

SUMMARY AND CONCLUSION:

The first hypotheses is true because four studies showed how the Diversity effects many aspects on the work group or the organization or the corporate climate, even the positive role of the leader on the implementing HR policies of diversity on the work place which will be effective with them. Moreover, the role of Diversity on enhancing the role of corporate social responsibilities because the employees are feeling belonged to the organization so they will make their best to spread the positive image of it toward the society. But on other hand and because of the new concept there was a research showed how the effect will be negative on the organization if we implement the diversity policy on a wrong way, but in general we can affirming our first hypothesis with positivity.

The Second hypothesis also true according to the two studies which they demonstrated the role of transformational leadership on creativity and how he motivation role is positive in this relation.

The Third hypothesis is true according to the articles and the previous six researches which showed the results of the inclusive leadership role on the creativity and innovation and the role of using the inclusive words to achieve these results.

In a nutshell, we need to make sure the organization has inclusive practices so that everyone feels they can be heard by inclusive leaders who will lead and implement these practices effectively and efficiently in the diverse organizations . All of this can make the teams creative

and highly performed environment also makes the diverse organizations more successful whatever the goals are .

REFERENCES

1. Lynn M.Shore et. Al (2018). Inclusive workplaces: A review and model. Human Resources Management Review. Volume 28, Issue 2, June 2018, Pages 176-189
2. Claudia Buengeler et.al (2018). How leaders shape the impact of HR's diversity practices on employee inclusion. Human Resources Management Review Volume 28, Issue 3, September 2018, Pages 289-303
3. Kearney, E., & Gebert, D. (2009). Managing diversity and enhancing team outcomes: The promise of transformational leadership. Journal of Applied Psychology, 94(1), 77-89.
4. (Stephen Bear et. al (2010). The Impact of Board Diversity and Gender Composition on Corporate Social Responsibility and Firm Reputation. Journal of Business ethics, December 2010, Volume 97, Issue 2, pp 207–221
5. (Thierry Verdier and Yves Zenou (2018). Cultural leader and the dynamics of assimilation. Journal of Economic Theory, 2018, vol. 175, issue C, 374-414
6. Donya Ahmadi (2018). Is diversity our strength? An analysis of the facts and fancies of diversity in Toronto. City, Culture and Society, Volume 13, June 2018, Pages 64-72
7. Xiao-Hua (Frank)Wang et. al (2016). Cognitive diversity and team creativity: Effects of team intrinsic motivation and transformational leadership. Journal of Business research, Volume 69, Issue 9, September 2016, Pages 3231-3239.
8. Hülya GündüzÇekmecelioğlu and Gönül KayaÖzbağ (2016). Leadership and Creativity: The Impact of Transformational Leadership on Individual Creativity. Procedia - Social and Behavioral Sciences, Volume 235, 24 November 2016, Pages 243-249.
9. David Coleman, Immigration, Population, and Ethnicity: The UK in international perspective, The Migration Observatory, 17 April 2013.
10. "Facing a skills shortage? Fix it yourself", McKinsey & Company, 2013; McKinsey Diversity Database.
11. Women Matter: Moving corporate culture, moving boundaries, McKinsey & Company, 2013; The Power of "Out" 2.0: LGBT in the workplace, Center for Talent Innovation, 1 February 2013; African-American Consumers: Still vital, still growing, Nielsen, 21 September 2013
12. Mike Fetzer (2018). Inclusive Leadership Boosts Organizational Performance
13. Hudie Xiang (2017). Inclusive Leadership, Psychological Capital, and Employee Innovation Performance: The Moderating Role of Leader-Member Exchange. DEStech Transactions on Social Science, Education and Human Science. 10.12783/dtssehs/hsmet2017/16465.
14. Chow and Irene (2018). Cognitive diversity and creativity in teams: the mediating roles of team learning and inclusion. Chinese Management Studies. 12. 10.1108/CMS-09-2017-0262.
15. Jakob Lauring and Anders Klitmøller (2015). Inclusive Language Use in Multicultural Business Organizations: The Effect on Creativity and Performance. International Journal of Business Communication. 54. 10.1177/2329488415572779.
16. Sonya Stinson (2018). How Hiring With Diversity In Mind Leads To A Smarter Team. Forbes 2018.

INDIA AT THE VERGE OF INDUSTRY 4.0: PERKS AND REPERCUSSIONS

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ABSTRACT

India is a developing economy and is at the verge of industrial revolution 4.0. The industries and businesses in India are adapting new technologies, computerization and mechanical advancement. The driving force of gadgets and data innovation is going deep into the roots of production processes of the industries and enterprises in India. But still adaptation of industry 4.0 in India needs time and technological development as India is taking small steps towards fourth industrial revolution. Government of India has taken many steps like 'Digital India' and 'Make in India' in order to increase productivity and for developing Indian economy. So, it is becoming necessary for industries in India to adapt with the technological advancements including Artificial Intelligence (AI), the Internet of Things (IoT), cyber-physical system, 3D-printing etc. This paper will address the impact of fourth revolution on a developing economy like India and what will be the repurcussions and benefits of fourth industrial revolution in India.

Keywords: *industry 4.0; internet of things (IOT); cyber-physical system; artificial Intelligence (AI); India*

INTRODUCTION

As we have already witnessed three industrial revolutions and now fourth industrial revolution is spreading its arms all around the globe. This new technological innovation has discovered its bend of movement and has changed and reshaped the manner in which things are seen in the manufacturing sector. After industry 4.0 the businesses and companies will face a great leap towards Information and Communications Technology (ICT). This includes development in manufacturing processes, data tools and analytics that use Internet of Things, 3-D printing, management of the product lifecycle, cyber physical production systems, robotics etc (Liao et, al. 2018). As far as India is concerned, it is at the beginning stage of industry 4.0 and taking very small steps towards evolving with fourth industrial revolution. India is a developing economy where there are ample opportunities ahead for development, technological boom and mechanization. Industry 4.0 is bringing a strong competition among industries to become a leading industry in the world. This fourth industrial revolution will open doors for innovations, automation and smart solutions and this innovation is a chance to change the financial principles of the businesses. India in its stage of advancement and mechanization needs to get adjusted with the fast pace of technological momentum and this will enrich the advancement of economy of India.

INDUSTRY 4.0

The first industrial revolution started nearly around 1760 and since then there is no looking back from the technological development. The first industrial revolution is commonly known as industry 1.0 which induced steam and hydro power and included reduction of labour. Then

it was displaced by industry 2.0 which came up with advancements and technological development including electric power. The industry 2.0 became the prime driver of development back then and it created a platform for new technologies to put a foot on. Information and Communications Technologies (ICT) became the key driver of industry 3.0 as computerization came into existence that empowered assembling and administration segments to accomplish numerous increases. Today the world is facing fourth industrial revolution that includes Internet of Things (IoT), sensors, 'digital physical' frameworks, robotics, cyber physical system, neuroscience, automation etc (Vuksanović et.al. 2016). This technological advancement is changing manufacturing and administrations over the whole supply chains of the businesses. A key segment of such changes is decentralized control. Intelligent segments work in each phase of the framework through which a section, request or data moves. Decentralized control makes it simpler to include, process and execute as required, making it smoother to meet the expanding consumer requests. Gradually we are continuously moving towards Industry 4.0, a fascinating idea presented by German organizations, for example, Siemens at the worldwide level (AIMA, 2018).

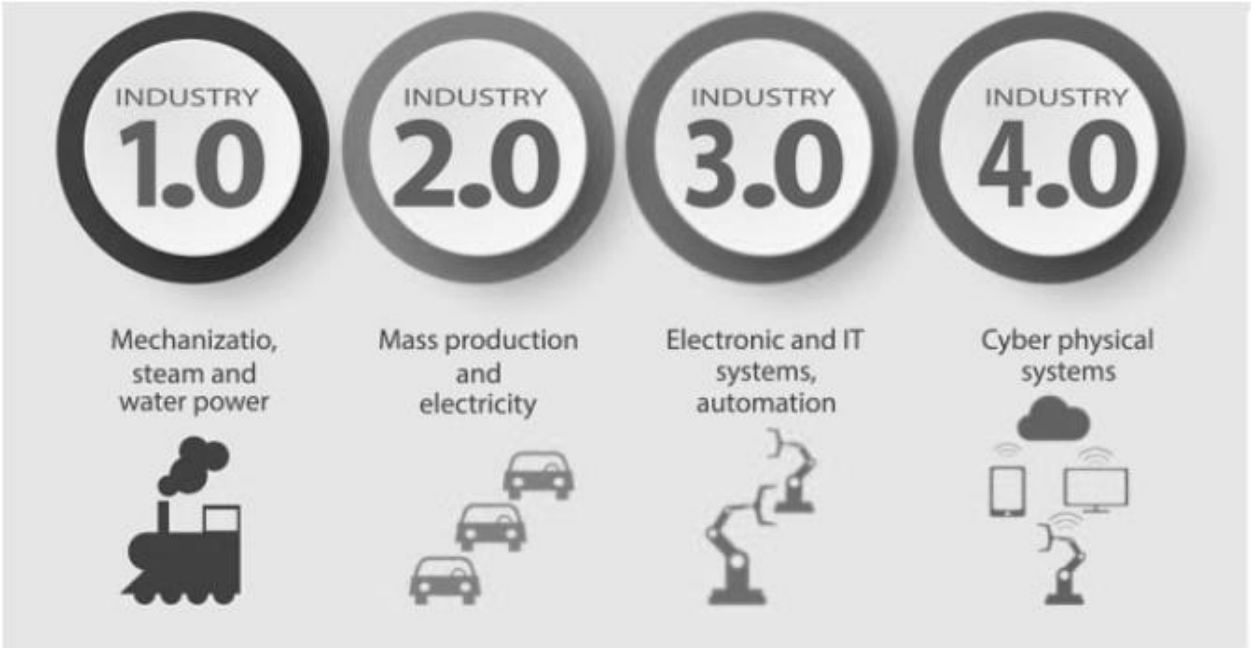

Figure 1. Industrial revolution

Source:engineering.com

Industry 4.0 is the most recent modern transformation, however rather than steam trains and materials, this age is utilizing man-made brainpower i.e. artificial intelligence (AI), always showing signs of change the manner in which machines gather and translate information. Assembling in this new time of machine learning requires minimal human intercession, changing from an information and yield way to deal with a smooth discussion among people and robots (Pierre-Olivier Bédard-Maltais, 2017). Machines are currently prepared to settle on choices and give specialized help, which has prompted more straightforward correspondence. The inundation of artificial intelligence (AI) innovation can result in expanded work effectiveness yet could likewise accompany downsides, similar to information security ruptures and less human employments (Rojko A, 2017). Nonetheless, on the positive side, work security and viability can increment exponentially. Where wellbeing and security are concerned, machines can compute and decide hazard factors, enhancing the workplace. For business pioneers, this can mean an expansion consequently due to augmented productivity.

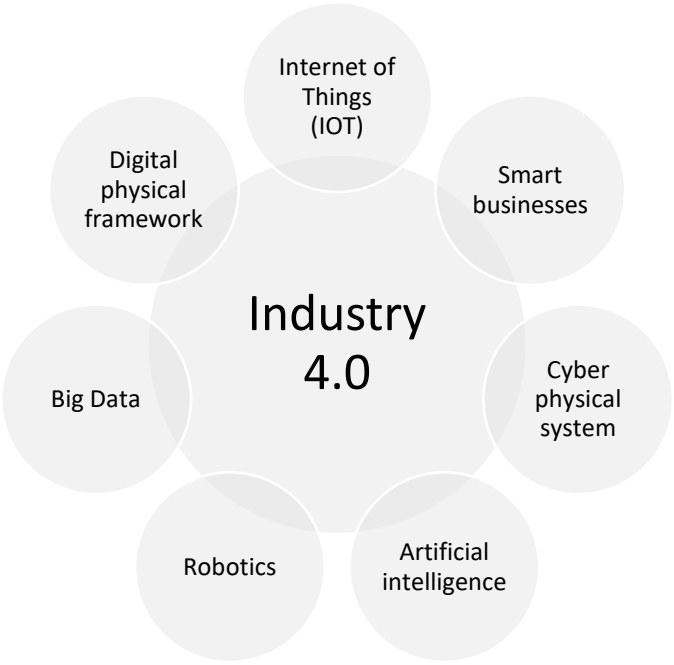

Figure 2. Components of Industry 4.0

Source: own edition (2018)

As we know that fourth industrial revolution is gaining momentum all over the world and enabling businesses to grow and excel. It is now feasible to make a keen manufacturing plant where the Internet, programming and other trend setting innovations cooperate to upgrade the creation procedure and enhance consumer loyalty. These devices enable a business to respond more quickly to showcase changes, offer more customized items and increment operational proficiency in a cycle of nonstop enhancement.

The market of industrial robots is growing worldwide and these robots are being used in many industries. Among the leading industries with robots is the automated car industry where the usage of robots is the largest. Industrial robots are entering into other sectors as well like food industry. United States, Japan, Germany, South Korea and China are the five driving mechanical robot markets around the world (Statista 2018). In developing assembling markets, the development incline is to a great extent driven by rising wages that influence the utilization of machines to show up a reasonable option in contrast to human work.

This figure shows the statistic of worldwide sales of industrial robots between 2004 and 2017. Industrial robot sales increased from about 294,000 in 2016 to around 387,000 in 2017 (Statista 2018).

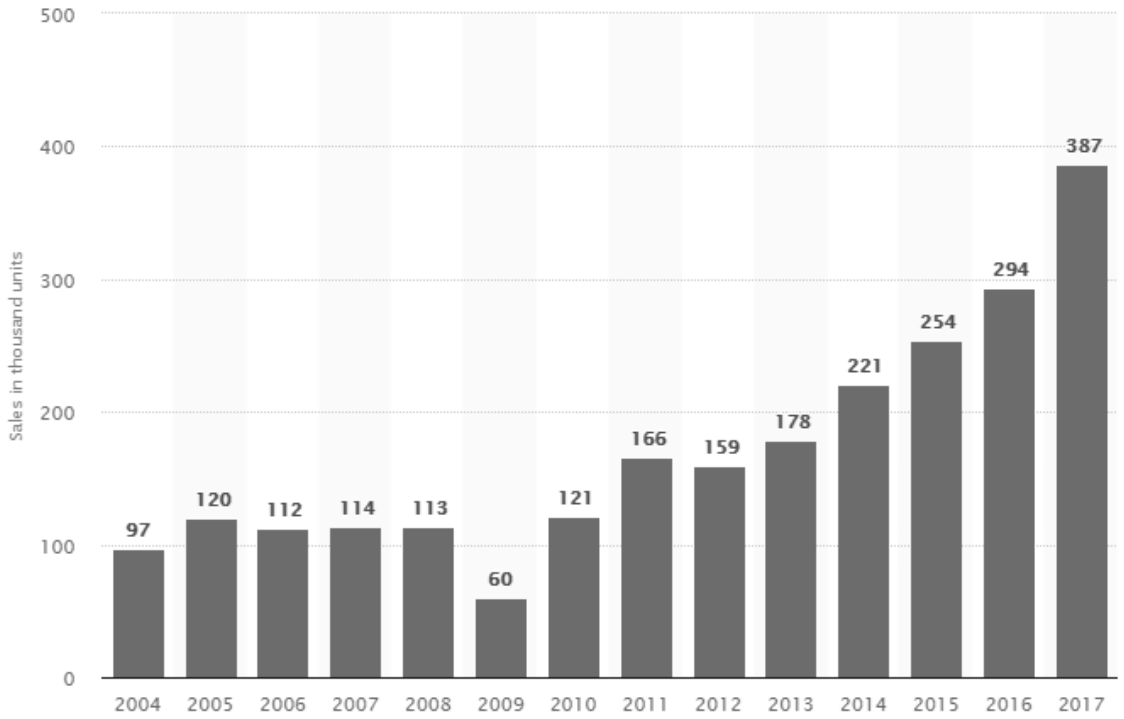

Figure 3. Worldwide sales of industrial robots

Source: Statista 2018

INDIA AND INDUSTRY 4.0

India is a developing economy and is at the cusp of the industrial revolution 4.0. Since 1970 Enterprises in India and everywhere throughout the world have adapted computerization and mechanical advancements (Sagar BS, 2017). Business visionaries, CEOs, organization authors and new businesses are quickly receiving advances including AI, the Internet of Things (IoT), 3D-printing, propelled mechanical technology and neuroscience. From numerous points of view, organizations in India are guaranteeing their survival by embracing these innovations (Victor et. al. 2018). The individuals who receive quicker and preferable will be more focused over others, and certainly in a superior position to contend with worldwide participants. Their survival comes at the expense of occupations but these can be countered by reskilling, and by creating new opportunities.

If the fourth industrial revolution is a given, then India needs to make sure that it has the right people and infrastructure in place to make the most out of it. As of now, the automobile industry in India is the only industry that has shown good promise in terms of factory automation (IBEF, 2018). The number of installed robots in the automobile industry is 58 for every 10,000 workers. Though still a modest figure, it is nearly 19 times more than the nation average of just three as there are only three robots per 10,000 employees in India, according to the 2017 World Robot Statistics report issued by non-profit International Federation of Robotics (IFR) on Feb. 07. By comparison, the average robot density in the world was 74 in 2016 (Bhattacharya, A. 2018) .

The government has been pushing for more indigenous production and has been constantly pressuring factories and companies to manufacture in India wither by imposing high taxes on imports or by giving special incentives for local production. If that goes on the way it has been going on, India will take small but necessary and meaningful steps towards Industry 4.0.

Impact of Industry 4.0 in India

On economy

- The economy will grow and will become competitive worldwide.
- The productivity of industries and businesses will increase on big level.
- There will be the issue of unemployment in a big country like India because of automation of industries.
- The effect of Labour substitution will take place.
- The nature of the work of industries and economy as a whole will change.

On businesses

- Because of new trends and preferences customer expectations for the product will change.
- The smart products will have sustainable life cycle and quality.
- There will be a big leap in collaborative innovation.
- New operational simulations will come into existence with better yield and productivity.

PERKS AND REPERCUSSIONS OF INDUSTRY 4.0 IN INDIA

Perks:

- Leads to advancement
- Effective globalization
- Optimum usage of assets
- Smooth human and robots interaction
- Efficient vitality utilization
- Autonomous controlling
- Greater adaptability
- Detailed end to final result straightforwardness continuously
- Secure and dependable reinforcement framework for each progression in distributed storage

Repercussions:

- Widen the employment gap
- Automation will shrink job creation
- Upskilling of workers will need time and investment
- Government intervention is required for better implementation
- Urban and rural gap will increase
- Cyber security will be a great subject to look into
- Social upheavals and increased income inequality

CONCLUSION

Moving towards Industry 4.0 makes it possible to preserve India's edge in manufacturing. Also create a sustainable ecosystem with qualified employees which support and adapt to large-scale customization. India is a country of 1.32 billion individuals and its assets are extended without a doubt. Nonetheless, India needs to modify the manner in which it has generally managed issues as its general surroundings are evolving. As we talked about before fourth modern unrest is headed to involve the world and likely gives extensive chances. Through Industry 4.0 it is believable to make drawn out life system with qualified workers and to endure on India’s edge

in assembling and can organize to substantial scale customization. In spite of the fact that it is exceptionally hard to deal with the procedure halfway, if players in the framework apply right switches there will be strengthened impacts. Consequently it is basic to convey the thoughts that players in government and corporate division will benefit most, if an activity of Industry 4.0 goes together. By embracing Industry 4.0, we will have a noteworthy upper hand over worldwide competitors in economy. Above all and first we have to have the quintessence of speed with the end goal to catch this chance and to accomplish our objective. The next industrial revolution lies directly ahead, and will likely prove to be a source of huge opportunities. By adopting Industry 4.0, we will have a major competitive advantage over global competitors in economy.

REFERENCES

1. AIMA,2018 A. (2018, March). Industry 4.0 India Inc. gearing up for change. Retrieved November 14, 2018, from http://resources.aima.in/presentations/AIMA-KPMG-industry-4-0-report.pdf
2. Bhattacharya, A. (2018, March 16). What robots? India's still far from being an automation nation. Retrieved November 15, 2018, from https://qz.com/india/1230201/with-robots-a-rarity-indias-factories-are-lagging-the-rest-of-the-world/
3. Bureau, O. (2018, August 24). 'Industry 4.0 will make India a leading manufacturing economy'. Retrieved from https://www.thehindubusinessline.com/companies/industry-40-will-make-india-a-leading-manufacturing-economy-says-murgappan/article24773922.ece Retrieved on 14 November 2018.
4. India Brand Equity Foundation. (2017, November 01). Indian Automobile Industry: Market Size, Investment Opportunity & Government Initiatives. Retrieved November 14, 2018, from https://www.ibef.org/industry/india-automobiles.aspx
5. Liao, Yongxin & Rocha Loures, Eduardo & Deschamps, Fernando & Brezinski, Guilherme & Venâncio, André. (2018). The impact of the fourth industrial revolution: a cross-country/region comparison. Production. 28. 10.1590/0103-6513.20180061.
6. Pierre-Olivier Bédard-Maltais, 2017 P. (2017, May). Industry 4.0: The New Industrial Revolution. Retrieved November 15, 2018, from https://bridgr.co/wp-content/uploads/2017/06/bdc-etude-manufacturing-en.pdf
7. Rojko, A. (2017). Industry 4.0 Concept: Background and Overview. Retrieved November 15, 2018, from https://doi.org/10.3991/ijim.v11i5.7072
8. Sagar BS, 2017 B. S. (2018, May 7). A study on impact of Industry 4.0 in India. Retrieved November 14, 2018, from https://iarjset.com/upload/2017/si/REPSE 17/IARJSET-REPSE 6.pdf
9. Srivastava, Samir. (2016). Industry 4.0. 10.13140/RG.2.1.1585.3843.
10. Statista 2018, Industrial robots - worldwide sales 2017 | Statistic. (n.d.). Retrieved from https://www.statista.com/statistics/264084/worldwide-sales-of-industrial-robots/ Retrieved on 15 November 2018.
11. Victor, V., Thoppan, J. J., Nathan, R. J., & Maria, F. F. (2018, September 07). Factors Influencing Consumer Behavior and Prospective Purchase Decisions in a Dynamic Pricing Environment-An Exploratory Factor Analysis Approach. Retrieved November 10, 2018, from https://www.mdpi.com/2076-0760/7/9/153/htm
12. Vuksanović, Dragan & Vešić, Jelena & Korčok, Davor. (2016). Industry 4.0: the Future Concepts and New Visions of Factory of the Future Development. 293-298. 10.15308/Sinteza-2016-293-298.

STRATEGIES AND CHALLENEGES OF INTERNATIONAL ORGANIZATIONS IN POST-CONFLICT SITUATIONS

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ABSTRACT:

There is no doubt that post-conflict situations call for physical reconstruction. However, a well-developed civil society along with independent media and a reliable police and judiciary are equally essential to physical reconstruction for obtaining sustainable economic growth and stability. Reconstruction in post-conflict situations must go beyond the technical aspects of reconstructing infrastructure and services. It should include a human dimension as well. The role of international NGOs will be accomplished when the governmental structures, supported by civil society are completely able to take over their tasks, with credibility (e.g. political and economic willingness, impartiality and accountability) and feasibility (concrete capacity and professionalism).

Key words: *wars, reconstruction, international organisations, non-governmental organisations, third world*

INTRODUCTION

After the end of the Cold War the world order changed, war threats among nations decreased and in parallel the possibility to create peace continuously increased. However, instead of experiencing a smooth transition from regulated economy to market-economy, from the system of communism to a democratic system; a new type of conflict was about to appear in the developing and in the former colonial countries.
These tendencies appeared in the 1990s, among which the latest was shown in the form of a new, permanently sustainable phenomenon in different parts of the world. In the first period, during the Cold War, it was confined to the Arab-Persian Gulf-region, but in parallel with the failure of one of the super powers, wars broke out in the majority of the countries in the region.

BACKGROUND

In the background of this new type of war mainly racial issues, religious issues, natural resources and energy sources could be observed, and similarly to the previous ones, it broke the previous war rules, which supported the principle of self-determination, which were not organized by governmental groups and were not tightly linked to countries.
These conflicts led to breakdown of societies, degradation of trade and to damaging of agriculture, and at the same time they had to tackle soaring unemployment and the lack of external financing.
As after the conflicts, there was not a statutory governmental structure, the traditional tools of exercising power were destroyed or were significantly deteriorated.
Meanwhile in the institutions and bodies of police and justice, which often were parts of the problem, the democratic institutional system either operated at a low standard or was missing completely.

Under such circumstances, the conflicts became permanent; they rapidly spread to other countries and therefore affected the whole region. Due to the effect of the tendencies, the United Nations examined how the established situation influenced the operation of the international community, how it affected certain countries including the possibility of spreading the conflicts further.
The more frequently appearing conflicts were observed being problematic also by the international community and they wanted to find solution how to prevent the appearance of extreme violence and humanitarian emergencies and how to take action against human rights abuses occurring in certain states and between certain states.

Responsibility of intervention

The nature of commitments, the responsibility of intervention and the increase of capacity to manage tasks -defined in the Foundation Statue of the United Nations Convention (UN) - made it possible for the UN to deal with the questions of state sovereignty and to make steps towards preventing war. Article 2 of the Foundation Statue defines that the organisation has to refrain from intervening into internal affairs of states, which raised more questions as the organisation did not possess adequate plans and intervention programs.
However the devastating effect of the wars convinced the organisation and its Security Council to develop a new approach regarding intervention and participation.
Therefore in the beginning the peacekeeping operations were formed on the basis of certain mechanisms, which came into existence during colonisation and after the Second World War in order to handle conflicts and they served as tools to fill in the power vacuum stemming from the lack of colonial powers. Apart from this, negotiation mechanism was developed, which promoted the lasting settlement of post-colonial conflicts.
It is important to note that despite the fact that non-governmental organisations have existed since the beginning of the nineteenth century, which pay attention to issues such as fight against slavery, significant changes and considerable shifts could be observed in the operation of these organisations in the previous years. Based on the tendencies, one of the politologists dealing with this field of research, Lester M. Salamon named this phenomenon as 'the first Global Association Revolution'[i] . Within the framework of the development discourse, this meant redefining the role of non-governmental organisations and at the same time it meant the real and fine approach of the representation of marginalised groups.
While the other approach is that according to the judgement of several researchers the non-governmental organisations have numerous comparative advantages, which -compared to the operation of the state and the market- will make them more effective considering both the allocation of resources and the reconstruction process. The primary aim of using more effective methods is to be able to have access to the territories involved in the conflict, their way of operation is flexible (in contrast to bureaucratic institutional system operating along strict rules), with the help of which it is easier to adapt to the needs of evolving broken communities. Furthermore, they possess more innovative skills in the field of managing problems and in the field of public service and the costs of their services are relatively low. Their situation concerning their ability to attract investments and to access financing opportunities is also favourable. Finally, by applying a bottom-up approach in participation they can have direct relationship with the individuals.

Role of international organisations

The international organisations played an important and special role primarily in securing the services in recent years. Almost in all countries they acted as an integral and structural part of

the operating systems. They made great effort in order to combat international practices and policies based on the exploitation of the individuals and to soothe the rather harsh living conditions in these societies. They performed important tasks during and after the war as well. The targeted goals of the organisations were to react quickly to the requirements of the current situations and to the needs of local communities through the validation of the fundamental rights defined in the international standard of human rights. Their tasks involved the detection and reveal of abuses and violations of law through several initiations and activities, and also the execution of urgency and aid projects aiming at treating the consequences of conflicts.

At present the international organisations undergo serious changes as regards not only their operational form or their institutional structure, but as regards also their policy and ideology as well. Nowadays next-generation organisations come into being, and their goals are primarily determined by short-term profit, international influence and prestige.

The aim of the present international organisations -either non-governmental or governmental- (based on the classification of the law) we talk about organisations or the international supranational organisations (in case we accept the geographical features) is to develop determining organisations in cooperation with the governments of the war-affected countries and also to operate under certain strategic frames, which are operable not only during wars but after wars as well. The aim of their activity is to reconstruct societies under a framework, where they form a unit from economic, cultural and social aspect and which helps them to be far from participating in another war.

The question of reconstruction after wars is always relevant; it coincides with the new generation of wars, which largely influenced the international circumstances. Providing basic humanitarian aid, food assistance, places of refugee and health services during conflicts is outstandingly important both for the national and international performers. Signing the peace agreement means the official end of the war and at the same time it means the beginning of another era, which is the period of reconstruction. There are bi- and multilateral organisations working together with national governments in this process in order to decide how to use the available financial resources to reconstruct economy and society of the war-affected countries. Although the transition from war to peace is not as easy and smooth as it seems to be.

The urgency aid and the aid to help rehabilitation and development are often difficult to access and the stable operation of such projects faces a number of obstacles. This problem especially occurs in the initial period of peace, which is stabilized by concluding agreements and decreasing the military violence. An important factor is to switch from urgency aids to long-term aids and to reach certain forms of social and economic development among the international donors. Reconstruction is a wide and complex process; it is the period of social, economic and cultural reconstruction, which takes time to be realized It is often referred to as gradual transition, which is of key-importance not only because of preventing the new conflicts, but also it can be a decisive step towards a long-term development as well.

The intersection of the activities of intergovernmental organisations and the international non-governmental organisations in the war-affected countries

As the international organisations are developed as a result of international agreement between the governments of these countries, the non-governmental organisations are outside their mandate despite the fact that the non-governmental organisations had an impact on governmental organisations, such as human rights organisations. As the large scale effect of such civil society organisations on international politics became clear, the UN -based on Article 71. of the Economic and Social Council- warned the member states to take appropriate measures and decide on proper processes regarding the consultation with non-governmental bodies dealing with issues in their scope of authority and that the Council should take proper actions in order to enhance consultation[ii].

According to the definition, the organisation is a group of people with defined aim, who can use one or more ways to reach their goal and they are entities who are independent from their creators and which is directed by the administration chosen at the general meeting of the members[iii]. The organisations can be classified into two categories: governmental and non-governmental organisations. The governmental organisations are subdivided into national governmental organisations established by the state and their control and support is based on implementing concrete tasks. Apart from this there are intergovernmental international organisations operating, of which creation is due to the views of an international conference. However the international organisations operate autonomously and independently from the member states[iv].

The intergovernmental organisations are developed between states by signing an international agreement and their members are the states. They are international legal bodies, which mean that the international law defines their rights and obligations. They participate in the elaboration process of the rules and standards of international law and they operate according to the rules of the international law and they are not under the national laws of the states. They operate in different forms:

They can be of global nature, such as the UN or international organisations covering one special field, such as the World Health Organisation, or the Food and Agriculture Organisation, the FAO, or the UNESCO.

There are general organisations of regional type, such as the European Union, the League of Arab States, and the African Union Association; the Organisation of the Islamic Conference, the Gulf Cooperation Council or special regional organisations, such as OPEC.

As opposed to the non-governmental organisations, the concept of intergovernmental organisations refer to the fact that their mandate is given by the governments, therefore the member states determine their activities. Special operational conditions apply to them, which is often referred to as 'privileges and immunities' in diplomacy.

The non-governmental organisations on the other hand are voluntary, non-profit groups, which are organised at local, national or international levels by civilians. If the membership or the activity of an organisation is limited to only one given country, then it is a national non-governmental organisation, but in case its activity goes beyond the boundaries of the country, it becomes an international non-governmental organisation. Some well-known organisations among the international non-governmental organisations are: MSF (Médecins Sans Frontières), the Amnesty International, the Human Rights Watch, the Oxfam, etc.[v] In other words, the non-governmental organisations are organisations of private individuals, which fall within the scope of the internal laws of the given countries and not of the international law. The organisations are legal entities and their operation is regulated by the rules valid in that given country. Such an organisation is for instance the Red Crescent in Iraq (the equivalent of the Red Cross relief organisation).

However, the international and national non-governmental organisations maintain strong contacts with intergovernmental organisations such as the UN as there are approximately 2100 non-governmental organisations operating in the field of economic and social development. These organisations obtain advisory activity in the Economic and Social Council, which is the main political decision making body concerning economic and social issues. Several non-governmental organisations have official representation in the centre of the UN, which provides precious relations for the UN with the people of the world.[vi]

THE DEFINITION OF RECONSTRUCTION AFTER WAR: (DEFINITION BY THE UN):

The supplement of the International Peace Agreement of the EU defines reconstruction as follows: 'complex efforts in order to identify and support structures, which strengthen peace, the feeling of trust and wellbeing between people by the agreements made to cease wars[vii]. This process can involve the disarmament of the ex-warring parties, setting back the order, repatriation of refugees, consultation services and training support for the security and election observation staff, efforts to enhance the protection of human rights, strengthening and reforming the governmental organisations and the participation of peaceful and non-official performers of the state in political processes[viii].

The second concept of the UN is based on the identification of the long-term reconstruction strategies, involving all the economic and social considerations serving to manage the root causes of the war, according to which the following new definitions were created[ix]:

1. *Preserving peace:* A temporary strategy, of which aim is to produce all the conditions necessary to prevent the repetition of violence, in case both parties agree and in case it corresponds with the conditions defined in the UN Charter Chapter VI. It is usually defined as part of the reconstruction process as it includes the aspects of economic reconstruction, the transformation of institutional structures within the state, such as transforming the system of police, military and justice, the follow-up of elections and the reconstruction of the civil society's capacity[x].
2. *Building peace:* Besides the peace-keeping operations, in accordance with the UN Charter Chapter VII., it includes the effort to encourage negotiations and to solve political conflicts, which form the base of violence. This document contains the general process of the UN's making the peace agreement in 1992, which meant a long-term, revolutionary progress in building peace in countries and societies after the war. It can affect all fields, such as building economy and state institutions, which is finally implemented as a comprehensive part of the reconstruction strategy[xi].

The third and probably the most possible concept determine the followings: 'measures aiming at the reconstruction of states and preventing other wars in order to maintain the 'status quo'. The final aim of reconstruction activities is to establish a safety margin against the return of violence. The aim of the reconstruction is not to secure the establishment of peace in itself, but rather to help strategies to be implemented, which contribute to the cease of conflict and to increase the capacity of war-broken countries. Probably the most important criterion of reconstruction success is phrasing the comprehensive, long-term strategy, which includes all the previous sub-strategies, from disarmament to building a political system through the negotiations being appropriate for the operation of internal and external political process of the war-broken countries[xii].

THE CONCEPT OF RECONSTRUCTION STRATEGY

The factors and activities defining the reconstruction strategy can be classified according to time, the affected territory and according to the participants. It is usually the time factor which stays in the background of problems in certain territories as urgent activities are frequently required. The strategies and the success of strategies depend on how the connecting steps influence the circumstances and type of the crisis and to what extent the reconstruction strategy serves the development targets[xiii].

In short, the reconstruction strategy after the war meant the release of human potential and the expansion of collective opportunities, which corresponds with the definition of Amartya Sen, saying that 'reconstruction is freedom itself', getting rid of war, of suppression, of poverty, of

political slavery and of everybody who obstructs the active and full participation of people in framing their future[xiv].
We can take it for granted that choosing the right reconstruction strategy is not independent either from the general common vision determining economy and society or from the contexts defining the external limits. The comprehensive strategy is part of it, during which we have to value the borders and power relations between freedom and the past heritage in detail without losing sight of the long-term plans of reconstruction. This perspective and the curtailments provide the ground for managing crisis successfully and the ground for reconstruction[xv].
It might happen that the reconstruction strategy is falsely phrased as this issue is much more complex than the funding and implementation of large-scale construction projects or involvement of determining international building construction companies. The reconstruction of economy, society and government is in the centre of real questions and they have to be implemented in parallel to each other and without any delay[xvi].
As far as the most appropriate perspective is concerned, economy and society appear as organic parts of the reconstruction process and not as a tool in itself to help the implementation of construction projects[xvii].

International pillars participating in the reconstruction processes after the war:

Communities leaving the conflict put more and more pressure on and express their worries to international donors because they are aware that war is about to end and therefore the period of sustainable peace will come, but its realization will face problems due to the dire poverty, ethnic, sacred or political rivalry. There are other factors aggravating the situation further, such as the spread of weapons or the fact that the operating governments are not based on developing infrastructure. All this means a huge threat as the countries can be easily directed back to wars. However, despite these huge challenges, the post-war period is the period for hope and opportunities, which can be materialized after struggling for years or for decades. Thanks to the financial and technical resources, managing the causes of war and the establishment of the nation's future seem to be a realistic aim even though there is too little time for that. It was revealed on an international level that in several cases 'building peace' was a much bigger challenge than 'winning the war' and reconstructing a state is a rather complex and long-term process[xviii]. It was also accepted and agreed that there is not a single institution, which is able to manage and handle the peace-building issues. This process can be implemented only with the common effort of several institutions, which form the proper formula for reconstruction processes together. These are as follows:

1. The World Bank group, which includes five institutions:
   The International Bank for Reconstruction and Development, the IBRD was established in 1946. Its aim was to cease the effects of war, promotion of private capital investments, development of international trade, harmonizing different loans and monitoring the effects of foreign investments[xix].
   The International Development Association, the IDA was established in 1960. Its aim was to support the backward countries. It offers quite favourable interest-free loans with 35-40 years repayment period. Its areas of support are: education, agriculture and transport[xx].
   The International Finance Corporation, the IFC was established in 1956. Its aim was to support private capital and private businesses[xxi].
   The International Centre for Settlement of Investment Disputes, the ICSID was established in 1965. Its aim was to settle debates in connection with investments[xxii].
   The Multilateral Investment Guarantee Agency, the MIGA: was established in 1988 in order to manage different risks and problems resulting from that[xxiii].

2. The refereed areas of Multilateral Development Bank (MDB):
   Such financial institutions belong here, which provide economic and social aid and also technical consultancy for countries at regional level. The expression MDB refers to the World Bank group and to four regional banks:
   The African Development Bank: focusing on developments in Africa
   The Asian Development Bank (ADB): focusing on decreasing poverty in Asia and in the Pacific-region
   The European Bank for Reconstruction and Development (EBRD): it implements investments in East-Europe, in the Balkan region and in several countries of the ex-Soviet Union.
   Inter-American Investment Corporation: contributes to the funding of development efforts in the region of Latin-America and the Caribbean.
3. The UN Office for the Coordination of Humanitarian Affairs (UN OCHA):
   Its task involves coordinating activates connected to natural disasters and complex emergency situations, harmonizing humanitarian activities and supporting development. The members and partners of the OCHA are governments, civilian and humanitarian organisations, UN-agencies, foundations and programs, such as The Red Cross.
4. The United Nations Development Programme; UNDP)[xxiv]: it is the world-wide development net of the UN. The UNDP is one of the UN General Meeting's implementing bodies. The organisation finances its activity from voluntary contribution and donation of member states. The organisation has representations in 177 countries and they help to solve development issues in cooperation with the local governments and provide support for the promotion of social development. The UNDP employs recognized experts who offer consultation and trainings for the government of the developing countries, furthermore it offers financial aid. Its activity is more and more focusing on the support of the most backward countries. The UNDP mainly focuses on the followings: to decrease poverty, to manage the problem of HIV/AIDS, to establish democratic structure, to deal with issues concerning energy and environment protection, to prevent crisis and to do reconstruction. The A UNDP considers the protection of human rights its important task and increasing the role of women gain special attention in all its programs[xxv].
5. The UN Development Fund for Women (UNIFEM), which deals with the empowerment of women and with gender equality at all levels of planning and practical implementation. In 2010 it became part of the newly established entity, the UN-Women[xxvi].
6. Other UN agencies:
   International Labour Organisation (ILO): specialized body of the UN, its main aim is to protect the basic labour and social rights of employees. Apart from this, it elaborates international labour standards. Among others it determines the prohibition of forced labour, the employees' right to organise and collective agreement[xxvii]. It has key roles in solving economic problems- such as employment in war-broken countries-: particular attention was always paid to protecting the rights of migrants guaranteeing their social security among the ILO's activities[xxviii].
   World Food Programme (WFP): a leading UN agency, which contributes to ensure the supply of food and to participate in fighting poverty in crisis and in emergency situations.
   They are very devoted to cooperate with women as they realized that women are the 'primary and most effective performers' in the process of reducing poverty and hunger[xxix].

Food and Agriculture Organisation (FAO): specialized body of the UN. Its main aim is to fulfil food safety. Related to this it pays particular attention to reduce hunger and malnutrition, to fight poverty and to ensure economic and social development to everybody and also to utilize natural resources (soil, water, air, genetic resources) in a sustainable way[xxx].

The United Nations International Children's Emergency Fund (UNICEF): this body was established in 1946 by the General Meeting of the UN in order to help the freezing, hungry and ill children of Europe after the Second World War, who had to suffer the horrors, the bombings and the passing of different warriors during the war. The main aim of establishing UNICEF was to secure the safety of children in war-broken countries. UNICEF participates in the reintegration of child-soldiers and in the process of providing and ensuring educational opportunities[xxxi].

The Organisation for Economic Cooperation and Development (OECD): it started its operation in 1961 as the successor of the Organization for European Economic Cooperation (OEEC), which was established in 1948 in order to fulfil the Marshall Fund, but later it aimed to develop an economic cooperation between the member states and to liberalise trade and to develop the payment system[xxxii].

The main aims of the organisation are: economic growth, high level employability, promotion of free trade, increasing the standard of living and to contribute to the development of international economic relations while preserving financial stability[*xxxiii*]

7. The Bilateral donors: Including the United States of America, Canada, and Sweden, the members of the European Union, Japan and several other countries. The UN assures the financial fund by the World Bank. The funds are directly given to national governments, international non-governmental organisations and to local entrepreneurs for the sake of reconstruction and establishing employment.

   The level and type of support provided by them change according to their interests and the time of intervening into the country. These agencies set up special offices in several cases in order to manage different situations during and after the war[xxxiv]. These are:

   The United States Agency for International Development (USAID): it was established in 1961 and it provides support -determined on an annual basis by the Congress-for foreign countries. Although in theory it is an independent body, its operation is largely influenced by the president, the foreign minister and the National Security Council[xxxv].

   The Canadian International Development Agency (CIDA): It was established by the Canadian government in 1968. The main aim of its operation is to support sustainable development in developing countries, to reduce poverty and the contribution to a more secure, reasonable and improving world[xxxvi].

   The EuropeAid: initiation based on the cooperation of more interested parties. The program is operated by the European Council. The European Council, which represents the interests of the EU members give the most support and aid to those in needs all over the world. The external aid programs is guided by the EuropeAid Cooperation Agency if the Council[xxxvii].

   The Japanese International Cooperation Agency (JICA): a governmental agency, which coordinates the allocation of official development aid on behalf of the Japanese government. The main aim of its activity is to support economic and social development of developing countries and to promote international cooperation[xxxviii].

   The Swedish International Development Cooperation Agency (SIDA): belongs to the Swedish Ministry of Foreign Affairs. It is responsible for organising Sweden's official development support to give to the developing countries[xxxix].

The Profit-oriented entrepreneurs: large companies undertaking engineering and building constructional activities and their presence is quite determining in the conflict zones: they open local offices, they employ local people and have contracts with local companies.
Although the bi-and multilateral development agencies are liable for the reconstruction projects, the actual work is usually carried out by sub-contractors and by private companies[xl].

CONCLUSIONS

Identifying and supporting structures aiming at consolidating peace is an organic part of reconstruction after war. The process involves several strategies, which are shared by states, international organisations and individuals with high level of international power.
Both proportionality and contrast can be found in the elaboration of conceptual and theoretical model of the reconstruction process as it has numerous fields, such as politology, economics, sociology, anthropology or psychology.
The post-war reconstruction strategy contains opportunities and activities, which are organised due to time, place and roles based on the available opportunities for the people and on the choice of the community. This is the so-called freedom by Amarta Syn (reconstruction is freedom).
The recognised international organisations belong to the most important pillars of reconstruction after war as they significantly contribute to political decision making and strategic development, but not only in the beginning part (in the transition period between war and peace), but also later.
The activity of the intergovernmental international organisations include the comprehensive strategies directed by the UN and the regional organisations, detailed strategies of the specialized agencies of the UN and of the development and reconstruction projects and the international financial institutions guided by the IMF and the World Bank.
On the basis of those frameworks, we can conclude that the role of international organisations in reconstruction is similar to a ‘puzzle” as having less or having more pieces could rather lead to devastation and not to reconstruction.

REFERENCES:

1. [i i] https://www.energizeinc.com/art/global-associational-revolution
2. [ii] Fracis Stewart, « Policies Toward Horizontal Inequalities in Post-Conflict Reconstruction, Crises working, paper 7, 2008 pp. 22
3. [iii] Ibid,p 364.
4. [iv] Van Tongeron, Exploring the Local Capacity for Peace, p63
5. [v] Weiss and Gordenker , "NGO’s, the UN and Global Governance Builder "CO and London. Lynne Rienner,1996,pp23-25,
6. [vi vi] Shahida El-Baz, Role of Non-Governmental Organizations in Implementing Two Research Platforms: Monetary Evaluation, ESCWA, 1998 Meeting. 11, p. 8. Second Arab follow-up to the World Summit for Social Development, Beirut
7. [vii] Jacob S.Kreilkamp, UN Post conflict Reconstruction, London ,p625.
8. [viii] Boulcler ; tynne Rirner ,The new UN Peace Keeping Building peace in world of conflicts after world, NewYork; ST Martins Press,p34 .
9. [ix] Michael W.Doyle & others,Building Peace :Challenge and Strategies After Civil War;NY; international Peace Academy,1995,p p20-22.
10. [x] Lt,General John Snaderson,;Former Force Commander of UNTAC,Builder , PP 46-52.

11. [xi] Lt,General John Snaderson,;Former Force Commander of UNTAC,Builder , PP54.
12. [xii] Paul F.Biehl. International Peace Keeping kaltiping Johns Hopkins press, p67.
13. [xiii] Amartha Sen, , Development AS freedom ,New York, OXFORD UNIVERSITY PRESS, 1999.
14. [xiv] Ibid,
15. [xv] R.G lipsy& K, lancaster the general they of Second Best review of economic studiesà ,vol (24), 2005p.p11-32.
16. [xvi] George gorn, Identifying of the rain financial and monetory issue in post worn reconstruction, paper
17. presented, ESCWA work shop on Iraq and the hegeo after wan D 9. 10 July 2003.
18. [xvii] George gorn, Identifying of the rain financial and monetory issue in post worn reconstruction, paper
19. presented, ESCWA work shop on Iraq and the hegeo after wan D 9. 10 July 2003.
20. [xviii] Cairns, E.; A Safer Future: Reducing the Human Cost of War,opcit,p,23
21. [xix] http://www.worldbank.org/en/who-we-are/ibrd
22. [xx] http://ida.worldbank.org/
23. [xxi] https://www.ifc.org/wps/wcm/connect/corp_ext_content/ifc_external_corporate_site/home
24. [xxii] https://icsid.worldbank.org/en
25. [xxiii] https://www.miga.org/-
26. [xxiv] https://en.wikipedia.org/wiki/United_Nations_Development_Programme
27. [xxv] http://www.undp-globalfund-capacitydevelopment.org/
28. [xxvi] http://www.unwomen.org/en
29. [xxvii] https://en.wikipedia.org/wiki/International_Labour_Organization
30. [xxviii] http://www.ilo.org/global/lang--en/index.htm
31. [xxix] http://www1.wfp.org/
32. [xxx] http://www.fao.org/home/en/
33. [xxxi] https://www.unicef.org/
34. [xxxii] http://www.oecd.org/
35. [xxxiii] https://nkfih.gov.hu/magyar/pdf-nyomtatas?cikkid=573
36. [xxxiv] Tim Allen, "A World at War", in Tim Allen and Alan Thomas (eds), Poverty and Development Into the 21st Century, Oxford University Press, 2000
37. [xxxv] http://www.usaid.gov
38. [xxxvi] http://www.who.int/workforcealliance/members_partners/member_list/cida/en/
39. [xxxvii] https://ec.europa.eu/europeaid/node/22_en
40. [xxxviii] https://www.jica.go.jp/english/
41. [xxxix] https://www.sida.se/English/
42. [xl] Lissner Jorgen; Politics of Altruism – a Study of the Political Behavior of Voluntary Development
43. Agencies. Geneva,opcit,p 61

SAIGA - ON THE VERGE OF EXTINCTION: IS THE 'THE BOOM-AND-BUST' STRATEGY SUSTAINABLE ENOUGH ? KAZAKHSTANI SAIGA POPULATION AS A CASE STUDY

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ABSTRACT

This study focuses on the key challenges faced by critically endangered saiga antelope (*Saiga tatarica*). The findings outlined in this paper will help guide further research and mainstream the most attention and financial resources on the most adverse driver of saigas' decline. It was demonstrated that although the majority of the research papers focused on disease due to the large-scale impact it exhibits on the population, poaching presents the most significant threat. Therefore, more stringent legislation, flexible conservation strategies, more effective transboundary cooperation as well as multi-stakeholder cooperation on national level are required to ensure conservation of this flagship steppe species.

INTRODUCTION

Saigas are enigmatic, endemic and endangered species of Central Asia. Saiga antelope (*Saiga tatarica*) is a migratory species of the semi-arid rangelands which travels thousands of kilometres twice-annually (Fig.1). It has two subspecies, the nominate *Saiga tatarica tatarica* found in Kazakhstan, Uzbekistan and Russia, and the Mongolian saiga *Saiga tatarica mongolica* in Mongolia (Fig.1) although it used to have a much wider range than today. The majority (75%) of the saiga population (*Saiga tatarica tatarica*) occurs in three populations in Kazakhstan and a small proportion (25%) in one population in the pre-Caspian region of Russia (CMS, 2017). Saiga went extinct in China in 1960s, however the demand for male saigas' horns used in traditional Chinese medicine remains high inducing significant poaching in other countries and subsequent import to China (IUCN).

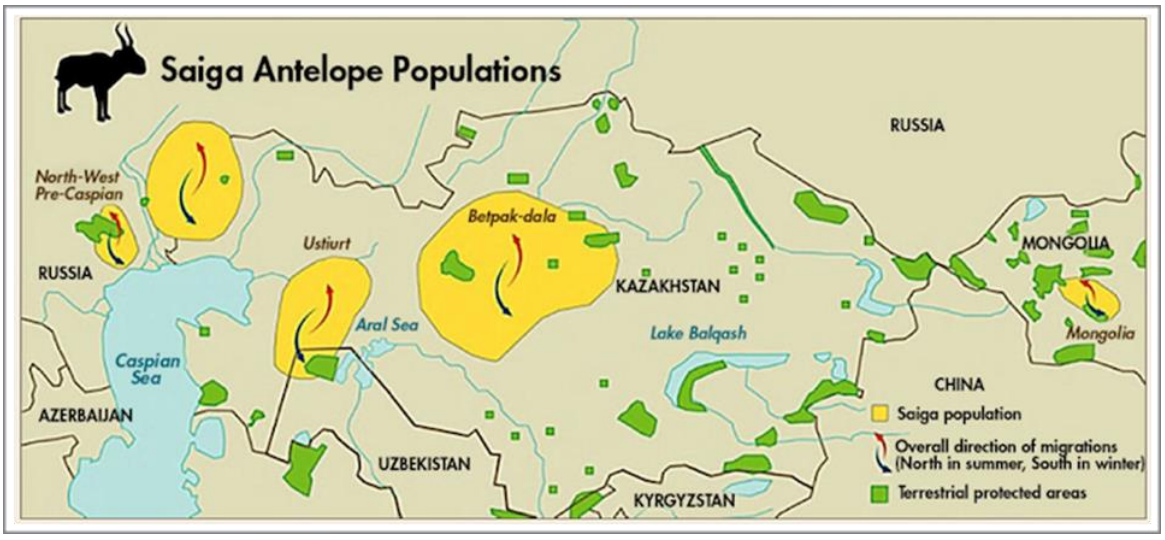


Figure 1. Saigas' range today

Source: CMS.

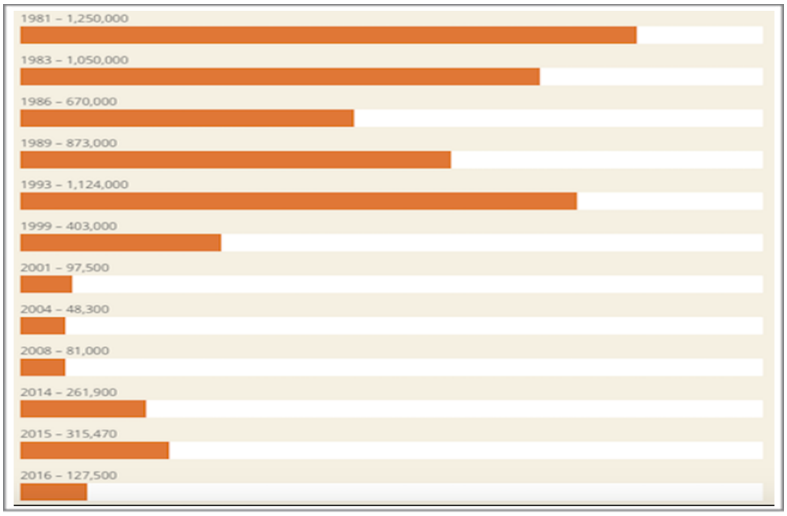


Figure 2. Saiga population over time. This data includes population numbers for four separate saiga populations excluding Mongolian saiga as data is limited
Sources: CMS; Bekenov et al. 1998.

Throughout their existence saigas have undergone cycles of near-extinction and rebounding, the so-called 'boom-and-bust' life history (Fig.2). The first recent-time sharp decline was observed in 1920s followed by a recovery by 1950s and subsequent stabilisation. Another dramatic collapse occurred when the population declined from over a million individuals in 1993 to an estimated 178,000 in 2000 based on aerial and vehicle surveys (Milner-Gulland *et al.*, 2001) and an estimated 20,000 in 2003 (Anon, 2015; CMS). Nevertheless, as a consequence of significant efforts of Kazakhstani government to restore the saiga population, their numbers increased to an estimated 216,500 animals according to aerial survey in 2014 (ACBK, 2014). In spring 2015 over 200,000 saiga of Betpak-Dala population in the Republic of Kazakhstan died during just several weeks and it took scientists almost two years to determine the cause of this mortality event which was eventually associated with the outbreak of bacterial infection *Pasteurella multocida* that triggered fatal respiratory problems (CMS, 2017).
Therefore, it is a well-known fact that they are rather resilient to variations in environmental factors and to anthropogenic disturbances. A fundamental research paper on saigas' ecology highlights the fact that in favourable years they may increase by as much as 60% in one season, while the population is completely renewed every four years (Bekenov *et al.*, 1998). However, the question is how resilient they are as perhaps there are certain limits of their resilience and thus what is the tipping point, or their maximum tolerance to adverse impacts reaching which may lead to irreversible processes, i.e. their extinction; and what are the threats that cause the most damage to them - whether these are direct environmental factors such as diseases, climate change, or human-induced factors such as habitat fragmentation and loss, or poaching.
In recent decades saiga population has experienced extraordinary and dramatic declines and what is more important the triggers remain contradictory. It was suggested that this sharp and massive die-out could be associated with infectious diseases acquired from with domestic livestock, however this is much uncertainty about it. The other probability is that they have ingested fresh forage which was not suitable for their stomach and thus created grave ingestion problems and resulted in a large number of deaths, e.g. the case with Ural population in 2010 (CMS, 2017).
Despite the fact that throughout saiga Range States it is illegal to hunt saigas, saiga poaching is the primary threat to species (*ibid*). In 2002 all saiga populations were listed on CMS (Convention on Migratory Species) Appendix II while the Mongolian saiga population was

added in 2008. The saiga is also listed on Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) since 1995 to prevent the illegal trade in saiga horn. Hence, CITES and CMS contribute their joint effort towards international conservation of this flagship species of the Eurasian steppes.

Therefore, it has become an increasingly urgent biodiversity issue to evaluate the dangers saigas face nowadays in order to detect the most severe ones and to be able to invest money in tackling it. This is a pressing issue since it is debated that the factors that influenced saigas' distribution have shifted dramatically from the environmental towards anthropogenic ones (Singh & Milner-Gulland, 2011). Secondly, it is essential to investigate the factors contributing to saigas' decline to be able to design and adopt the most appropriate conservation strategy. For instance, the former conservation strategies may not be the most comprehensive ones as saigas' range and habitat varies and shrinks and hence there is a need for constant and effective monitoring methods and modification of conservation strategies.

Hence, this paper will investigate the scientific literature that concentrates on the drivers affecting saiga distribution in Kazakhstan and on the basis of the literature review will reveal what are the key threats to saigas today as well as the most relevant conservation strategies that should be employed to conserve this valuable species so that it does not disappear from our planet as many other species already did. The main hypothesis is that saigas' decline is driven by poaching as a type of anthropogenic disturbance due to considerable monetary value associated with their horns and meat.

METHODOLOGY

The main method employed in this paper is meta-analysis, i.e. a considerable number of peer-reviewed articles on saiga antelope were analysed and the results were compiled to reveal the trends. In order to achieve this, scientific databases such as Science Direct, Web of Knowledge, Google Scholar were used to identify the relevant articles. Thus, the following terms of search were utilised "Saiga Antelope Kazakhstan OR Saiga Antelope Conservation". In terms of timeframe a wide array of literature included articles up to 2017. From a range of articles the most relevant were chosen having read the abstracts and scanned the results & discussion section. Apart from scientific articles, several reliable websites were utilized to extract information such as the official CITES and CMS websites mainly to obtain quantitative data on saiga distribution patterns. In addition, the saiga conservation websites were consulted to gain the up-to-date information on conservation actions being undertaken. As the literature review was conducted, a number of reliable references were identified, i.e. during the process of reading scientific articles some important sources were cited within the article and then followed, e.g. results of personal communication etc. Moreover, PhD theses from high-ranking universities were utilised whereas MSc dissertations were disregarded to ensure reliability of the findings.

RESULTS

The results of the search in the Science Direct database using the search terms "Saiga antelope AND Kazakhstan" yielded 74 results most of which were irrelevant. However, using the same search parameters in the other scientific database, namely Google scholar yielded a considerably larger output - 790 articles. In contrast, using Web of Science yielded just 25 articles. Despite the fact that Boolean language was used, i.e. "Saiga antelope AND Kazakhstan" some of the papers were irrelevant and thus when the results were refined using "Saiga antelope AND Kazakhstan" as title in the advanced search only three most relevant articles remained. The relevant research articles, i.e. the ones that contained research only on

saiga antelope populations in Kazakhstan were considered mainly due to time-constraints. Therefore, the articles retrieved from Web of Science were analysed although other sources as mentioned in the methodology section were additionally included (Appendix 1, Table 1).

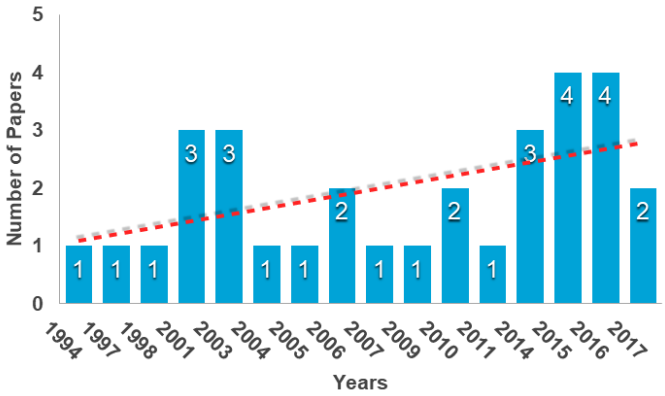
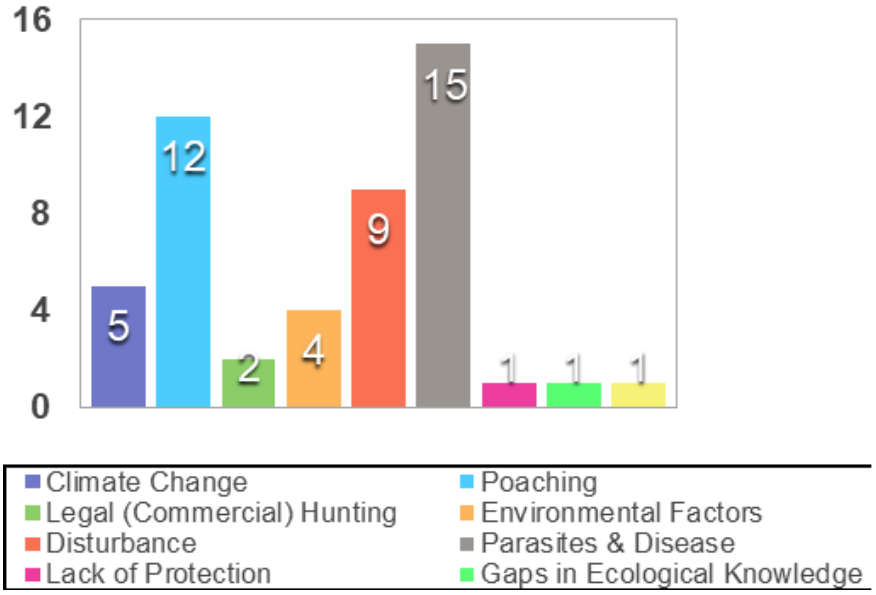


Figure 1. Number of scientific papers published on saiga per year.

An overall increase in the number of published work on saiga antelope in Kazakhstan can be observed (Fig.1). Furthermore, the major events of collapses in saiga populations tend to correlate well with research undertaken, i.e. as Figure 1 illustrates four main periods can be distinguished in terms of research interest drawn to this iconic steppe species. It is interesting to note that the profound research on the saiga was initiated in mid-90s which coincides with the start of their decline. From 2001-2003 the most drastic collapse in saiga population was observed, that is when they almost went extinct (just estimated 20 000 individuals were left) which triggered considerable research efforts closely investigating these incidents. Nevertheless, starting from 2014 a total of twelve scientific papers out of thirty papers analysed focusing on issues faced by saigas were published which represents a significant increase in interest.



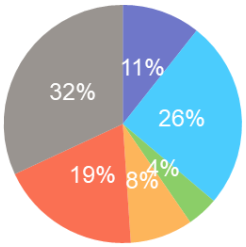


Figure 2. Frequency of threats cited in the literature (left)
Figure 3. Frequency of threats cited in the literature shown in proportion (right)

Figure 2 demonstrates the frequency of various categories of threats saigas have been facing for the last twenty-three years. As some factors have had insignificant impact on saigas, they were excluded and Fig. 3 thus represents the relative proportion of each threat. It is clearly

demonstrated by both figures that disease and poaching closely followed by disturbance are the main threats saigas face. Importantly, disturbance incorporates habitat loss and fragmentation as a result of anthropogenic influence while environmental or climatic conditions included extreme weather variations, e.g. harsh winters and droughts, and less extreme changes in temperature and precipitation. In spite of the fact that poaching may be also classified as a type of anthropogenic disturbance, in this study it was identified as a separate category due to the fact that it is most severe and disruptive form of disturbance for saiga.

Furthermore, all the factors do interact to produce a compound effect; or one factor could induce other factors, e.g. climate change may trigger changes in disease distribution and frequency patterns. Similarly, human disturbance tends to impact adversely on the spread of disease due to increased incidence of livestock contact with free-ranging ungulates. On the other hand, it is not always feasible and straightforward to distinguish the effects of poaching from legal hunting as both affect saiga population dynamics in a similar way, i.e. preferential hunting on adult males influence the fecundity rates such that extremely female-skewed ratios lead to extremely low reproductive rates and thus population reproductive collapse. Hence, if both are combined this would lead to disease and poaching having the same magnitude, i.e. essentially the same impact. Therefore, these results should be treated with caution although the main tendencies can still be derived from these graphs.

An array of targeted conservation strategies was identified (Table 1). As Table 1 demonstrates they are arranged according to specific threats and measures. However, it was not possible to quantify the number of articles that focus on a specific conservation strategy as they tend to assess the effectiveness of a number of conservation measures in relation to their research question. Moreover, only a few articles specifically discussed conservation of saigas, or their calving sites. Therefore, it was decided to classify them according to a specific factor or threat they address. Overall eight strategies were identified with the majority of articles concentrating on disease control and law enforcement to reduce poaching. Socio-economic factors are discussed widely in the articles as they tend to play an important role due to regulation of poaching. International instruments that aid halt illegal trade and conserve the migratory species on transnational level are mentioned rarely as they are not as effective as other strategies. For instance, eleven years ago CMS Saiga MoU which is a legally non-binding international instrument came into force. However, its importance is questionable as it does not have any legal power. Despite the importance of protected areas and up-to-date technology in saiga conservation they are not discussed extensively in the literature. In case of the former measure, this may be due to the fact that it is rather difficult to establish effective protected areas for migratory species while as for the latter, this is related to cost-effectiveness as similarly it is quite costly to monitor saigas that migrate such long distances.

Table 1. Targeted Conservation Strategies Based on the Category of Threat

Management Strategy	Sustainable Harvest	Disease Control	Biological / Ecological Factors	Socio-economic factors	International Players	Protected Areas	Latest Technology
Facilitation of Saiga migration corridors, e.g. by providing water sources	Constant Escapement Policy	Parasite Control, e.g. vaccination in Livestock, e.g. FMD (foot-to mouth), GINs (gastrointestinal nematodes)	Age estimation techniques required, e.g. tooth-sectioning (TS) & tooth eruption & wear technique (TEW)	Halting regional trade in saiga meat	CITES - Appendix II; CMS - MoU (legally non-binding)	Need to widen geographical scope of protected area planning	Satellite imagery should be deployed to identify 'desert kites'
Funding to control poaching, especially under-staffed management during calving period & PA management stuff	Suboptimal decision rule	Health Policy is needed; Times & places of high infection risk should be studied; Mathematical models to evaluate disease transmission should incorporate parasite life histories, host migration & climatic variability	Genetic diversity conservation	Alleviating socio-economic situation in rural areas to prevent illegal hunting	MOA on Saiga Protection as part of Bonn Convention should become a legally binding document reenforcing more stringent punishments for saiga poaching.	Conserving spring distribution is crucial as spring calving aggregations are important for population viability	GIS database of a global distribution of kites
Better representativeness; Enhanced data collection for wildlife monitoring	Legislation & its enforcement	Bluetongue virus (BTV) control in livestock as antibodies present in livestock but *not* in saigas. Transmission between saiga & livestock should be further investigated due to helminth fauna overlap	The current realised niche of saiga is reduced compared with their potential capacity for adaptation. During late Pleistocene saiga occupied a separate niche. However, this species could also adapt to lichen-dominated diet seen in reindeer.	More cross-sector collaboration, e.g. by involving stakeholders in conservation & agriculture; threat assessments including the use of citizen-science databases.	Transboundary cooperation, e.g. Ustiurt population migrates between Kazakhstan & Uzbekistan Halting illegal trade of horn in China	Temporary reserves in calving areas Conserving spring population Increase number of Protected Areas; Complementarity in the protected area system	To predict future changes in saiga distribution under climate change scenarios, it is necessary to understand their historical range dynamics
National Conservation Actions Adaptive management approach	Predictive models (Simulations)	Ecological niche modeling to provide national level maps of pathogen distributions for surveillance planning		Incentives to engage rural people in saiga conservation	CMS and CITES treaties should conserve migration as a phenomenon	PA placement should be based not only on current but also on projected distribution due to climate change	

DISCUSSION

Threats to Saiga Population

The global attention and major international concern for saiga antelope started in 1994 which marks the start of their decline. This is when the species was listed on Appendix II of the CITES. As the population sharply declined in 2000s the research focused on identifying threats and measures to mitigate their extinction. The results on threats are inconsistent with the findings of other authors who consider poaching for horns and meat as the major threat (Bekenov *et al.*, 1998; Kamp *et al.*, 2016; Singh *et al.*, 2010b; Singh & Milner-Gulland, 2011). However, the number of papers published may not always be a true indicator of the importance of the dangers. Poaching may be the most important threat although the frequency of the threats cited showed the relative importance of disease larger more than poaching. Therefore, it largely depends on the expertise of a particular scientist as well as on the scale of mortality event as dramatic events due to epidemic tend to attract the most attention.

Wildlife Disease

Most of the research concentrated on investigation of various wildlife diseases in this ungulate species. Saigas congregate into large groups during migration and calving, and disperse in small groups over the summer and winter ranges (Bekenov *et al.*, 1998). According to Bekenov *et al.* (1998) on a temporal scale mass die-off events were mostly attributed to infections such as *Pasteurella* spp. or foot-and-mouth disease (FMD). It was found that in *Saiga tatarica* as host species 25 out of 26 species of GINs (gastrointestinal nematodes) are shared with livestock and the interspecific parasite transmission may occur in both directions (Morgan *et al.*, 2004; 2005; Walker & Morgan, 2014). These macroparasites of ruminants are of specific importance as they have a broad range of hosts including humans while parasite persistence depends on host abundance and density. There is some evidence that saigas acquired immunity to GINs (Morgan *et al.*, 2005). Thus, Milner-Gulland *et al.* (2001) & Morgan *et al.* (2006; 2007) argue that saiga are infected by nematodes of the genus *Marshallagia* from livestock pasture in the south and transfer these parasites to livestock in the north in summer. Other research confirms these findings, e.g. Lundervold (2001), Robinson & Milner-Gulland (2003) claim that disease transmission between species of livestock and saiga does occur, especially for FMD, when they are in close proximity. For instance, in 1955-1974 saiga population was severely affected by FMD due to transmission from livestock (Robinson & Milner-Gulland, 2003). Therefore effective and regular vaccination programs for livestock are required to prevent FMD persistence in saigas (*ibid*).

On the other hand, Lundervold *et al.* (2003) discovered presence of a new virus in Kazakhstan as they found high prevalence of antibody of this virus in domestic livestock whereas negative reactions indicated absence of BTV antibody in saigas. Similarly, Orynbayev *et al.* (2016) detected seropositives to *Coxiella burnetii* of saiga and the adjusted seroprevalence of Q fever antibodies while seropositives to Akabane virus were detected in all 3 populations and the adjusted seroprevalence values for this virus were high. Lower adjusted seroprevalence values were estimated for PPR (peste des petits ruminants, i.e. goat plague) virus & Mycobacterium *avium* subsp. *paratuberculosis*. However, there were no seropositives for blue tongue, *Toxoplasma*, *Brucella* or Schmallenberg. The absence of seropositives for blue tongue confirms the results of the research conducted by Lundervold *et al.* (2003). In order to reduce parasite transmission between saigas and livestock pathogen maps should be incorporated into Geographical Information System (GIS) so that the times and places of high infection risk are

known for each host group (Blackburn *et al.*, 2015). Moreover, application of models and scenario-based simulations as tools for early evaluation of disease transmission between wildlife and livestock is necessary and such models should incorporate parasite life histories, host migration and climatic stochasticity (Rose *et al.*, 2014).

Climatic Conditions

Although climatic conditions were not shown as the major cause of saigas' decline, Milner-Gulland (1994) asserts they may exert strong influence on population structure as summer droughts and harsh winters determine female fecundity and juvenile mortality. Moreover, mass mortality may be caused by dzhut - a phenomena when frost occurs immediately after rain usually in October - as ice ingested with grass kills animals (Bekenov *et al.*, 1998, ibid; Kühl, 2008). It is quite a rare event that occurs only once in ten years; however, other extreme events such as droughts may come into play - and they take place more often - three years in ten. As Milner-Gulland (1997) & Rose *et al.* (2014) highlight new environmental factors such as desertification of steppe due to climate change and dramatic change in land-use, increased proximity of human disturbance and livestock resulting in increased risk of epidemics and habitat loss may play crucial role.

On the other hand, non-extreme events may also play an important role in saiga survival. According to Singh et al. (2010a) migration of saiga is mainly driven by productivity and precipitation so that intermediate productivity and its low interannual variability determine habitat selection. Here a major threat appears as according to IPCC (2007) winter precipitation will increase due to climate change resulting in higher snow while summer precipitation will decrease (lower forage during crucial spring and summer seasons). Furthermore, there will be net annual increases in precipitation in the north and east, whereas net annual decreases in the south and west. However, this will further exacerbate the current situation for saigas as the south and west are already semi- and deserts ecosystems. Another important fact to consider is that female saigas aggregate to give birth and the choice of calving areas is largely driven by environmental factors. Hence, they select sites with lower than average productivity and low interannual variability in productivity, at intermediate distance from water sources, away from human settlements (Singh *et al.*, 2010b).

However, saigas depend on climate for their dispersal as for instance in MIS 2 and the Late Glacial (MIS 1) this species was able to colonise Central Europe at least three times and Western Europe at least twice (Nadachowski *et al.*, 2016). Furthermore, as Jürgensen *et al.* (2017) confirm the current realised niche of saiga is reduced compared with their potential capacity for adaptation. During late Pleistocene saiga occupied a separate niche. However, this species could also adapt to lichen-dominated diet seen in reindeer. Thus, competition for food resources with livestock in the face of climate change -induced low forage availability may not be seen as a major threat to saiga survival.

Disturbance

The second significant threat is disturbance, i.e. the destruction of key habitats & traditional migration routes (Singh & Milner-Gulland, 2011; Kamp *et al.*, 2016; IUCN 2017). Disturbance caused by new roads and railroads is an adverse factor as it interferes with saiga migration routes and leads to habitat loss and fragmentation due to barrier effects. For instance, in Kazakhstan three new railroads cross the range of populations of critically endangered saiga antelope (Olson & van Der Ree, 2015; Singh *et al.*, 2010b). Railways, highways and fences

prevent saigas' access to seasonal resources and therefore trigger their decline. Furthermore, roads and railroads increase mortality as well as indirect effects as previously remote areas may be followed by other infrastructure projects, industry and mining, poachers and altered land-use (*ibid*). To avoid this disturbance, saigas prefer the most remote areas as their calving sites with intermediate productivity and low inter annual variability habitat (Singh *et al.*, 2010b). For instance, Singh *et al.* (2010b) detected a change in calving grounds in Kazakhstan whereby calving areas occur further north and further away from settlements than before to avoid human disturbance irrespectively of environmental factors.

CONSERVATION STRATEGIES

Poaching

Poaching appears to be a key driver of saiga extinction which is further aggravated by the fact that it is very selective for males as they produce more meat than females and bear horns (Milner-Gulland, 1994; 1997; 2001). As a consequence of this selective poaching population structure is highly female-skewed leading to fecundity failures and subsequent reproduction collapse due to lack of adult males (Milner-Gulland, 2001; Lundervold *et al.*, 2003; Kühl, 2008). For instance, it was found that changes in fecundity in Kalmykia population are not related to population density or climatic variables, but are due to skewed sex ratios, i.e. lack of adult males (Milner-Gulland, 2003). Although it does not seem feasible to effectively control poaching, according to Milner-Gulland (1994; 1997) it is vital to design the best harvest strategy for maximum production as legal hunting affects the population similarly. For instance, a constant escapement policy whereby both yield and population security are ensured is recommended. In reality, a manager must balance social and economic pressures, such as the requirement for a stable output from year to year, with the biological necessities, preferably using a simple suboptimal decision rule that takes into account population size and structure. As poaching usually occurs just before legal hunting starts, it decreases immediate yields and affects population size and structure going into winter (*ibid*). Hence, it should also be accounted for when applying this rule. Furthermore, it is advisable to hunt only in years when climatic conditions are favourable and to harvest intermediate level of males. It is also essential to monitor hunting pressure together with corresponding climate data which may help gain insight into population sizes and develop long-term datasets for management policy.

The single measure that would help mitigate poaching on saigas is adequate funding (Milner-Gulland *et al.*, 2001). Particularly short-term financial support of saiga management authorities is required for urgent anti-poaching work. On the other hand, longer-term funding is essential to design incentives to engage rural communities in saiga conservation as it was found that the effect of several households is disproportionally large even when the majority of the village is not engaged into poaching activities (Kühl, 2008). As Kühl *et al.* (2009) assert poaching is generally an unpopular livelihood activity carried out of necessity by poor and unemployed communities in all countries of saigas' range. Therefore, there is an urgent need to address socio-economic situation in rural villages within saigas' habitat.

Laws & Protected Areas

Bekenov *et al.* (1998) underscore the lack of adequate conservation laws in Kazakhstan. For instance, hunting industry should be given an independent status, i.e. acting as an authority with the ability to issue laws and rights to create nature reserves. Moreover, more authority should be given to hunting inspection and mobile ranger groups so that they can arrest poachers on the

spot (Kühl, 2008). Also raids should be conducted during peak periods of poaching activity such as autumn or just prior to this which may prevent poaching. On the other hand, corruption is likely to inhibit effective law enforcement as corruption is widespread in the Commonwealth of Independent States (CIS) (*ibid*). Temporary reserves should be introduced in calving areas while also facilitation such as building crossings for saiga over rivers, gas and oil pipes, railways, roads etc. Kamp *et al.* (2016) stipulate that so far reserves were created in non-productive areas that significantly reduced the effectiveness of creation of PAs. Overall, national conservation actions are required due to increase in domestic consumption rather than international trade control (Milner-Gulland *et al.*, 2001; Kühl, 2008).

Captive Breeding

The other potentially useful conservation tool is captive breeding to preserve the gene-pool of the population (Rduch & Sliwa, 2017). Despite the fact zoos failed to establish a stable captive population and thus saigas almost went extinct as it is very challenging to maintain saigas in zoos, (Rduch *et al.*, 2016) some zoos such as Cologne zoo, Germany were successful at keeping and breeding saigas in captivity for years - from 1976 to 2009. Captive population may serve as a reserve if the situation in the wild deteriorates further. It would also be possible to research the captive animals and draw attention to their critical situation and raise funds. This paper also highlights the fact that captive breeding similarly to breeding in the wild is restricted by the presence of a fecund breeding male as females usually can only reproduce during four years, while males cannot sire under the age of 2 years. Semi-captivity, e.g. the desert island of Barsa-kelmes in Kazakhstan can be considered, or biosphere reserves such as one UNESCO Cherny Zemli Nature reserve in Kalmykia should also be considered as a plausible conservation tool.

General Strategies

Adaptive management (Table 2) was proposed as the relative importance of various threats varies over time (Bull *et al.*, 2015). According to Singh & Milner-Gulland (2011) conservation strategies for declining migratory species should vary over time as factors that determined their distribution before are considerably different from current and future distributions. Therefore there is a need for modelling to incorporate the effects of climate change. Singh *et al.* (2010b) recommend using predictive models to guide stratification of sampling to ensure effective monitoring and to increase numbers of rangers to protect females at critical times during calving. More cross-sector collaboration, e.g. by involving stakeholders in conservation and agriculture; more considerable allocation of funds to under-staffed areas, e.g. protected area management; better representativeness and complementarity in the protected area system and enhanced data collection for wildlife monitoring & threat assessments including the use of citizen-science databases (Kamp *et al.*, 2016) are needed.

Technological Advances

According to Nowak *et al.* (2014) genetics should be employed to help understand annual migration dynamics of this endangered species. Thus they stipulate that satellite markers can be used to delineate conservation units. On the other hand, satellite imagery is a useful tool to understand 'desert kite' phenomenon on a global scale as these kites can be observed not only in Kazakhstan but also in Jordan, Armenia and other countries (Brage *et al.*, 2015). Hence, according to Borshier *et al.* (2016) fieldwork observations as well as satellite imagery analyses should be combined to produce GIS maps of saiga distribution and migration patterns. Furthermore, age-estimation techniques such as the tooth-sectioning technique (TS) and the

tooth eruption and wear technique are the most powerful laboratory methods and they should be employed to interpret long-term ecological data-sets for conservation of the saiga (Lundervold *et al.*, 2003).

CONCLUSIONS

In this paper the existing literature was analysed in an attempt to evaluate the issues that threaten the existence of saigas. Fundamental research had been carried out on the problems of saiga conservation, however it still remains controversial as to what were the causes of their recent declines. Very often a number of factors coincide to produce an added effect. For instance, the preceding harsh winter undermines the immune system of saigas and therefore when they come into contact with infected livestock a severe epidemic may take place (Bekenov *et al.*, 1998; Milner-Gulland, 1994). However, poaching remains a single significant anthropogenic factor contributing to saigas' extinction as it causes reproductive collapse in their population due to selective hunting for males.

It is known that this species is resilient to large fluctuations in climatic conditions as they recover more or less rapidly from mass mortality events. However, it is very misleading as this 'boom-and-bust' strategy is not safe if compounded by heavy exploitation including both poaching and inconsistent harvesting strategy that do not consider climatically induced mortality. That is to say, several years of heavy exploitation combined with droughts and bad winters would lead to severe reductions in population size. Therefore, the choice of management strategy is vital to maintain high population numbers (Milner-Gulland, 1994).

It is important to note that there are several limitations to this study. First, number of papers analysed here may not be a representative sample as only thirty papers were analysed due to time constraints. Moreover, for further research it would be advantageous to incorporate other saiga populations in Kalmykia (pre-Caspian) population and Mongolia sub-species to compare the distribution dynamics for conservation purposes.

RECOMMENDATIONS & MANAGEMENT APPLICATIONS

It is vital to facilitate migration corridors, particularly at finer scales for patch selection during migration in terms of water resources and exclusion of man-made barriers to preserve saiga population. Moreover, these saiga migration corridors should be used to connect the three distinct populations which were separated due to agricultural development and subsequent habitat alteration in Kazakhstan. Thus, it is necessary to re-connect these populations to ensure genetic connectivity and viability of the gene-pool. UNDP in Kazakhstan has already started a small-scale work on establishment of these corridors, however it was only a short-term project, and this work needs to be continued.

Transboundary conservation efforts should be invested as Ustyurt population (the smallest population to-day due to heavy poaching, Fig. 1, App. I) migrates to Uzbekistan during winter, and there is virtually no monitoring programme for the species there. Within Kazakhstan still few protected areas that have considerable impact on saiga population exist. Therefore, it is essential to widen protected areas while their placement should be based on projected distribution of saigas due to climate change, e.g. saiga distribution is predicted to shift to the east due to increased precipitation. Moreover, temporary reserves should be established to protect females during calving in spring, while mobile ranger groups should carry out extra raids to ensure protection during this critical period.

The latest technologies such as GIS and satellite radio-collars should be applied to advance saiga research. Creation of GIS database will allow an integrative and comprehensive analysis of long-term and continuous datasets into their population dynamics to advance the conservation efforts. On the other hand, MOA (Memorandum of Agreement) on Saiga Protection as part of the Bonn Convention should become a legally binding document for all saiga range states re-enforcing more stringent punishments for saiga poaching.

REFERENCES

1. Anon. Unpublished Report of the Working Group Forestry and Hunting Committee of the Ministry of Agriculture of the Republic of Kazakhstan. July 2015.
2. Bekenov, A., Grachev, I.A., Milner-Gulland, E. (1998) The ecology and management of the Saiga antelope in Kazakhstan. Mammal Review 28(1): 1–52.
3. Blackburn, J. K., Kracalik, I.T., Fair, J.M. (2015). Applying science: Opportunities to inform disease management policy with cooperative research within a one health framework. Frontiers in Public Health 3: 276.
4. Borchier, J., Barge, O., Jean-Marc, D., Plakhov, K., Renato, S., Karakhanyan, A., Avagyan, A. (2016). The desert kites of the Ustyurt plateau. Quaternary International, Elsevier: 395.
5. Brage, O., Brochier, J.E., Regagnon, E., Chambrade, M., Crassard, R. (2015). Unity and diversity of the kite phenomenon: a comparative study between Jordan, Armenia and Kazakhstan. Arabian archaeology and epigraphy 26(2): 144-161.
6. Bull, J.W., Singh, N.J., Suttle, K.B., Bykova, E.A., Milner-Gulland, E.J. (2015). Creating a frame of reference for conservation interventions. Land Use Policy 49: 273-286.
7. IPCC – Intergovernmental Panel for Climate Change. (2007) Fourth assessment report on climate change. http://www. ipcc.ch/ipccreports/assessments-reports.htm.
8. IUCN Red List of Threatened Species (www.iucnredlist.org)
9. Jürgensen, J., Drucker, D.G., Stuart, A.J., Schneider, M., Buuveibaatar, B., Bocherens, H. (2017). Diet and habitat of the saiga antelope during the late Quaternary using stable carbon and nitrogen isotope ratios. Quaternary Science Reviews 160: 150-161.
10. Kamp, J., Koshkin, M.A., Bragina, T.M., Katzner, T.E., Milner-Gulland, E.J., Schreiber, D., Sheldon, R., Shmalenko, A., Smelansky, I., Terraube, J., Urazaliyev, R. (2016). Persistent and novel threats to the biodiversity of Kazakhstan's steppes and semi-deserts. Biological Conservation, 25 (12): 2521-2541.
11. Kholodova, M.V., Milner-Gulland, E.J., Easton, A.J., Amgalan, L., Arylov, Iu.A., Bekenov, A., Grachev, Iu.A., Lushchekina, A.A., Ryder, O. (2006) Mitochondrial DNA variation and population structure of the Critically Endangered saiga antelope Saiga tatarica. Oryx 40(1): 103-107.
12. Kühl, S.A. (2008) The conservation ecology of the saiga antelope, PhD thesis, Imperial College London, UK.
13. Kühl, A., Balinova, N., Bykova, E., Arylov, Y.N., Esipov, A., Lushchekina, A.A., Milner-Gulland, E.J. (2009) The role of saiga poaching in rural communities: Linkages between attitudes, socio-economic circumstances and behaviour. Biological Conservation 142(7): 1442-1449.
14. Lundervold, M. (2001) Infectious Diseases of Saiga Antelopes and Domestic Livestock in Kazakhstan, PhD Thesis, University of Warwick, UK.
15. Lundervold, M., Langvatn, R., Milner-Gulland, E.J. (2003) A comparison of age estimation methods for the saiga antelope Saiga tatarica. Wildlife Biology 9: 219-227.

16. Lundervold, M., Milner-Gulland, E.J., O'Callaghan, C.J. and Hamblin, C. (2003) First evidence of blue tongue virus (BTV) in Kazakhstan. Veterinary Microbiology 92(3): 281-287.
17. Lundervold, M., Milner-Gulland, E.J., O'Callaghan, C.J., Hamblin, C., Corteyn, A., Macmillan, A.P. (2004). A serological survey of ruminant livestock in Kazakhstan during post-soviet transitions in farming and disease control. Acta Veterinaria Scandinavica 45: 211.
18. Milner-Gulland, E.J. (1994) A population model for the management of the saiga antelope Izvestiya MON Rep. Kazakhstan. Journal of Applied Ecology 31(1), 25-39.
19. Milner-Gulland, E.J. (1997) A stochastic dynamic programming model for the management of the saiga antelope Izvestiya MON Rep. Kazakhstan. Ecological Applications 7(1), 130-142.
20. Milner Gulland, E.J., Kholodova, M.V., Bekenov, A., Bukreeva, O.M., Grachev, I.A., Amgalan, L., Lushchekina, A.A. (2001). Dramatic declines in saiga antelope populations. Oryx 35, 340–345.
21. Milner-Gulland, E.J. et al. (2001) Interactions between saigas and domestic livestock: exchange of parasites and its influence on the dynamics of ungulate populations. Izvestiya MON Rep. Kazakhstan. Biol. Med. Ser. 3, 84–94
22. Morgan, E.R., Milner-Gulland, E.J., Torgerson, P.R. and Medley, G.F. (2004) Ruminating on complexity: macroparasites of wildlife and livestock. Trends in Ecology & Evolution 19 (4): 181-188.
23. Morgan, E.R., Shaikenov, B., Torgerson, P.R., Medley, G.F., and Milner-Gulland, E.J.(2005) Helminths of saiga antelope in Kazakhstan: Implications for conservation and livestock production. Journal of Wildlife Disease 41(1): 149-162.
24. Morgan, E.R., Lundervold, M., Medley, G.F., Shaikenov, B.S., Torgerson, P.R. and Milner-Gulland, E.J. (2006) Assessing risks of disease transmission between wildlife and livestock: the Saiga antelope as a case study. Biological Conservation 131(2): 244-254.
25. Morgan, E.R., Medley, G.F., Torgerson, P.R., Shaikenov, B.S. and Milner-Gulland, E.J. (2007) Parasite transmission in a migratory multiple host system. Ecological Modelling 200(3-4): 511-520.
26. Nadachowski, A., Lipecki, G., Ratajczak, U., Stefaniak, K., Wjotal, P. (2016). Dispersal events of the saiga antelope (Saiga tatarica) in Central Europe in response to climatic fluctuations in MIS 2 and the early part of MIS 1. Quaternary International 420: 357-362.
27. Nowak, C., Zuther, S., Leontyev, S., Geismar, J. (2014). Rapid development of micro satellite markers for the critically endangered Saiga (Saiga tatarica) using Illumina (A (R)) Miseq next generation sequencing technology. Conservation Genetics Resources 6(1): 159-162.
28. Olson, K.A. & van der Ree, R. (2015). Railways, Roads and Fences Across Kazakhstan and Mongolia Threaten the Survival of Wide-Ranging Wildlife. In Handbook of Road Ecology (eds. R. van der Ree, D. J. Smith and C. Grilo), John Wiley & Sons, Ltd, Chichester, UK.
29. Orynbayev, M.B., Beauvais, W., Sanzybay, A., Rystaeva, R.A., Sultankulova, K.T., Kerimbayev, A.A., Kospanova, M.N., Kock, R.A. (2016). Seroprevalence of infectious diseases in saiga antelope (Saiga tatarica tatarica) in Kazakhstan 2012-2014. Preventive Veterinary Medicine 127: 100-104.
30. Rduch, V. & Sliwa, A. (2017) Breeding and life history patterns of saiga antelopes (Saiga tatarica) at Cologne Zoo, Germany. European Journal of Wildlife Research 63:90.

31. Robinson, S. & Milner-Gulland, E.J. (2003) Political change & factors limiting numbers of wild & domestic ungulates in Kazakhstan. Human Ecology 31(1): 87-110.
32. Rose, H., Hoar, B., Kutz, S.J., Morgan, E.R. (2014). Exploiting parallels between livestock and wildlife: Predicting the impact of climate change on gastrointestinal nematodes in ruminants. International Journal for Parasitology: Parasites & Wildlife 3(2): 209-219.
33. Singh, N.J., Grachev, I.A., Bekenov, A. and Milner-Gulland, E.J. 2010a. Tracking greenery across a latitudinal gradient in central Asia – the migration of the saiga antelope. Diversity and Distributions, 16: 663–675.
34. Singh, N.J., Grachev, I.A., Bekenov, A. and Milner-Gulland, E.J. 2010b. Saiga antelope calving site selection is increasingly driven by human disturbance. Biological Conservation, 143: 1770– 1779.
35. Singh, N.J., Milner-Gulland, E.J. (2011). Conserving a moving target: planning protection for a migratory species as its distribution changes. Journal of Applied Ecology, 48: 35-46.
36. Walker, J.G. & Morgan, E.R. (2014). Generalists at the interface: Nematode transmission between wild and domestic ungulates. International Journal for Parasitology: Parasites & Wildlife 3(3): 242-250.

Internet:

1. 2015 event https://fzs.org/en/news/surprising-findings-research-saiga-antelope-mass-die/
2. https://fzs.org/en/projects/kasachstan/
3. First Central Asian Migration Atlas Created to Reduce Harm to Wildlife from Infrastructure
4. http://www.cms.int/saiga/en/news/first-central-asian-migration-atlas-created-reduce-harm-wildlife-infrastructure
5. http://www.iucnredlist.org
6. http://www.mammalparasites.org
7. http://saiga-conservation.org/saigas/
8. http://www.saigaresourcecentre.com
9. http://www.wwf.ru/about/where_we_work/asia/closed/econet/maps/eng

HOW INFLUENCE ARBUSCULAR MYCORRHIZA FUNGI ON GROWTH AND MAIN COMPENENTS OF ECLIPTA PROSTRATA.

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ABSTRACT

Arbuscular Mycorrhizal Fungi (AMF) have gained much importance in the field of crop and medicinal plants cultivation. AMF provide benefits to host plants by increasing resistance to environmental stresses, enhancing plant nutrient acquisition, improving soil quality and medicinal value.
Eclipta prostrata is one of the main medicinal plants in Vietnam belonging to the family of Asteraceae and used for traditional medicine in Asian countries. However, the influence of different environment factors on the growth and biological component of E. prostrata are not tested until now. The aim of this work was to investigate the efficacy of arbuscular mycorrhizal (AM) inoculation and nutrient supply on the growth of E. prostrata.
Six proportions of sand and peat substrates were used, representing different nutrient supplies to test different growth parameters of E. prostrata. There were significant differences in dry shoots and roots of AM inoculated plants compared to non-inoculated ones. The shoot heights and length of branches were significantly lower in control plants than in mycorrhizal plants. Different nutrient supplies had significant impacts on both mycorrhizal colonization and growth of medicinal plants. On the bases of our result concludes that 60 % (v/v) sand vs 40 % (v/v) peat together with mycorrhizal inoculation offers the best growth of E. prostrata.

Keywords: *Arbuscular mycorrhizal fungi, Eclipta prostrata, Nutrient supply*

INTRODUCTION

Plants have evolved symbiotic relationships with partner organisms (e.g., fungi, bacteria, insects). This association has evolved and has been inherited over the generation as it provides selective advantage to the super-organism. The symbionts in general are nutritional symbionts show a kind of mutualistic association in which the plant provides the carbohydrate skeletons in turn the symbiont enables the plant to have access to the sparsely available nutrients and also stress resistance. The most obvious example of symbiosis in the plant kingdom is that of fungus-green plant (Frank, 1885), bacteria-green plant (Beijerinck, 1888) and actionomycetes - green plants (Callaham et al., 1978), their abundance being in order of their mention.
AMF is one of the most important association existed and might have played important role in the colonization of the land.
It was first coined by Frank (1885). A mycorrhiza is a symbiotic, non-pathogenic, permanent association between a plant root and specialized fungus both in natural environment and in cultivation. Mycorrhizal fungi may be involved in: improved uptake of macro and micronutrients, increased tolerance to stresses (by affecting water relations and pathogen resistance) and beneficial alternations of plant growth regulators (PGRs).
Mycorrhizal associations are the most common and most common symbiosis that have been described. In natural ecosystems, productivity, diversity and species composition are very often

dependent on the presence and activity of mycorrhizae. In Europe, more than 76% of plants are mycorrhizal (Harley & Harley, 1987).
In earlier studies, AMF applied in the cultivation of medicinal plant have been undertaken to evaluate AMF efficiency and to quantify to change in both agronomic characteristic and pharmacology components. Mycorrhizal fungi may be involved in: improved uptake of macro and micronutrients, increased tolerance to stresses (by affecting water relations and pathogen resistance) and beneficial alternations of plant growth regulators (PGRs).
Application of AMF to promote the accumulation of medicinal value with increasing 13% beta-carotene and lutein in Spinacia oleracea L (Lizarazo et al. 2010),
Eclipta prostrata L, is one of the oldest tonic herbs in traditional Chinese medicine. Belongs to the family of Asteraceae and is widely distributed across the world. It is known from the North and South America and the tropics of the Old World (comprising the islands of Oceania and Australia) (Wagner & al. 1999), and from Tropical America (Smith 1991).
Its aerial parts have been extensively used in China, Korea, India and Thailand for tonifying the liver and kidney, promoting the growth of hair, resisting hyperlipidemia, improving antioxidant and treating snake venom poisoning (Pithayanukul et al., 2004; Kumari et al., 2006; Roy et al., 2007; Kim et al., 2008; PCCn, 2010). Chemical constituent investigation indicates that E. prostrata is rich in thiophenes, coumarins, triterpenoid saponins, steroids and flavonoids which accounting for the beneficial functions on the human health (Zhang et al., 1997; Wang et al., 2009). The two main groups of chemical content in E. prostrata are the polyphenol and triterpenoids, and the main functional group of E. prostrata is wedelolactone (polyphenol group) (Lifeng Han et al., 2014 Muruganantham. S et al., 2009).
Among the flavonoids in E. prostrata, luteolin is the main flavones possessing a wide spectrum of pharmacological properties including anti-amnesic (Liu et al., 2009), anti-tumorigenic (Lee et al., 2006; Samy et al., 2006; Du et al., 2008), anti-hepatotoxic (Domitrović et al., 2009), anti osteoporotic (Choi, 2007), anti-proliferative (Hou et al., 2009), anti-inflammatory (Choi, 2007; Leemans et al., 2010) and antioxidant activities (Horváthová et al., 2005; Ashokkumar et al., 2008). It is used internally for the treatment of anaemia, diphtheria, etc. (Bown 1995). Therefore, themain goal of this study was to investigate the effect of AM inoculation and nutrient supply on the growth rate, total phenolic content of E. prostrata.

MATERIALS AND METHODS

Experiment design

Sand and peat were evenly mixed and autoclaved before the experiment. The proportions of sand-peat were preparing in different proportions of (0/100…..100/0) (v/v); The sand and peat characteristics are summarised in Table 1.
The growing media (AMF+ plants) was mixed with 15g of commercial AMF Symbivit® (a mixture of G. intraradices, G. mosseae, G. etunicatum, G. claroideum, G. microaggregatum, G. geosporum) which putted into the planting pots. And the control one contained the same proportion of sand and peat and mixed with 15 g Symbivit after have been sterilised.
Seeds of Eclipta prostrata original brings from Vietnam, sterilised with 1% NaOCl then washed with sterilized water and seeding into the petri dish to generating. After seven days planting in the plastic pots.
The plant is grown in a climatic chamber EKOCHL 1500 (24/28°C, 60% RH, 16h light/8h dark) during seven to Eight weeks. Each treatment had ten (10) biological replicates.

Table 1. The main chemical characteristics of sand and peat.

	pH	Phosphorus (mg/kg)	Potassium (mg/kg)	Carbonate %	Nitrogen %	Dry matter content (m/m%)
Peat	6.45±0.06	1610 ± 14	3320 ± 24	0.94±0.018	42.93±0.347	15.7 ± 0.1
Sand	7.23±0.03	62.16 ± 0.78	2485 ± 11	0.01±0.0015	0.38±0.081	79.4 ± 0.3

Source: own edition (2018)

Assessment of plant growth rate and biomass

The growth of E.prostrata was determined by measuring the fresh weight of shouts and routs, also the root colonization was predestined.
The plant growth will be evaluated every week for two months, after seven weeks of growth, plants were harvested.

Assessment of plant growth rate and biomass

Fungal colonisation of roots can be investigated visually by microscopy as described by Trouvelot et al. (1986), using MYCOCALC software which five plants were selected randomly from each treatment, then thirty root fragments (1 cm long) from each plant were collected; The roots were cleared with 10% KOH for 10 min, acidified using 2% HCl and 0.05% Trypan blue in 1:1:1 water: glycerine: lactic acid overnight. The roots were then mounted on slides; root pieces were observed under a stereo microscope at 100X magnification.

Proline determination

Proline content was quantified by reacting with acid ninhydrin, following the procedure of Bates 1973. Briefly, 0.5 gram of fresh plant material was homogenized in 10 ml of 3% aqueous sulfosalicylic acid and homogenate filtered through Whatman # 1 filter paper. Then added a 1:1:1 solution of proline, ninhydrin acid, and glacial acetic acid was incubated at 100 ºC for 1 hour. The reaction was arrested in an ice bath, the chromophore was extracted with 4 ml toluene, and its absorbance at 520 nm was determined in a BioMate spectrophotometer (Thermo Spectronic).

Determination of total phenolics contents

Total phenolics (TP) concentration was measured by Folin–Ciocalteu assay. Briefly, 20 ml 60% ethanol was added to approximate 2 g of plant material mixed well and then filtered. Folin-Denis reagent (0.5 ml) was added to 1 ml filtered sample, and the content of the tube was mixed thoroughly. After 3 min, 1 ml of saturated Na2CO3 was added. The mixture was completed to 10 ml with distilled water, and it was allowed to stand for 30 min at room temperature. Total phenolic contents absorbance was taken at 760 nm and was expressed as mg gallic acid/ 100 g fresh weight.

High performance liquid chromatographic (HPLC) determination of poly-phenols

For the preparation for HPLC experiment, 0.50 g of E. prostrata was weighed accurately. The herb extracted with 20 ml of a mixture of 45% MeOH + 45% EtOH + 10% water followed to ultrasonication force using the ultrasonic water bath device for 4 minutes. The extract was

shaken by a mechanical (GLF3005) shaker for 15min and kept overnight at 40C. The sample solution (supernatants) was filtered through a membrane filter and then cleaned-up by passing through a 0.22 μm PTFE HPLC syringe filter to obtain the filtered solution, and an aliquot (20 µL) of filtrate was injected into the HPLC system.
The analytes were determined at room temperature on an analytical column nucleosil C18, 100, Protect-1 (Macherey-Nagel, Duren, Germany), 3 μm, 150 × 4.6 column, the mobile phase consisted of the solvent of 1% formic acid in water(A) and acetonitrile (B) with a flow rate of 0.6 mL/min. Gradient elution started with 2% B, changed in 10min to 13% B, in 5 min to 25% B and then in 15 min to 40% B and finally it turned in 7 min to 2% B.

Statistical analysis

Root and shoot biomass, phenolic content, proline and root colonization from 3 biological replicates were used in analysis. Statistical analyzed was carried out using with ANOVA two-ways test, and Tukey test was used as a posthoc test for multiple comparisons of the data measured.

Results and discussion

Seven-weeks of growth later, inoculation with the commercial product Symbivit (AMF+) significantly increased the growth of E. prostrata compared to the control-plant. The fresh and dry biomass of shoot and root of plant inoculated with Symbivit® were significantly greater than control plant. A measurement of fresh and dried biomass of shoot in AMF treated plants 150% higher than CONTROL in the fresh biomass, 65% greater than non-inoculated in the dried biomass. Moreover, the total fresh root biomass 180% higher than control and higher 234% than control plants in the total dried biomass. 60/40% (v/v) sand /peat mixture ratio give the impression of being the best solution for improving both plant growth and the quality of the medicinal plant in both inoculated and non inoculated plants due to the the increase aerobic condition and better water holding capacity of peat compared to the sand.
The applied inoculant contains not only mycorrhizal fungi but also other microorganisms, living together in the mycorrhizosphere (Duc et al.,2017). The beneficial effects of these bacteria can be found on root weights as well when both mycorrhizal and non-mycorrhizal plants are compared. The increased weight of roots has a big importance because it contains beneficial secondary metabolites such as phenolic content from Echinacea purpurea (Ariam et al.,2009) and stigmasterol, ecliptal, heptacosanol from E. prostrata (Chung et al.,2017).

Table 2. How influence different treatments the biomass of shoot, roots, and leaf area of *Eclipta prostrata* (mean ± SD, n=5) after seven weeks of growth.

Treatment		Shoot		Root	
Sand: Peat %(V/V)	With and without AMF	Fresh (g/plant)	Dry (g/plant)	Fresh (g/plant)	Dry (g/plant)
100/0	AMF+	1.99±0.47 f	0.13±0.027 ef	0.25±0.09 d	0.06±0.02 d
	AMF-	0.39±0.09 g	0.03±0.022 f	0.18±0.49 d	0.01±0.005 d
80/20	AMF+	19.38±3.82 de	2.34±0.73 bc	9.79±1.21 ab	1.41±0.16 b
	AMF-	14.37±3.84 e	1.91±0.47 bcd	6.61±0.59 c	0.72±0.15 c
60/40	AMF+	38.85±3.92 a	3.93±0.46 a	11.68±0.43 a	1.75±0.15 a
	AMF-	27.43±3.97 bc	2.74±0.53 b	8.95±1.78 b	0.92±0.17 c
40/60	AMF+	14.83±1.94 e	1.48±0.27 cd	1.52±0.25 d	0.14±0.03 d
	AMF-	14.41±3.87 e	1.27±0.49 cd	1.32±0.57 d	0.11±0.025 d
20/80	AMF+	33.41±4.91 ab	3.89±0.92 a	5.73±0.54 c	0.70±0.15 c
	AMF-	12.58±2.97 e	1.15±0.43 de	0.96±0.17 d	0.08±0.01 d
0/100	AMF+	23.43±4.72 cd	2.2±0.28 bcd	4.78±0.67 c	0.62±0.12 c
	AMF-	15.70±1.55 e	1.28±0.31 cd	0.79±0.36 d	0.11±0.04 d
Growing media(GM)		***	***	***	***
Mycorrhizae(M)		***	***	***	***
M*GM		***	***	***	***

Different letters in each parameter indicate significant difference according to the Tukey test (P<0.05) among sand: peat ratio.
Source: own edition (2018)

Root colonization

The higher percentage of root colonization was found at the proportion of 60/40 % (v/v) sand-peat by (76.23±15.6) compared to the other ratio. In contrast no infection was observed in non-inoculant plants, also the different volumes of peat representing various nutrient supply, and showing various colonization levels and it is well documented that high soil phosphorus usually results in low root colonization (Marschner., 1995; Smith and Read., 2008) and the high root colonization found in high sand substrat which contain lower nutrient supply and this founding confirmed by the work of Amijee et al. (1993). In addition, Corkidi et al., 2004 reported that AMF colonization rate differed due to the difference of growing medium composition and identity of inoculum.

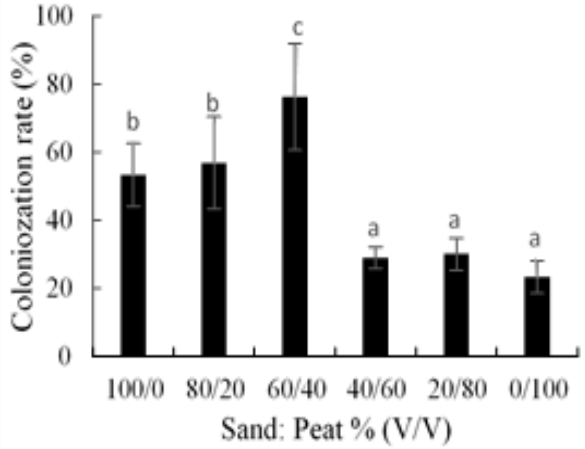

Figure 1. Colonization rate at different percentages of sand and peat
Source: own edition (2018)

Proline and total phenolic content:

Different proportion of sand and peat with the inoculation of Symbivit® has a significant influence on proline concentration of the erial part of Eclipta prostrata (leaves) while proline concentration increase with the increase of peat proportion (100% peat) in both treatment.This positive correlation betwwen the proline accumulation and the increase of peat proportion (high nutrients specially P) is related with the higher effects on cell membranes stability and with higher Na content.

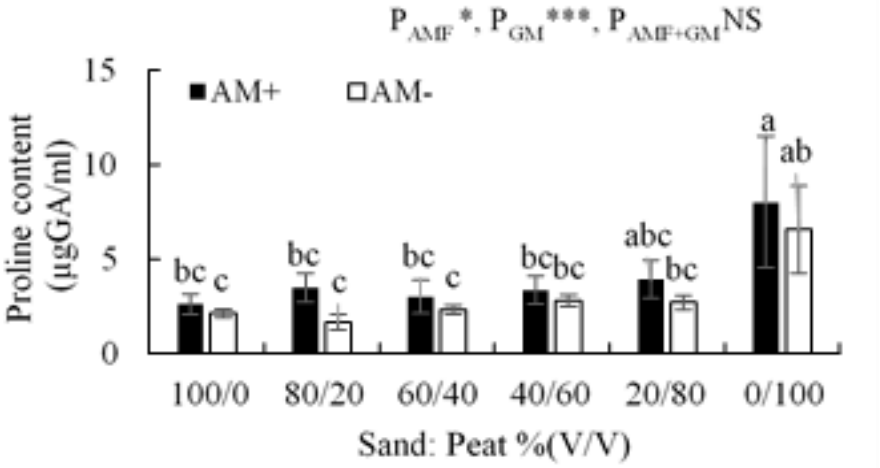

Figure 2. Proline concentration at different ratio of sand and peat
Source: own edition (2018)

Different proportion of peat have significant effect on the concentration of total phenolic component (TP) of leaves but mycorrhizal inoculant has no. Higher peat concentration than 40% (v/v) decreased in the phenolic content of plants. E. prostrata growing in 60/40% (v/v) sand-peat substrate had the the ighest phenolic content by both treatments.
The higher levels of total phenolic content following AMF treatment, correspond well with the report of increased production of phytochemicals due to infection of AMF (Toussaint et al., 2008).

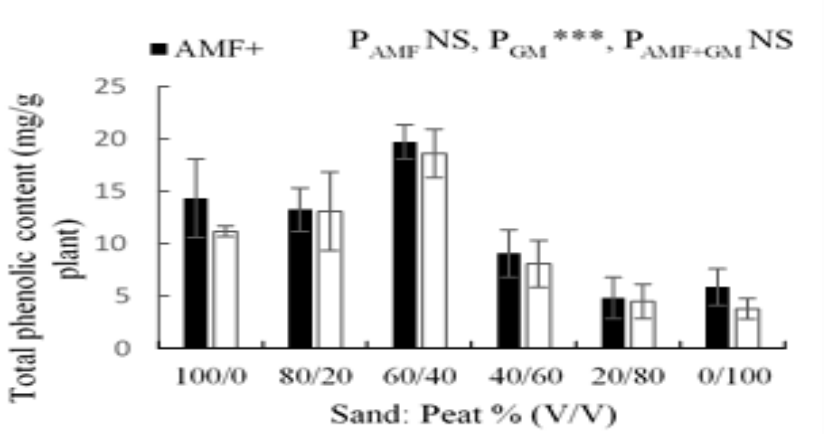

Figure 3. Total phenolic content at different ratio of sand and peat
Source: own edition (2018)

HIGH PERFORMANCE LIQUID CHROMATOGRAPHIC (HPLC) OF POLY-PHENOLS

In the HPLC analysis, we are separate a wide range of phenolic compounds, with demethyle-wedelolactone and wedelolactone being abundant in all of the different samples. The highest levels of wedelolactone, which is the major poly-phenols, were found in plants grown under peat proportion between 0 and 40% in both inoculated and control treatments. In addition, the high concentration of this two major phenol almost found in plant inoculated with AMF.

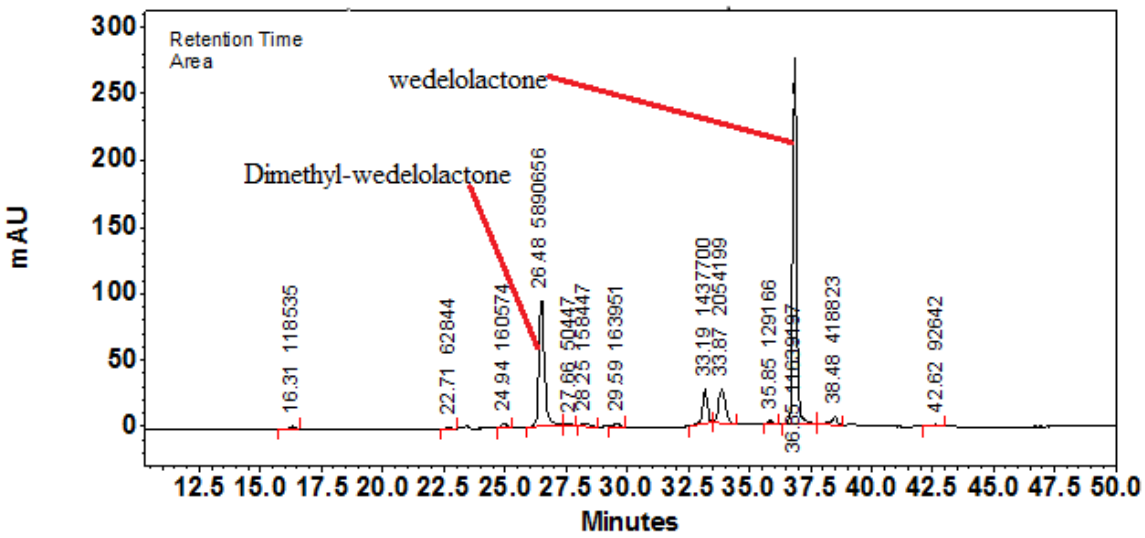

Figure 4. HPLC profile of polyphenols extracted from Ecliptat Prostrata without AMF.
Source: own edition (2018)

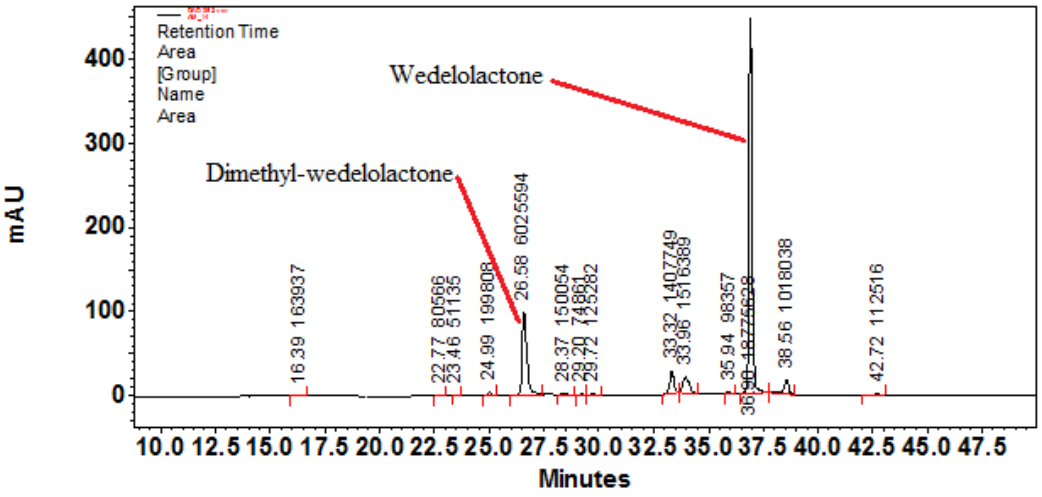

Figure 5. HPLC profile of polyphenols extracted from Ecliptat Prostrata with AMF.
Source: own edition (2018)

In conclusion, the inoculation of arbuscular mycorrhizal fungi and the use of different proportion of sand and peat significantly affected plant growth of Eclipta prostrata.
The experiment was indicated that 60% sand and 40% peat is the best ratio for E prostrata which promote plant growth, stimulation mycorrhizal colonization and enhance mycorrhizal effectiveness therefore this ratio be applied on a large scale of cultivation E. prostrata and also our results indicated that using a commercial mycorrhizal product can apply for culturing E.prosrata.also the establishment of mixed communities by different AM fungal species may be more beneficial to the growth of plants than any of individual species.
However, more research required to test the influence of AMF on the quantity and the quality of secondary metabolites in Eclipta prostrata during this condition.

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REFERENCES

1. Mijee, F.; Stribley, D. P.; Tinker, P. B. Effects of Soil-Phosphorus and Fungal Colonization on the Concentration of Soluble Carbohydrates in Roots. New Phytol. 1993, 123 (2), 297–306
2. Araim, G.; Saleem, A.; Arnason, J. T.; Charest, C. Root Colonization by an Arbuscular Mycorrhizal (AM) Fungus Increases Growth and Secondary Metabolism of Purple Coneflower, Echinacea Purpurea (L.) Moench. J. Agric. Food Chem. 2009, 57 (6), 2255–2258.
3. Ashokkumar P, Sudhandiran G (2008). Protective role of luteolin on the status of lipid peroxidation and antioxidant defense against azoxymethane-induced experimental colon carcinogenesis. Biomed. Pharmacother. 62:590-597.
4. Beijerinck, M.W. 1888, Die Bacterian der Papilionaceen-knollchen, Botanische Zeitung, 46:797-804.
5. Bown, D. 1995. Encyclopaedia of Herbs and their Uses. Dorling Kindersley, London.

6. Callaham, D., Del Tredici, P. and Torrey, 1.G. 1978, Isolation and cultivation in vitro of the actinomycetes
7. causing root nodulation in Compotonia, Science 199:899-902.
8. Choi E (2007). Modulatory effects of luteolin on osteoblastic function and inflammatory mediators in osteoblastic MC3T3-E1 cells. Cell Biol. Int. 31:870-877.
9. Chung, I. M.; Rajakumar, G.; Lee, J. H.; Kim, S. H.; Thiruvengadam, M. Ethnopharmacological Uses, Phytochemistry, Biological Activities, and Biotechnological Applications of Eclipta Prostrata. Appl. Microbiol. Biotechnol. 2017, 101 (13), 5247–5257.
10. Domitrović R, Jakovac H, Milin C, Radosević-Stasić B (2009). Dose- and time-dependent effects of luteolin on carbon tetrachloride−induced hepatotoxicity in mice. Exp. Toxicol. Pathol. 61:581 -589
11. Du GJ, Song ZH, Lin HH, Han XF, Zhang S, Yang YM (2008). Luteolin as a glycolysis inhibitor offers superior efficacy and lesser toxicity of doxorubicin in breast cancer cells. Biochem. Biophysl. Res. commun. 372:497-502
12. Duc, N. H.; Mayer, Z.; Pék, Z.; Helyes, L.; Posta, K. Combined Inoculation of Arbuscular Mycorrhizal Fungi, Pseudomonas Fluorescens and Trichoderma Spp. For Enhancing Defense Enzymes and Yield of Three Pepper Cultivars. Appl. Ecol. Environ. Res. 2017, 15 (3), 1815–1829.
13. Frank, A.B. 1885, Uber die auf Wurzelymbiose beruhende Ernahrung Gewisser Baume durch unterirdische Pilze, Ber. dt. bot.3:128-145.
14. Harley, J.L. and Smith, S.E. 1'983, Mycorrhizal Symbiosis, Academis Press, New York.
15. Horváthová K, Chalupa I, Sebová L, Tóthová D, Vachálková A (2005). Protective effect of quercetin and luteolin in human melanoma HMB−2 cells. Mutat. Res. 565:105-112.
16. Hou Y, Wu J, Huang Q, Guo L (2009). Luteolin inhibits proliferation and affects the function of stimulated rat synovial fibroblasts. Cell Biol. Int. 33:135-147.
17. Kim DI, Lee SH, Choi JH, Lillehoj HS, Yu MH, Lee GS (2008). The butanol fraction of Eclipta prostrata (Linn) effectively reduces serum lipid levels and improves antioxidant activities in CD rats. Nutr. Res. 28:550-554.
18. Lee WJ, Wu LF, Chen WK, Wang CJ, Tseng TH (2006). Inhibitory effect of luteolin on hepatocyte growth factor/scatter factor-induced HepG2 cell invasion involving both MAPK/ERKs and PI3K–Akt pathways. Chem. Biological. interact. 160:23-133.
19. Leemans J, Cambier C, Chandler T, Billen F, Clercx C, Kirschvink N, Gustin P (2010). Prophylactic effects of omega-3 polyunsaturated fatty -acids and luteolin on airway hyperresponsiveness and inflamma tion in cats with experimentally−induced asthma. Vet. J. 184:111 -114
20. Liu R, Gao M, Qiang GF, Zhang TT, Lan X, Ying J, Du GH (2009). The anti-amnesic effects of luteolin against amyloid β25–35 peptide-induced toxicity in mice involve the protection of neurovascular unit. Neurosci. 162:1232-1243.
21. Lizarazo, K.; Fernández-Marín, B.; Becerril, J. M.; García-Plazaola, J. I. Ageing and Irradiance Enhance Vitamin E Content in Green Edible Tissues from Crop Plants. J. Sci. Food Agric. 2010, 90 (12), 1994–1999
22. Marschner, P.; Solaiman, Z.; Rengel, Z. Rhizosphere Properties of Poaceae Genotypes under P-Limiting Conditions. Plant Soil 2006, 283 (1–2), 11–24.
23. PCCn (2010). Pharmacopoeia Committee of PR China, (2010ed.).Chinese Pharmacopoeia, Beijing: Chemical Industry Publishing House. p. 351.

24. Pithayanukul P, Laovachirasuwan S, Bavovada R, Pakmanee N, Suttisri R (2004). Anti-venom potential of butanolic extract of Eclipta prostrata against Malayan pit viper venom. J. Ethnopharmacol. 90:347-352
25. Roy RK, Thakur M, Dixit VK (2007). Development and evaluation of polyherbal formulation for hair growth–promoting activity. J. Cosmet. Dermatol. 6:108-112.
26. Samy RP, Gopalakrishnakone P. Ignacimuthu S (2006). Anti-tumor promoting potential of luteolin against 7,12−dimethylbenz(a)anthracene-induced mammary tumors in rats. Chem. Biol. interact. 164:1 -14.
27. Smith, A. 1991. Flora Vitiensis Nova: a New Flora of Fiji. Vol. 5. National Tropical Botanical Garden, Lawai, Kauai, Hawaii.
28. Smith, S.E, and Read, D.Mycorrhizal Symbiosis; Edn, 3rd, Ed.; Academic Press: London.,2008
29. Toussaint, J.P., Kraml, M., Nell, M., Smith, S.E., Smith, F.A., Steinkellner, S., Schmiderer, C., Vierheilig,H., Novak, J. 2008. Effect of Glomus mosseaeon concentrations of rosmarinic and caffeic acids and essential oil compounds in basil inoculated with Fusarium oxysporum f. sp. basilici. Plant Pathol. pp. 1109-1116.
30. Trouvelot, A., Kough, J., Gianinazzi-Pearson, V. Evaluation of VA Infection Levels in Root Systems. Physiol. Genet. Asp. Mycorrhizae. INRA Press. Paris, Fr. 1986, 217–221
31. Wang XM, Zhang JS, Dai Y, Gao YT (2009). Study on extraction of flavone from Eclipta alba and its antioxidation in vitro. Lishiziien Med. Mater. Med. Res. 20:356-358.
32. Wagner, W., Herbst, D. & Sohmer, S. 1999. Manual of the Flowering Plants of Hawaii. Revised edition. Bernice P. Bishop Museum special publication. University of Hawai‘s Press, Bishop Museum Press, Honolulu
33. Zhang M, Di XH, Liu M (1997). Immunomodulatory effects of flavonoids from Eclipta alba (L.) Hassk. Chinese traditional herbal drugs. 28:615.

TERRORISM & TOURISM

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ABSTRACT

The purpose of the lecture is to get acquainted with the connections between tourism and terrorism, to analyze new types of challenges: terrorism, cybercrime, and its impact on tourism and travel security. In addition, the purpose of the lecture is to familiarize the audience with the elements and characteristics of tourism security. What are the factors influencing tourism? Military conflicts, terrorism, domestic instability, natural disasters, international crime, epidemics, migration, climate change, tourism security and crime. What does tourism security mean in practice? Travel security (air travel, airport, train station, road), accommodation security (in hotel, motel, hostel, airbnb), event security (sports tourism, mass events, concerts) protection of biometric data, security of the biometric data, the existence of cyber security, security of the environment, security of life as well as appropriate legislative environment and international conventions - all contribute to making us feel safe as a tourist.

Keywords: *terrorism, tourism, security, safety, new challenges*

Security has become a fundamental problem for tourism. In the period since 2001, a new situation has emerged in the tourism sector as a result of the increasing number of previously unusual terrorist acts and the unpredictability of the locations of the disasters. The issue of tourism security can not be considered as the newest societal challenges of our time, as travelers have always had to face the dangers of those journeys. At the same time, at the same time, as security becomes more complex, tourism security has become a complex and increasingly widespread issue. This is demonstrated by the fact that the general conditions of tourism are grouped around the security factor. A more general understanding of the security of the issue of security and of the effects of terrorism, which is perhaps the most affecting tourism, is therefore of two importance (Puczkó L. - Rátz, 2002).

With the emergence of a new type of international terrorism, new frontiers have emerged and new actors have come to the fore in the international order and security world, and the actors have been given the same headlines and developments with the power and power of tourism also have a great impact: free travel, shrinking time and space, unlimited and almost uncontrolled in-formation flow. However, it is also important to keep in mind that tourism has been particularly affected by terrorism for several reasons. First and foremost because tourists are easily accessible to terrorists, and the impact of tourism on tourism has a wide and profound economic impact. Secondly, because tourists are the embodiment of Western culture against which some of the terrorist groups are organized. The international order, security after the Cold War is a phenomenon of the new type of terrorism, which undoubtedly opened a new chapter on security aspects of tourism. One of the "novelties" is the change of the international order itself and its objective security in general. The other is a change in subjective sense of security. The attacks in New York and Washington are indisputably a watershed on both the actors and evolution of the international order, the concept of security and the concept of the sphere of security and defense organizations. The major cause of change in perceptions is the significant

modification of their image of terrorism in terms of where and when the terrorists are able to strike, and how much sacrifice and the consequences they may have to account for their activities. The possible doubts regarding the need to create an urgent new picture of the security of the world in Europe, and of our own security, the Madrid bombing (March 2004) and its effects on foreign and domestic politics, have been permanently dispelled. Terrorist attacks, previously unknown, have drawn attention to a new milestone perhaps most important for international order that not only states are able to influence international relations. International economic and political organizations, non-governmental organizations (NGOs), and last but not least international terrorist organizations, such as al-Qaida, are both actors of the emerging new international order (Kiss, 2006). These terrorist organizations are so called. a new type of terrorism, which by its peculiarities significantly influences both the international order and the political, structural, operational mechanisms associated with the security (economic, financial, defense, etc.) of the individual states in a broad sense (Póti - Takács - Tálas, 2004) . The new type of terrorism is characterized by the intention to overthrow the current international order and not follow national or regional goals. Thus, terrorist claims can not be a basis for negotiation. Since terrorists are practically unattainable in the current order, and there are no means of enforcing the legitimacy of their interests, their attack options are unlimited. This does not mean, of course, that they choose their targets without consideration, since we have seen that both from a symbolic, economic and political point of view, and (if so formulated), have done so carefully from a communication point of view. September 11, 2001 had a serious economic and media impact (communication), the Madrid attack resulted in domestic changes in Spain. At the same time, this type of terrorism is also a peculiarity of destroying unscrupulous and unreleased civilians, of which tourists are the easiest targets. Tourists embody the lifestyle and value system that characterizes the world that is currently dominating. Of course, it is of political significance that it is mostly nationals of those countries that have been defined as enemies. It is also a novel development that, in addition to "traditional" terrorist devices, attacks are not traditional (for example, nuclear, chemical, biological) devices. The effects of these terrorist attacks can spread to a large area, which is not only physically true of the scale of destruction but also because of globalization, even across continents, due to the economic and beyond. (For example, in case of a terrorist attack on a US terrorist regime, restrictions are imposed in Europe and Asia.) The new type of terrorism is clearly international. International as regards participating members, regarding base locations and the selection of targets. Using the expression of globalization, or Thomas Friedman, the flat world, almost all elements are found in this case (Friedmann, 2006). Groups in different parts of the world come together to form a virtual organization that works independently of the times of the day and the seasons, and if they need to be in real-time relationship with each other. Terrorist organizations also move people, materials, and information without borders to the full potential of the technology.

Terrorism has altered the travel habits worldwide. The number of transcontinental trips has fallen, people prefer to go home close to their home. In general, the weight of domestic tourism has increased. People are afraid of flying, and as a result many airlines have gone bankrupt. The crisis in tourism, however, has led to the transformation of the strategy almost all countries that have profited much from tourism. People, however, are increasingly overwhelmed by the anger of the assassin, becoming accustomed to becoming a terrorist threat in their lives. After the blasts in Istanbul and Spain, there was no apparent decline in the rate at the end of 2001. The negative impact of terrorist contingencies on tourism can also be seen in numbers. In the United States, after 11 September 2001, tourism has virtually ceased. In the last three months of the year the number of visitors decreased by 12 percent. In 2002, a further 6.1 percent was the decline. The New York bombings, however, have brought back not only the tourism of America, but the whole world. In the European Union after the September 11, 2001 attacks in

New York and Washington, extraordinary measures were adopted. (Such as the European Arrest Warrant, the concept of terrorism and the adoption of uniform judgments). In Brussel, they decided to appoint a coordinator for counter-terrorism action and to ensure that issued visas are centrally recorded, terrorism suspected or convicted of terrorism. A body has also been set up to make it easier for Member States to exchange intelligence information. The united blacklist, which European banks have set up to control illegal money moves, already works. In a statement of solidarity, they undertook to provide even military assistance to a member who is a terrorist attack. The EU treats data confidentiality and freedom as a central issue. That is why it is in opposition to many places, for example, to provide travel documents with fingerprints or iris identifiers. The new anti-terrorist programs are part of the observation of terrorist extremities by hypermodern means. However, this would require the establishment of a global network of these structures. Additionally, terrorist attacks need to build a more robust, smarter infrastructure that, in the event of an attack, alleviates damage, helps people with recovery and recovery. According to the plans, the data of independent, but cooperating, organizations (law enforcement, intelligence, public health, local government) would be transferred to a large common computer system. The system would function as a coordinated, data center, immediately highlighting the most important information. The purpose is to keep the data stored in the organization so that it can be accessed to the authorities via the Internet.

Terrorism can also be perceived as a special kind of organized crime, so action against it is closely interwoven with organized crime, since there is a lot of information about it. In a broader sense, prevention of terrorism involves the prevention of all-social crime: the prevention of terrorist inclinations or terrorist inclinations, especially those young people, who are subjected to terrorism. An important part of prevention is also the creation of legal frameworks. Most of the information is obtained by more than 80 percent of people from the internet and television. This is especially the case for foreign affairs. Even more terrorist acts. The media have three key features. The importance of visual imagery on the Internet, on the internet, on the Internet: one image can be repeated hundreds of times or thousands, in fact it can be put into the subconscious. It becomes a means of fear-making if it shows dramatic, emotional or shocking images - repeated a thousand times. It also provides interpretation frameworks beyond. It does not matter what the journalist uses - terrorist, rebel, insurgent, freedom fighter, say IRA, Basque, Chechen or Arab terrorism. But in this, the international journalist community is also very divided. The press also decides on a topic on its agenda and on its agenda. For example, the image of twin towers on September 11 was seen on the agenda by the global television, CNN, Fox and others. Because of these three features, media is so important in mediating terrorist acts. On the other hand, terrorists, of course, have not only a political but also a media strategy. The 1960s saw the presence of extreme terrorist movements without mass-support in Western Europe in their media coverage. Terrorists want to reach different target audiences: supportive audiences, persuasive audiences, engaging governments, distant governments, hostile governments, and hostile public opinion. Unfortunately, this is mainly due to the fact that the commercial media are experiencing too frequent repetitions of the effects of terrorist acts. Terrorism would be pointless if there was no global media, where everything went almost everywhere and its impact was very rapid. Terror and media are in fact very close to each other. This is a compulsory relationship, even more powerful. Current terrorism is specifically designed for the media and for specific target groups. Personal safety during the trip is the top motivational attribute in attracting tourists to visit a destination. Destinations considered to be unsafe by tourists may not be considered to be suitable holiday choices and it is clear that violent attacks do strongly influence the choice of destination in a negative way. Previous studies only indicated that the choice of destination would be affected by the safety information from media.

The subject of safety and security has become more imperative not only for the host-community, but also for the tourist who is a guest in a new environment.

Security is a basic necessity. Safety and security needs include, personal security, emotional security, financial security, health and well-being, safety needs against accidents/illness and their adverse impacts. *Factors influencing the tourism security level:*

- Military Conflicts
- Terrorism
- Internal instability
- Natural Disasters
- International Crime
- Epidemics
- Migration
- Climate change
- Relationship between tourism security and crime
- Tourist as a victim
- Tourist as a criminal

Tourism security in practice:

- Travel safety (aviation, airport, train station, road)
- Accommodation security (hotel, motel, hostel)
- Event security (sports tourism, mass events, concerts)
- Information security (communication, travel planning)
- Health safety (vaccines, quarantine, medicines)
- Personal security (self-defense, self-defense devices)
- Financial security (insurance)
- Security of the future (biometric data, cyber security)
- Legislation and international conventions

The system of security and protection - *security sectors :*

- Political
- Social
- Military
- Environmental
- Economic
- Information security

The system of security and *protection sectors:*

- Police
- Military Defense
- Border Police
- Civil Protection
- Tax- and Customs Office
- Penalty Enforcement (prison, jail)
- Justice System
- Disaster Management
- Secret Service
- Intelligence Service

In Hungary the following organizations are responsible for security: Police, Terror Counterterrorism Center (TEK and TIBEK), National Security Services, Public Administration,

Civil Guard, Disaster Management (including Civil Protection, Fire Protection, Industrial Security).

The "new types of security challenges" have emerged in the world in tourism-related areas:

- economic recession
- cybercrime
- terrorism

How can we talk about these new types of challenges? We can do this through an experts' eyes or with a sober peasant mind. What these challenges as before? They became more complex, multiplayer, unfamiliar and became "mediated" by using the media, or even with help of the media. Think of the terrorists' messages - they knew their demands in a video message and then increased the impact by exploiting the internet and sometimes broadcast live their brutal acts - resulting in a shocking and dampening effect. Tourism security as an interdisciplinary field of science has only received more attention in Hungary over the past few years, primarily in the two fields of science from which it is conceivable. Tourism, as an economic and sociological concept, and the security, which basically - but as we shall see - are not the only ones of the military (and the political) sciences, can be interpreted and analyzed in a wide variety of ways. Perhaps this and the relatively new field of science can be attributed to the fact that the studies and treatises so far have been regarded as one of the aspects of security in the two major conceptual areas. In addition, tourism security has emerged in many other areas, for example, it has become a decisive part of governmental and foreign policy concepts and even strategies. Such a recent governmental concept was, for example, the definition and designation of NO-GO zones, which can already be interpreted as a tourism security issue. Of course, not only science has observed the phenomenon of tourism safety. As an organic process, as a result of globalization, we are becoming more and more involved in the field of tourism, and we are all concerned about tourism in this area, so the conscious consideration of the issue in society is becoming more and more common. Today, almost all aspects of the phenomenon of tourism are permeated by the issue of tourism safety, which is reflected, among other things, in the selection of travel destinations, pre-information and orientation, during the design of the tourist destination and during the return journey. The assessment of travel, later tourism security and of course its importance has changed a lot over the centuries. In my opinion, the concept of tourism and security can be linked to the fact that tourism security is nothing more than a" complex social phenomenon - with free movement in a safe environment. Terrorism is characterized by attacks that affect many people at the same time and are ruthless in their nature. Brian Jenkins defines terrorism as: "The calculated use of force to achieve certain political, religious or ideological goals." It is also worthwhile to deal with the internal psychology of terrorist acts, with motivation, goals and group identity. „Despite what most people think, terrorism is not really about mass murder. The primary goal of a terrorist attack is to strike fear and panic in the heart and minds of ordinary civilians. It's all about the psychological impact rather the physical damage." What is the terrorism? Terrorism is NOT a political activism and not "freedom fight". Terrorism is a conscious decision to choose a deadly tactic to support a case. Its purpose is to frighten and intimidate and create fear. Terrorism (terrorist) targets innocent people, civilians and soldiers. The psychology of terrorism : based on the definition of terrorism, tactics used to achieve a strategic political impact. Terrorism is a tool that is used to change political behavior through the use of punishment and threat. A quantum scale of violence can be considered as a medium technique. Its devastating effect is greater than a strike, but less devastating, such as a traditional military operation. What motivates the terrorist? *Ideologies:* each ideology is a system of values and principles - a belief system - which encourages people to act. The majority of religious (and political) ideologies are based on noble

ideals. (Later it may become distorted). Other ideologies, such as white supremacy, are based on hatred and fear. People who commit some kind of terrorist act say that they are acting in the name of a religious, political or other affair. So there are politics-related ideologies, and there are religious ideologies. Each terrorist group has primary and secondary goals that motivate a terrorist attack. These goals often strengthen each other. This will allow the consequences of an attack to multiply. It is important to understand the causes and goals. Motivation can have many different roots.

Motivations and Goals:
Primary goals:

- create fear
- to achieve in the target group with as many dead and wounded as possible

Secondary Goals:

- financial distress in the country / region concerned
- creating political unrest
- exploiting the media
- to force the government to introduce political or other operational changes.

The fundamental purpose of every terrorist is to shake up the existing structure of society and force responsible leaders to accept their demands in order to avoid further destruction. Despite popular belief, international terrorism is not necessarily associated with large number of massive victims, as is commonplace in wars between countries. Terrorism builds on fast, unexpected attacks, the consequence of which is never-ending, constant attentiveness. This constant vigilance is forced by the use of resources for the prevention, security and maintenance of security, which in the long run can cause economic and political crisis. Terrorist actions can also be used abroad to undermine foreign support for domestic politics and government. One-person terrorism is a rare phenomenon. Effective terrorist leaders are before groups, with permanent organization characterized by the existence of groups. Terrorism is a group activity, even if terrorist acts itself appear to be a lonely action.

How Terrorism Destroys Tourism? Tourism is a target of terrorism that has a strong impact on almost every area of economic life, so the economy can be immediately felt by the economy as well. After 2001, the operators of the travel market had to organize their lives, their work and their decisions. However, the international political climate of recent decades has shown in a number of cases that the brutality of terrorism does not spare the touristic frequented regions either. Recent events demonstrate that terror can not only appear in potential conflict zones that are part of Northern Ireland, Cyprus or Spa, but also in popular tourism paradises (Djerba Island, Bali, Luxor). Today, the issue of dealing with such conflicts plays a significant role in tourism planning and event marketing communication. 2006-2007 presented at the 16th Annual General Meeting of the WTO - World Tourism Organization - Dakar (Senegal) held on 28 November 2005. The annual work program and budget plan outlines the following security issues: Developing security-related services and measures (including health issues). Maintain the capacity of the tourism sector (even if temporary use does not justify it). Safety precautions. Recovering the confidence of tourists by increasing the sense of security and better communication. A S.A.F.E. strategy (security and facilitation strategy). The document highlights the importance of developing and implementing safety related issues (risk management, security plans) in relation to the Middle East. We have examine three countries. We experienced it in Tunisia local people were tormented by a terrorist act. They lost their jobs, locked the hotel. Tourism in Tunisia is one of the pillars of the economy. About 400,000 people work directly in the tourism sector and another 400,000 indirectly. The consequences of a

terrorist act are very serious. Families will be unemployed, as a consequence of the family's financial collapse. Vendors won't be able to sell their goods, but guests from the neighboring country are coming, not English or German (European) tourists and locals will thus be the ultimate "solution" for illegal immigrants to go and look for jobs in Europe. In Egypt half as many tourists arrive. Inner instability and internal revulsion frighten tourists away. People are confident that the next generation will re-enjoy the better life and economic prosperity of visiting tourists. 500 hotels closed in Egypt. Out of 900,000 hotel workers are now 600,000 unemployed. Whatever money came from tourism could have built hospitals, schools, houses ... instead, people are now in slums. Luxor - the cradle of cultural tourism today is bleak. You can hardly see a European tourist. Instead, they come from other Arab countries - from solidarity. People are scared by terror. In Turkey, Istanbul, in the Blue Mosque a terrorist exploded between German tourists. Thirteen people were killed and an additional of fourteen were wounded. In 2016 there was another assassination - at the airport. Three terrorists killed fourty-one people. 239 people were injured. Two weeks later, the military coup attempt came. Today the world-famous bazaar is not as packed as earlier. Earlier we heard about terrorist acts but they were more like a hijack of airplanes and bombings on politicians. Counter-terrorism activity in Hungary as a separate field of expertise has not been the focus of attention until the Terror Counterterrorism Center (TEK) has been established in 2010, which coordinates all activities related to counter-terrorism. However, the legally precise content of the anti-terrorist and preventive national security and police activities can only be defined recently, since the legal-normative regulation of the area was in the past typically in a low level of legislation and often in the form of secret instructions (National Security). The word "terror" comes from the Latin word "terrere" meaning "intimidate". Much can be intimidating. It may be an epidemic, such as pestis or Spanish fever, but we can remember the avian influenza virus or, in the case of animals, the chickenpox - the disease can be intimidating. The intimidation of the entire population is a terrorist purpose. You can use a variety of tools to do this. The events of 11 September 2001 have raised the level of fear in many parts of the world. Any act that reduces fear and concern among the population is an effective defense against terrorism. Terrorists act consciously and follow a plan, creating the impression that the attack is unexpected, the effect is random. Terrorism is characterized by attacks that affect many people at the same time and are ruthless in their nature. The events of 11 September 2001 have raised the level of fear in many parts of the world. Any act that reduces fear and concern among population is an effective defense against terrorism. Terrorists act consciously and follow a plan, creating the impression that the attack is unexpected, the effect is random. Terrorism is characterized by attacks that affect many people at the same time and are ruthless in their nature. Terrorism is a threat to violence which is not the most important feature, but the emergence of a fearsome and state-of-the-art fear of violence. According to Juergensmayer, "terrorist acts are usually products of an inner logic, not a random crazy idea. They do not want to achieve a strategic goal by carrying out these terrorist acts, but they are making a symbolic statement. All of the ethnic, religious, cultural and national big identity groups are subjected to the provocation of regressive, primitive and fanatical thinking and extreme emotions, especially when these groups have found fundamentalist ideologies they become self-confessed as they feel vulnerable and vulnerable and lose their "mi" consciousness. "Some people do not like to call these acts of violence" foolish "or psychotic, in fact these are psychotic processes that take place on the social and political stage of international human relationships. International terrorism involves individuals or groups who cross their actions one or more national borders. "Five cycles of terrorist attack: target selection, operational planning, implementation of the plan, escape and concealment, and exploitation of the media" . Attention should also be paid to supporting terrorism. In the Havala system (a cash dispensing system for money moving) where money does not "pass" physically across countries, full anonymity is ensured, as no documentation exists, agents make phone

calls, they are usually settled by freight, debt settlement, so that the items are in order for the accounting to be ok. The Islamic banking traditions are aligned with Muslim needs, they are different from ours. Here is the mention of financial terrorism, money laundering, which can lead to financing specific terrorist acts. How to fight terrorist financing? Exclusively, internationally, with an international offensive. Homeland Security Controls should be part of the transparency of financial areas. Today, prevention is of paramount importance in almost every field of expertise. This is the preparation. Preparing for protection and public order organizations, but just as important for the citizens as well. Terrorist planning is of the utmost importance. Just as planning is needed to implement a terrorist act, this is not the opposite on the other side of the defense and prevention side. In this, gathering information is of paramount importance. Examining the side of protection and prevention, professional security organizations should also mention the role of private security firms and services. In Israel, every private security guard has a military background, which means a special attitude and preparedness to "protect my family at any cost if I need to be in front of the bullet,,. It reduces the chances of terrorism, the actual guard is in civilian clothes in the "crowd". (S)he will not let go of the terrorist, or detect the danger in time, and interfere with it. Vigilance does not exist without preparedness, practice or routine. Destination country with a view to Israel's tourism. Despite the fact that there are parts where increased attention is needed, there is no shortage of visitors to Israel, but it is growing since authorities are well-prepared and tourists are almost invisibly protected at touristy places. An important question is whether intelligence supplies and timely delivers important and necessary information to organizations responsible for defense, including professional and private staff. Terrorism is a dynamic process. The remedy can not work otherwise. Intelligence based anti-terrorism requires an inter-country news agreement. This diplomacy has a significant role to play, maintaining a good relationship between countries will also help to bring a successful exchange of information, which give participating countries a greater security. This co-operation can be a useful technical assistance not only in prevention but also in the assessment of threats. On one hand, the policy of freedom - free travel in the European Union, is rather counterproductive in terms of police and security agencies and service perspectives, on the other hand, the development of new strategies and tools (like body scanners), mobilizing more human resources on defense and prevention. From the point of view of counter-terrorism, triainformatics, that is, the integration of "human geography" and spatial information technologies, is of huge importance. Geospatial intelligence is a specialized area of intelligence that has evolved from the integration of imaging, imaging intelligence and GIS information. Geoinformatics technologies and geographic information are used in strategic operations in spatial intelligence actions that focus on components of geospatial space, location, people, topologies, and activities. Activities in the social and geographic spheres are related. In the fight against global terrorism today it is indispensable to identify the patterns of geographical and social contexts. Today terrorists are global people. Travelling around the globe, they have world-wide connections, information technology allows organizations to make day-to-day contact with leaders from different parts of the world, making use of the virtual world. However, it is necessary for the virtual world to enter the virtual world. Use "smart" devices that already have a positioning system. The Global Positioning System (GPS) was originally a military development and an enterprise that became civilian but did not lose its military character; let's just think of the locator that has been placed in the "head" of the drone to help the observed area or even the target can be determined with precision. GIS intelligence and technologies have many benefits to counter-terrorism and national security, but it must be borne in mind that the same benefits are offered to terrorists in planning and strategy. Security policy is a crucial part of the government that defines success of foreign policy. As a result, a country can be classified as a tourist destination. The success of foreign policy is to be familiar with the leadership, to be a realistic view of international relations, dangers, to be aware

of the potential threats and to possess the necessary capabilities for the challenges. This task appears when defining the task set of national security services. The most important aim of national security services is to protect the independence and law of the country, and to provide decision-makers with necessary information, as they must protect the country from external threats and internal conflicts that have a negative impact on the functioning of the country and the security of citizens . "The acquisition of information that is so important from the point of view of security requires, by its very nature, special expertise, tools and methods, and an ability-based organizational structure that covers the full spectrum of civilian and military life. Security is not only a tourist's personal and property security, it is worth mentioning the quest for alien environment, the understanding of local signal systems, customs, conveying social conventions, and safety of consumption. The close relationship between terrorism and tourism is getting closer. In the eyes of the terrorist the tourist, the tourist events - Christmas fairs, festivals - are new opportunities. Ramming is a new form of terrorism. It is very important for both the police and the various departments responsible for various security services to co-operate in order to prevent a planned terrorist act. Today, almost all aspects of the phenomenon of tourism are permeated by the issue of tourism safety, which is reflected, among other things, in the selection of travel destinations, pre-information and orientation, during the design of the tourist destination and during the return journey.

REFERENCES

1. Friedman, T.L. (2006): The World is Flat. The Globalized World in the Twenty-frst Century, London
2. Kiss J. L. (2006): A „hiperterrorizmus” és az új nemzetközi rend kialakulása. In: Válaszok a terrorizmusra II. Budapest, SVKK.Chartapress
3. Póti L. – Takács J. – Tálas P. (2004): A terrorizmus elleni küzdelem fogal-mi és tartalmi keretei, különös tekintettel annak katonai dimenziójára. Budapest, SVKK Elemzések 2004/3.
4. Pizam and Y. Mansfeld: Toward a Theory of Tourism Security, Elsevier Butterworth-Heinemann, 2006.
5. Puczkó L. – Rátz T. (2002): A turizmus hatásai. Aula Kiadó Kft. – Kodolányi János Főiskola, Székesfehérvár
6. Tálas P. (2006): Kelet-Közép-Európa és az új típusú terrorizmus. In: Tálas (szerk.): A terrorizmus anatómiája. Budapest, Zrínyi Kiadó 2006.

"THE ROLE OF FOREIGN LANGUAGE LEARNING IN THE LIFELONG CAREER GUIDANCE PROCESS"

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ABSTRACT

I examine the role of language proficiency in the career orientation process. The essence of career guidance is to support people to understand their goals. Important, that their to understand their own personality and make a decision about their career. The usable language knowledge are a remarkable pillar of this process. According to my hypothesis, "the prerequisite of success" is language proficiency. LLL and LLG are particularly closely related to this topic because not only young people, young adults, retired people are recognize of the need for language skills – with other motivational backgrounds. I would like to point out that there is a need for a social paradigm shift that the proven existence of language proficiency (exam) in itself is not sufficient. Language skills are needed, usable language knowledge are needed. Proof of language proficiency in the form of paper entry entails many areas of the labor market, but the lack of usable language knowledge in the work area results in a failure, narrowing down the scope for enforcement, continuation or integration.

Keywords: *useable language skills, career orientation, competencies, "LLL", "LLG"*

INTRODUCTION

In Hungary - it has a tradition of being - in elementary school, but there are those who are already familiar with at least one foreign language in kindergarten. Nowadays, getting a diploma is also subject to a language examination. Surprisingly, however, it is difficult to communicate in another language as a tourist or as a prospective employee. International literature is widely recognized in a wide variety of fields, which, due to language difficulties, means that many professionals are lagging behind, and may even lose job losses later. As a Member State of the European Union, there is more uncertainty about languages around the EU in terms of representation and communication, as we would imagine.

I have investigated the ads of the more familiar Hungarian job search portals (http://www.careerjet.hu/, http://www.jobinfo.hu/, http://www.workania.hu/, http: //www.profession .hu /? gclid = CJbN-Lf108ECFe3LtAodBFwAyw,) as well as foreign work sites (http://iranynemetorszag.com/informaciok/allashirdetesi-oldalak.html, http://dolgozzaustriaban.jimdo.com/munkakeres%C5%91oldalak /), http://kulfoldimunka.lap.hu/ - which is a collection page for various foreign job placement sites. I am practicing almost 100 different job positions. In most cases, an advertisement or an important part of the ad was published in English or German, for example: "College or University degree or diploma (preferably in Economics), Fluent in other European language is an advantage, this is a job posting in Budapest. For example, in Győr-Moson-Sopron county, they are looking for an industrial project engineer - expectation: "Negotiating English Language Skills". There are many different levels of language schools at all levels of the country. With regard to the number of language schools, we might think that most of the population in this

country can communicate in one or more foreign languages, yet experience shows the opposite. It is a fact that the Adult Education Act governed the conditions for the operation of language schools. Human factor and motivation can not be regulated by law. While in a childhood, the outcome of a decision made by a parent or other person determined by which language is studied in adulthood is usually a result of conscious and autonomous decision - which may include achievement of a goal or other personal need to fulfill or maintain a job. Environmental - linguistic impact can not be ignored. More professions, scientific publications, official or semi-official languages of English. This language is spoken outside the mother tongue by millions of people in the world. The explanation is that English is "the most pragmatic", the "culture neutral", the viable, the rich, even the "democratic" best suited to modern technology. The expansion of American English in the world language is undoubtedly aided by the (unfortunately, no global) attraction of the American way of life (the dream of americanism, the "American Dream" - "whatever it may be" or otherwise the American way of life) that the advertising world particularly generates and distributes . Its specific language mirror is the use of English words and texts in a non-English language without translation. It should also be seen that many people also like this. The untranslated English text is a perfect manipulation: the "incomprehensibility" of advertising texts serves to mislead Americanism, like, for example, to the medical Latin. In 2005, the Medián Public Opinion Institute published a study by Márta Szénay about the knowledge of the Hungarian foreign language. Some of the data would be quoted from work: "In English, 17 percent of the 15-44-year-old population has 10 percent of the knowledge of the language. In other languages, 4 percent of the age group is at an acceptable level ... .15 to 44-year-olds, very high, 45 percent, those who do not have virtually any foreign language skills. Another 30 percent, the proportion of those who have a low level of limited language skills. Only 5% of the population surveyed knows some other Western European language, most often French or Italian. Those under the age of 25 who have begun their language studies in the course of free language selection and language education are in a much better position than the 25-29-year-old generations who were learning in public education at the time of change , but its benefits - probably due to problems with all major changes - have not yet been sufficiently profitable ... the foreign language skills of two-thirds of the 40-44 age group are virtually zero. "(Adult Education Research Factures 2005) For many years , the Russian language was compulsory, so, gently, utterly in vain. "The development of course can not be stopped, and the texts of foreign advertisements are still used by young people, as an English slogan not only carries the message of the advertisement but also a sense of life. It is now established that pubs, pubs, shopping centers, If you have a tendency to continue, then it is expected that the tongue will be "weeping" and will probably be "hent." If you already have everything for a company, you should at least make it clear to everyone. there are and will be some words that will eventually be incorporated into the Hungarian language, but not one of the traders will have the gold ring from his finger - if the law does not even concern him - if he signs the inscription in Hungarian on the sign board of his shop ... At least for our grandmothers ... " (Péter Virányi 2007) The question to which I would like to answer in my thesis is how language skills affect the career orientation process in different age groups. Career orientation is to support people to understand and clarify their goals and aspirations themselves to understand their own personality and make informed choices about their optimal career choices. After decision-making, they will be able to implement them during their career paths to manage planned and ad hoc changes. In this process, language knowledge as a help or as a "survival technique" appears, its lack of motivation can be a goal. According to my hypothesis, "the prerequisite of success" is language proficiency. Lifelong Learning and Lifelong Guidance are particularly closely related to this topic because not only young people, young adults, retired people are recognized as recognizing the need for language skills - other motivational backgrounds . With my dissertation, I would like to point out that a social paradigm shift is

needed, namely that the proven existence of language proficiency by itself is not enough. "Most foreign graduates are looking for opportunities in Germany, Austria and the UK, but in addition to the labor market, adaptability to the country's value system also has a significant impact on young people, with qualifications in engineering, information technology, medicine or psychology available anywhere in Europe. Those with a few years of experience have a significant advantage, "said Tamás Fehér, Managing Director of Trenkwalder, HVG Career Plus. (HVG Career Plus 2014) "Young graduates are attracted by British jobs, but we are surprised to find that work on cruise ships and ads in Germany over the period January 1 to January 2014 was preceded by an interest in working in Hungary," said Katalin Szekeres, Manpower Marketing Manager of Hungary. What's the reason? Language skills are important not only at work but also in terms of up-to-date professional knowledge. Knowledge of international publications is indispensable for scientific work, but today it is not just there. Not only scientists and researchers publish the results of their work, but also the representatives of all professions. The World Wide Web also brings people close to you, events that are essential for understanding other languages. A basic requirement for working abroad is the knowledge of the language of the given country. Well-trained specialists in their profession often perceive a job interview because of the lack of language skills. In some cases, the professional team is primarily selected from multi-ethnic staff, and the common knowledge of the English language in most cases is the decisive factor. An employer can not be obliged to have the employment contract available in the language of the employee, so this may give rise to many misunderstandings. When building a career, it will be an unavoidable task, and it must be fulfilled in a job interview with an English language or other foreign language. Are There Techniques That You Can "Be Safe " How to Prepare for This? Many people study language online, even more in language schools, fewer in private teaching. " It is a typical phenomenon in the field of graduate students - they are accustomed to colleges and universities for many exams, and they get a one-week intensive study, but they can no longer do this with spoken angles in real life, and a job interview can not be done with a short training get ready if you do not have a firm foundation of language skills. You have to start thinking about time planning the stations and levels to reach the goal. "(Gábor Fekete, 2014) Gábor Fekete, the leading English language teacher in GO! Online language classes, advises that language learning should be part of everyday life because it may be needed at any time and it is too late to start The preparatory training will only work if the candidate is fluent in the given language. In the domestic and international context, bounty hunters, HRs prefer to browse the Internet where there is a greater chance, for example, in English (also), filling in some data sheets and registrations for new career opportunities, who wish to modify the career path or lose their jobs. Forums, Blogs, Twitter, Videos are all excellent presentation options. On social networking, especially on Linkedln, it is worth filling in all the sections in the datasheet - exactly, in detail ... of course in English. It is almost commonplace to start a theme that has "since childhood" ... and since I was a child, I have been learning language learning, the role of languages, the level of knowledge, the necessity and the usability of everyday life. Different languages have followed my life - my studies, my career choice, my career change, my work. I've met countless ways, a teacher, I've met several languages in a variety of ways from my childhood to the present - and the process has not ended. The geopolitical situation of Hungary, its membership in the European Union, the free flow of labor and many other time-bound aspects all reinforce the need for language, but rather the acquisition of languages in addition to our mother tongue in order to move on in a changed or specific situation, we can look for new ways for our prosperity - at home or in another country. What is needed to be able to do so?

COMPETENCES

Under the concept of competence, the Pedagogical Lexicon attributed the ability to master the meaning of the word Latin, emphasizing the fact that it is an intellectual property but plays an important role in motivational elements, skills and other emotional factors such as attitudes to certain things. Among the motivations I would highlight the existential and the prestige motifs. There is another interpretation where professional skills are considered competence. For each position, long competency lists are made, which can be frightening for a beginner. Fortunately, they are used in many places to design staff development. "Competence is the common name of inherited and learned psychic conditions. Competence motives (needs, tendencies, attitudes, persuasions), knowledge (skills, skills, knowledge and so-called recognition routines) and so-called constrained elements (reflexes, habits, routine We talk about personal competence - it allows to meet personal needs and to personalize interests without social interactions, consists of motives, abilities and skills - cognitive competence - the motive and ability system of information management, the elements of communicative, thinking, knowledge acquiring and to be a competent person to be able to act, to decide and to act, to be competent, to be competent we have been able to solve the problem and to deal with our environment. So far, we have talked about abilities, in turn, about lack of ability and ability to develop. The emphasis on the concept of competence is needed because not only children, but also the necessary competences (skills) for school subjects, but are needed in everyday or extraordinary situations (a situation of recognition and good interoperability.) There are many competencies, based on a unique talents factor. Cognitive Competencies: Language, Learning, Mathematics, Science, Information Processing Ability ... etc. Social and Personal Competencies: Capability, Connection Capability, Ability, Collaboration Capability, Conflict Resolution. Moving Competencies: Handmade, Fine-Motor, Motion Coordination, Balancing, Reaction Rate. "

Competence and success

"Successfulness - in any field of activity - depends in part on the cooperation and interconnection of several competences. This is the explanation that persons who achieve similar results in certain activities have different personality traits and even different competence structures (Budavári-Takács, 2009) Exploring the level of competence and developing the special competences is only a prerequisite for success in the career as the whole personality as well as the environmental factors influence the functioning of the competences. The interest in the cognitive competence system is of utmost importance as this attribute gives the motivation basis for work, so we discuss this personality feature separately. (Budavári-Takács, 2009) Competences play a very significant role in the success of work and the satisfaction of work. This also includes the fact that the pace of development of different competences is different, so we need to know the process of developing professional competencies. On the other hand, competences reach a level of development that is characteristic of a personality at a given age, but the level of development of competences may vary according to a specific level of education, such as higher education. "4 (Budavári-Takács, 2009)

Eight Key Competences

The European Union has identified eight key competences:

1. Communication in the mother tongue

Communication in the mother tongue is the ability to express and interpret concepts, thoughts, feelings, facts and opinions both verbally and in writing, and to engage in the full range of social and cultural activities in a language correctly and creatively; education and training, work, family life and leisure activities. The essential knowledge, skills and attitudes associated with this competence: Communication competence follows from the acquisition of mother tongue, which by its very nature is related to the development of the cognitive ability of an individual by interpreting the world and relating to others. Communication in the native language requires the individual to have the knowledge of vocabulary, functional grammar and language functions. This includes the main types of verbal contact, the literary and non-literary styles, the main peculiarities of the various language styles and registers, and the change of language and communication in different situations.

2. Communication in foreign languages

Communication in foreign languages is largely based on the same skills in communication with the mother tongue: it is based on an oral and written ability to understand, express and interpret concepts, thoughts, feelings, facts and opinions within the appropriate framework of social and cultural activities - education and training , work, family life and leisure activities, according to the individual's needs and needs. Communication in foreign languages also requires skills such as mediation and intercultural understanding. Individuals' level of language proficiency can be variable in terms of the four dimensions (listening comprehension, speaking skills, reading comprehension and writing skills), different languages and the individual's social and cultural background, environment and needs and / or interest. Knowledge of foreign languages requires knowledge of vocabulary and functional grammar, as well as the viewpoint of the verbal connection and the main types of language levels. It is important to know the social traditions and the cultural attitudes and varieties of languages. Positive attitudes include respect for cultural diversity and interest and curiosity for languages and intercultural communication.

3. Mathematical Competences and Basic Competences in Natural and Technical Sciences

Mathematical competence is the ability to develop and apply mathematical thinking to solve the problems of everyday life. Based on confident knowledge, the emphasis is on the process and activity and knowledge. Mathematical competence at various levels involves the ability and the tendency to apply mathematical thinking (logical and spatial thinking), as well as the representation of this kind (formulas, models, structures, graphs, tables). The natural science competence refers to the ability and willingness to use the knowledge and methodology used to explain the natural world in order to identify problems and draw conclusions based on evidence. Competence in the field of technical sciences is considered to be the use of this knowledge and methodology in response to perceived human will or needs. Science and technology competence involves understanding the changes caused by human activity and the responsibility of each citizen.

4. Digital Competence

Digital competence encompasses the confident and critical use of information society technologies in work, leisure and communication. That is, basic knowledge: using computer for retrieving, evaluating, storing, producing, presenting, and exchanging information, and for communicating and participating in collaborative networks over the Internet.

5. Learning the Learning

Acquiring learning is the ability that an individual strives to do and deals with, organizing his / her own learning, including time management and efficient management, both in individual and group learning. This competence involves knowledge of the learning process and needs of an individual, recognition of available opportunities, and the ability to eliminate obstacles for effective learning. This competence means acquiring, processing and assimilating new knowledge and skills, as well as seeking and applying guidance. Acquiring learning will lead the learner to build on pre-learning and life experiences in order to use and apply knowledge and skills in a multitude of situations: at home, in work, in education, and in training. Motivation and self-confidence are essential to the individual's competences.

6. Social and Civic Competence

These include personal, interpersonal and intercultural competencies and define all forms of behavior that enable an individual to participate effectively and constructively in social and professional life, especially in an increasingly diverse society, and if necessary conflict solve. Civic competence equips individuals to be fully involved in public affairs, based on their knowledge of social and political concepts and structures, and the commitment to actively and democratically engage them.

7. Initiative skills and entrepreneurial competence

Initiative skills and entrepreneurial competence refer to the individual's ability to realize his or her ideas. This includes creativity, innovation and risk-taking, as well as the ability to plan and carry out plans for the individual's goals. It helps individuals - not only in their daily lives at home and in society, but also in their workplace - to understand the wider environment of their work and enable them to seize the opportunities and provide the basis for more specialized skills and knowledge to which they are they need those who create or associate social or commercial activity. This includes awareness of ethical values and encourages good driving practice.

8. Cultural awareness and expression

Recognizing the creative expression of ideas, experiences and feelings through various forms of expression in various art forms, including music, performing arts, literature, and fine art.

Important objectives:

Member States should develop key competences for all as part of their lifelong learning strategies, including a strategy for access to general literacy, and use it as a reference tool for the "Key Competences for Lifelong Learning - European Reference Framework" (hereinafter referred to as "the Framework") in order to ensure that basic education and vocational training

provide all young people with the tools to develop key competences to a level that prepares them for adulthood and which is the basis for further learning and job creation as well as to ensure that appropriate measures are taken for young people who, by virtue of their educational disadvantage due to their personal, social, cultural or economic circumstances, education and the ability of adults to develop and update their key competences throughout their lives and to pay particular attention to the target groups identified as priorities in the national, regional and / or local contexts, such as the need to update their skills persons. In addition, adequate infrastructure should be available for continuing education and training for adults, including teachers and trainers, recognition and evaluation procedures, measures to ensure equal access to lifelong learning and access to the labor market, and support for students taking into account adults and ensure the coherence of adult education and training opportunities available to individual citizens through close contact with employment policy and other policies affecting social, cultural and innovation policies and other youth policies and cooperation with social partners and other stakeholders. Besides mentioning the competences, it is important to mention the importance and the role of interest.

The role of interest

"One of the most prominent representatives of the Psychosocial Psychology, János Csirszka (1966), is defined as" The interest is the sense of contentedness of the personality's saturated content that serves the subjective value of the object to which it is directed. It can be regarded as a lighthouse that is to a smaller or larger part of reality falls and illuminates them, creates a connection between them and the personality, which can be a spontaneous turning and can be deliberately directed. "The definition highlights that the object of interest is to be found in the outside world, and interest itself is a selection, screening process, in which the personality characteristics of the individual are decisive.The interest is expressed by the relationship between the world and the individual The interest in Csirszka (1968) consists of two main elements: one element is the choice of object on the basis of subjective evaluation, there is a long-lasting relationship with the subject, the development of interest in personality exposure. Grössler argues that objects create interest. Interest is nothing more than an active susceptibility. This makes susceptibility of the object more and more grasping. Hofsetter also emphasizes the attractiveness of the objects in their interest. He argues that the interest is based on the fact that the individual emphasizes subjects from different subjective perspectives and creates an inner relationship with them. (Szilágyi, 2010) According to Johann Friedrich Herbart, the scientific founder of educational science, interest is rather the self-activity of the spirit. It is a concern that it is not the result of personality's efforts, but the learning creates and strengthens it. Interest seems to be the same with spiritual activity, that is to point to the cognitive aspect of interest. (Szilágyi, 2010) According to Édouard Claparéd, interest is the complete and mutual adequacy of the subject and the object. The object, which is neutral in itself, becomes subject to the subject in some respects. The subject's interest is that the subject has a psychic state that conveys the value of the object. (Szilágyi, 2010) Rubinstein distinguishes between direct and indirect interest. Direct interest is directed at the subject itself, the indirect benefit to the subject. Interest can be a direct trigger of action. One of the most important aspects of interest is the diffusion intensity: interests usually form groups, dynamic systems, clustering around focal points and not at a certain level, but at different depths, some of which are fundamental, more general, others secondary, more partial. According to Szilágyi (2010), interest is nothing but a preference regarding a phenomenon or a knowledge of it. Interest is a kind of sympathy with some cognitive, acquiring activity. During the development of personality, an individual's interest structure develops, which corresponds to an environmental condition, that is, to the characteristic structure of a job or profession. In the optimal case, the profession or profession

carries the material conditions of satisfying the interest. In Super (1987) career theory, the importance of knowing interest is important for the definition of self-definition. " Interest affects the lifelong learning process.

Lifelong Learning (LLL)

"Lifelong Learning can be interpreted as a paradigm for the European Union as a strategic thinking and concept that simultaneously assists in increasing the individual's sphere of action through learning, as well as the co-operation renewal of community frameworks in terms of employability and social in order to increase cohesion, so it wishes at once to achieve economic and social objectives by balancing individual and community interests. " The Modern Concept of Lifelong Learning: "All Learning Activity Undertaken throughout Life, with the Aim of Improving Knowledge, Skills and Competences within Personal, Civic, Social and / or Employment-Perspective". (Németh, 2016) Appropriate knowledge, skills and attitudes in the given circumstances are key competences that are essential to a knowledge-based society for all individuals. By providing flexibility, adaptability, satisfaction and motivation, these key competences are an added value in the labor market as well as in social cohesion and active citizenship. The concept of lifelong learning has transformed the usual, fixed-minded orientation picture that, for example, someone started as a architect in the world of work, he could retire as an architect - not often from the same company he started his job. The accelerated, changing rhythm and dynamism of the world around us make constant change and change. In this, language skills are becoming more and more important because, as I have already written, borders have expanded, challenges and opportunities have become world-wide. Today, tomorrow, in another country, you will need the knowledge we have or just build a new factory in our country, where we need to get acquainted with a new technology - an international staffing team, maybe a new profession or a specialty to get acquainted with to this group of employees.

The concept of career orientation - goals and principles

"The word" career "comes from a French word for carriere, the original meaning of which is the horseshoe track and horses' rushing, the word has meant a change in meaning, so it has a career and a career in the world of work. long-term work experience in Hungary, the word career has long been negative in terms of content, incapacitation and disparaging others. After the change of the system, professional career guidance has gone through, the word career has undergone a positive development, today the concept of building a career we use it. "(Budavári-Takács, J. Klér, Langer, 2011) Starting from ancient societies, during career, they generally understood the status achieved in the social hierarchy. Status refers to the position of an individual or group relative to the surrounding society, which depends on the prestige of a hierarchy within a group or society. The status may be active or latent, donated or acquired. The gifted status can be acquired through the birth of a person, while the acquired status is the result of personal effort and rivalry with other persons who want status. This status ensured the privileges, property, and respect for the individual. By the content of the content, the status is the individual occupied within an organization. With the formation of industrial societies, with the differentiation of division of labor, the word career has changed. Career primarily started to work and work. Later, as a result of the Industrial Revolution, profound economic and social changes led to career development for the individual's career. (Budavári-Takács, J. Klér, Langer, 2011) The career orientation process plays a very important role in the construction of a personal career, as the construction of an individual life course begins at school age. According to a modern interpretation of career guidance, the decision about career choice and

career development is a preparatory process. Thus, the career guidance process is the key to acquiring an adequate amount of and quality self-knowledge, career guidance and labor market knowledge. In this process you are aware of what activities you are doing with pleasure (interest), what activities are good (eg competence, ability), what is important to you (values), and how you like to work (work mode). At the same time, it recognizes the paths, the fields of interest, their activities, their competences and their features, which are compared to their own characteristics. At the same time it also gains knowledge on the labor market, so it also meets the realities and the perspectives of the tracks. A career counselor can be a career counselor, a job advisor, a career counselor, a teacher, a vocational trainer, a school psychologist, a psychologist working in the educational counselor, and everyone involved in this process. (Budavári-Takács, J. Klér, Langer, 2011) Career counseling is a professional human service whose essence is personality. The counselor and the counseling staff take part in the counseling process, so counseling is always tailor-made and unique. It is a feature of a career-oriented, supportive process. (Szilágyi, 2010) Career orientation is a broad support for the individual, in which the individual and the environment have an ongoing influence on each other. To understand career guidance, it is important to be aware of thinking about career counseling. Thinking about career orientation begins with theories of evolution. In the psychoanalytic theories emphasizing the development, the role of the environment in career choice is already raised by the acquisition of social roles. Socialisation becomes the central thought of theory based on socio-cultural determinism. Kohli (1973) defines career choice as a social process, in which socialization plays a prominent role. Daheim (1967) points out the process of career choice, which has a narrowing role in orienting the choice of school, training, occupational position and workplace choice. The socio-cognitive career model builds life course building as a complex process in which the individual's self-efficacy is fundamentally determined by the career path. Self-efficacy has an impact on expectations, which affects the individual's interest, career choice, election actions, and then manifests in different performance areas and the person's knowledge. Performance and knowledge as a learned element are built into self-efficacy expectations and performance expectations. Learning experiences are also affected by personal inputs (eg predisposition, ethnic characteristics, disability) and environmental factors. Personal characteristics also affect the environment's supportive and obstructive effects, which are also reflected in the selection of career choices and in the execution of career choice actions. The experience of self-efficacy is a decisive factor in choosing an activity and a career path. The experience of self-efficacy is shaped by the process of family and school socialization. (Kiss, 2009) The role of self-knowledge in the career orientation process is very significant. It is important to understand how a person can measure the positive and limitations of himself and how to reconcile the picture of himself with the data and possibilities in reality. Interest, ability, values, and workflow as a psychological factor affect the whole life-cycle and can be a central part of self-knowledge. Based on these, self-knowledge is organically linked to career orientation and career development. In the course of career development, the new literature related to career choice implies a process that is related to the development of personality (both of which lasts for a lifetime), and emphasizes the evolution or the procession as a process of self-realization or a way of self-expression. (Budavári-Takács, 2009) As these key competences need to be mastered, this Recommendation proposes a reference tool for EU Member States to ensure that they are fully integrated into their strategies and infrastructures, in particular lifelong learning . All key competences are equally important, as they can all contribute to a successful life in a knowledge-based society. Many of the competences are partly intertwined and intertwined: the elements that are indispensable for one area support the competences of the other area. The existence of basic skills in language, writing, reading, counting, and information and communication technologies is an indispensable basis for learning while learning to learn provides support for all learning activities.

The psychological and pedagogical aspects of adult language learning

(Language) learning and motivation

Basic Motive for Action "Motivation" comes from the Latin word "movere". In the area of language learning and teaching, we have many known and lesser-known theories. However, all important theories agree on one thing: motivation is one of the most important factors in language learning and language teaching. However, of course there are other factors, but I think motivation is one of the main drivers of learning, which it helps but may hinder the process of acquisition. Krelem Kelemen studied linguistic susceptibility, language sensitivity and linguistic self-confidence among the factors relevant to adult learners in the framework of the Eszterházy Károly College School of Educational Sciences, highlighting the positive attitudes that affect the whole language learning. "Language learners are looking forward to the long process they are waiting for. It is aware that language learning is a complex and lengthy process and, unfortunately, forgotten to learn from many years of schooling away from school. they need to be taught to learn. To do so, it is indispensable to have a certain level of language teaching, psychology and subject-based knowledge of the adult teacher, perhaps more accentuated than teachers teaching other ages. Clément draws attention to the importance of motivation. He was the first to examine the issue of language self-confidence in the field of foreign / second language motivational research (Clément, 1980; Clément, Gardner & Smythe, 1977). The category of language self-confidence defined by the individual and his environment describes how much he trusts in the language learner and how much he thinks he has the skills to learn a foreign language, that is to say that he or she can successfully accomplish the tasks needed to accomplish the goals set. Linguistic self-confidence is, therefore, the language-learner's own ability to perform the tasks required to learn foreign languages. The focus of the language learning model of Clément et al (1994) is also the focus on the learners' language, ie internal (integrative) motivation, but in multicultural environments the language self-confidence is also influenced by the quality and quantity of contact with spoken language speakers.

SUMMARY

Is the skill or survival technique of success a language knowledge in the lifelong career guidance process? In my opinion, language skills can not be used with one or more language exams. But once you have the certificate, language skills need to be maintained, continually nourished and enriched because a previously acquired language knowledge is practiced, forgotten without use and when it is needed, we can not speak but before we learned a few languages for years . In my current and future work, I consider it important to emphasize the need for usable language skills in my lifelong career guidance process. The failure of a former, but forgotten, knowledge failure is worsening self-esteem, lack of usable language skills will worsen the chances of competing in the market. Klára Szilágyi (1976) breaks down the process of career orientation into three major phases: "at the first stage of knowledge, the individual's personal qualities are recognized as an interest, ability, values, etc. At the second development stage, This is where the person is thinking in perspective: a prospective career as a life prospect In the third synthesis stage, a picture is created in the third synthesis stage of itself, which is the centerpiece of the presumed career image, and to which the person's true (actually characteristic) attributes are related to the person's orientation during the career guidance. " The essence of career guidance is to support people to understand and clarify their goals and aspirations themselves in order to understand their own personality and make informed choices about their optimal choices in their career. After making their decision, they are able to

implement them while managing their planned and ad-hoc changes in their careers. This is a basic need for language skills in today's labor market competition. It is not a survival technique, it is the pledge of success itself.

REFERENCES

1. Budavár-Takács I. - Kasik L. (2012) „A pályaorientáció rendszerének tartalmi és módszertani fejlesztése" kiemelt projekt (TÁMOP-2.2.2-12/1-2012-0001)
2. Budavári-Takács I.- J. Klér A., Langer K., (2011): Karriertervezés, elektronikus tankönyv, Szent István Egyetem, Gazdaság- és Társadalomtudományi Kar, Gödöllő
3. Budavári-Takács I. (2009): Az önismeret és a döntések szerepe a pályaépítésben, TÁMOP 2.2.2. „A pályaorientáció rendszerének tartalmi és módszertani fejlesztése" című projektjéhez kapcsolódó módszertani segédanyag
4. Clément, R. (1980): Ethnicity, contact and communicative competence in a second language. In Giles, H. M., Robinson, W. P., & Smith, P.M. (szerk.): Language. Social psychological perspectives Oxford: Pergamon.
5. Clément, R., Gardner, R. C. & Smythe, P. C. (1977): Motivational variables in second language acquisition: A study of francophones learning English. Canadian Journal of Behavioral Science, (9),
6. Csirszka János (1966): Pályalélektan, Gondolat Kiadó, Budapest
7. Csoma Gyula (2001): Az andragógiai elmélet kialakulása és alapproblémái. Budapest
8. Csoma Gyula (2001): Új szempontok a felnőttoktatás tanítási-tanulási folyamatainak időszerkezeti hátteréhez. Budapest
9. Daheim, Hansjürgen (1967): Der Beruf in der modernen Gesellschaft : Versuch einer soziologischen Theorie beruflichen Handelns, Köln: Kiepenheuer & Witsch.
10. Felnőttképzési Kutatási Füzetek 2005 évi száma
11. HVG Karrier Plusz 2014
12. Kiss István (2009): Életvezetési kompetencia, PhD. Disszertáció, ELTE, PPK, Budapest
13. Kohli, M. (1973): Studium und berufliche Laufbahn, Stuttgart
14. Kukla Mária (2008): "Foglalkoztathatósági Skála" Mérés és értékelés lehetősége a munkaerő-piaci szolgáltatások terén. Munkaügy fejlesztéséért pályázat.
15. Németh Balázs (2010) A lifelong learning-paradigma hatása az Európai Unió oktatáspolitikájának formálódására PTE FEEK jegyzet
16. Super, D. E. - Minor, F. J. (1987): Career Development and Planning in Organizations. In: B. Bass (szerk..) Advances in Organizational Psychology, International Review, Sage Press: Beverly Hills 50
17. Szilágyi K. (2010): Munka- pályatanácsadás, mint professzió, Kollégium Kft., Budapest
18. Virányi Péter (2007): Nem igaz, hogy a reklámtól lettem ilyen Gondolat Kiadó Budapest

Internet

1. http://europa.eu/legislation_summaries/education_training_youth/lifelong_learning/c11090_en.htm (11.11.2018)
2. http://europa.eu/legislation_summaries/education_training_youth/lifelong_learning/c11090_en.htm (11.11.2018)
3. http://www.elgpn.eu/publications/browse-by-language/hungarian/az-elethosszig-tarto-palyaorientacios-szakpolitika-fejlesztese-europai-kezikonyv/ (14.00.2018)
4. Borbély-Pecze Tibor Bors, Gyöngyösi Katalin (2012): Beszámoló a IV. európai pályaorientációs szakpolitikai konferenciáról, Ciprus, Larnaka, 2012. október 24. http://www.munkaugyiszemle.hu/beszamolo-iv-europai-palyaorientacios-szakpolitikai-konferenciarol (11.11.2018)
5. http://ec.europa.eu/education/policies/2010/doc/keyrec_hu.pdf (11.11.2018)

THE POTENTIAL IMPACT OF MIGRATION AND REMITTANCES IN THE GAMBIA

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ABSTRACT

This paper provides a review of the literature on the impact of migration (internal and international) and remittances on alleviating poverty in The Gambia. Migration is an on-going phenomenon that has important development implications both within and outside the borders of a country. From the point of view of a sending country, migration and the resulting remittances lead to increased incomes and poverty reduction, better output in education, improved health and promote economic development for the beneficiaries.
Besides the literature review, the authors also provide an insight into theories of both migration and remittances. It takes into consideration the impacts that migration and remittances hold in the country of origin and destination specifically focusing on the country of origin. The paper employs and depends more on secondary data using case studies of selected countries to illustrate how migration (internal and international) and remittances have impacted in the socio-economic development of such countries. The potential impact that Gambia can experience as a result of high rate of its youth migration are discussed in this research. The findings from the various case studies provide a multidimensional approach in curbing migration. Recommendations relating to policy guidelines with respect to the Gambian context has been identified in mitigating internal and international migration.

Keywords: Remittances, poverty, migration, international migration, country of origin and destination country, Diaspora

PROBLEM STATEMENT /INTRODUCTION

Migration has been an on-going phenomenon in the Gambia, both in terms of regular and irregular migration especially within the shores of Europe. According to the World Bank (2018) remittance data inflow of The Gambia 2017 stood at USD 217 million. The high unemployment rate and the fluctuation of the Gambian economy by the government has been key issues of most Gambian migrants. The unfavourable phenomena have resulted into a high attrition rate of both the skilled and unskilled workers. According to C. Kebbeh (2013), the number of Gambians living in abroad is 65,000 (or around 4 percent of the total population) though when compared to other African countries could seem very small.
However, its skilled emigration rate (63 percent in 2000) was ranked among the top 20 worldwide and the second highest among African countries. Emigrants from The Gambia — both skilled and unskilled — send high levels of remittances to their family members at home. (C. Kebbeh 2013) The trend has drastically increased, especially in the last decade when the Gambia has lost some of its youthful population as they search for greener pastures in the shore of Europe prominently using the Mediterranean Sea.

The research objective

The general research objective is to Analyze the potential impact of International Migration and Remittance on Gambian households. The specific objectives of this research are as follows

1. To Analyse the impact international migration will have on the Gambian economy
2. To Examine the potential effect of remittances on livelihood of recipient household.
3. To Determine the destination of Gambian migrants.

LITERATURE REVIEW

Most migrants search for a better life, and as a result, overcome tremendous geographic, cultural, and legal barriers with countless stories and experience (Clemens, 2015). Sub-Saharan Africa lags behind other developing nations in several human development indicators (UNDP, 2010). International migration is a phenomenon with multiple implications pointed initially towards the emigrant and secondly towards the home community, family, and also migration community (Cormoş, 2014). These factors among others have resulted in consistent migration of both skilled and unskilled labour in search of better working conditions. Remittance flows are one of the upshots of migration, which has emerged as a key link between human mobility and development (Akobeng, 2016)

International migration has a significant role in contemporary social transformations. As the trends of international migration rises changes are bound to be felt both in countries of origin and in the receiving countries, individually and collectively. However, not only is its immediate impact primarily felt at the economic level, but also affects labor, social, cultural domains, national policies and international relations, leading inevitably to a high socio- ethnocultural diversity in all states (Cormoş, 2014).With regards to Remittances it's usually the money and goods that are transmitted to households by migrant workers working outside of their origin communities. (Adams Jr, 2013). What seems to be unclear is probably on how these goods and especially money that are been received by migrant's home country are used. How are the remits used in the home country? Is it in a productive or flamboyant life which may have adverse effects on the sustainability of the standard of living.

The remittances continue to have double sided view. There are some reviews of literatures that looks remittances to have improvement in the economic and livelihood of the migrant's families and others see it otherwise. Most of these remittances are viewed to have little positive impact to the livelihood of the recipient households since parts of it is used for consumption. They focus most of the remittances on housing, land, and jewellery- which to the author is not productive especially to the economic holistically (Chami, 2003). Remittances induced disincentives to work and promote idleness among migrant household members as they used remittances to substitute for other income sources. (Nga Bui, 2015) .

In contrast to the above view, the studies of Adams et al, (2010) indicates that there are evidences in the countries of Guatemala, Philippines and Nigeria that the remittances are used in productive investment like eductaion and good housing. Remittances give migrants, households and communities greater freedom to concentrate their activities and to allocate investments to those economic sectors and places that they perceive as most stable and profitable.

Brown et al (2008), in a survey-based study for the World Bank among migrants sending and remittance-receiving households in Fiji and Tonga, it was discovered that remittances make a significant contribution to the alleviation of poverty, as well as promoting saving, investment and human capital.

The living conditions of most of the developing countries would have been worst off without the emerging roles of remittances. Haas et al (2005), indicates that remittances have made possible a drastic improvement in the living conditions of millions of households in migrant-sending countries. For an increasing number of developing countries remittances form a crucial source of foreign exchange, sustaining their balance of payments. In addition, governments of sending countries have placed renewed hopes on migrants as potential investors in the national economy.Remittances are an important injection for an economy, especially during times of economic depression for the recipient economy when remittances provide a significant source of income for recipient families.

Taylor (1999) states that 'migration is no panacea for development' but can play a significant role in development. Immigrants' remittances can improve the wellbeing of the poorest segments of the population as it allows recipients to increase their consumption, to start business initiatives, and to allow the recipients to be more forward-looking .What is more prominent is the dilemma on how the remittance at household level is spent. This could be possible if these inflows ignite economic activity and improve human capital through better access to education, healthcare, and consumption.

As decades pass by, the amount of remittances sent is increasing especially for Sub Saharan Africa. According to the World Bank, nominal personal remittances totaled just under $18 billion worldwide in 1980 and comprised about 0.3% of world GDP. By 2012, they had grown to about $480billion and more than doubled their share of world GDP to 0.7%. The trend is particularly true of Sub-Saharan Africa (Bang,2016)

Despite the increasing importance of remittances in total international capital flows, the relationship between remittances, poverty and inequality has not been adequately studied. In particular, studies on Sub-Saharan Africa are scarce. This is due to inadequate poverty data and the poor nature of data on international remittances (Akobeng,2016) .

Adams Jr (2008) and Bang (2016) state that reduction of poverty in Lesotho and Ghana has seen some significant improvement especially on international remittances. This goes to indicates that the impact of having the opportunity to receive remittances carries with it the prospect of substantially reducing both the level of income inequality and the incidence of extreme poverty within a region

Most migrants send money back to their origin countries. Over the years, migrants' remittances have become a major source of financing in the developing world: in 2013, officially recorded remittance flow were estimated at US$542billion worldwide, US$404billion of which went to developing countries World Bank, (2013). They constitute the second largest source of currencies for these countries, slightly behind Foreign direct investments but before official development aid (Naiditch, 2015)

Remittance school of thought

The migration and remittance nexus cannot be separated. Remittances are the outcome of migration. Among most literature, three schools of thoughts emerge each an analysis of remittance. These are the risk-sharing motive, Altruism or livelihood and risk sharing and altruism school of thought.

The risk sharing school of thought views remittances are contingent plans meant to alleviate the family in case of unforeseen circumstances in the future. Essentially, in this approach the remitter and his family needs are catered for in the event of recession. This recession could be due to loss of employment on the part of the remitter or famine in the case of a rural beneficiary. The remitter has a latent function of sending money home especially in the events of repatriation. In this case both the remitter and the recipient judiciously use the remittance for their own benefit in the future. (Chimhowu, 2005).

However, is a not a sole responsibility of the migrant to remit. The remittance sent home could be out of his/her own will and not an obligation that he/she owes to the family. Some of the Gambian migrants had to fend for themselves in finding their way abroad.
The Altruism or livelihood considered remittance as a responsibility or commitment shouldered on the remitter to his/her family. Who migrate is an entire decision taken by the family and the individual supported to migrate must reciprocate through providing unflinching support to the family home.
In this approach the amount to be remitted depends on the number of migrants that have been supported by the family and the socio-economic status of the household. Since migration is expensive and it does not favor the poor, the status quo between the rich and the poor keeps widening especially as the migrants continue to provide huge support to the family back home (Banerjee,1984; Haan,2000 ; Agrawal and Horowitz ,2002).
The final school of thought combines both Altruism and self-interest. In this model the decision to migrate and remit is based on personal interest and nature of the family ties with the migrant. Empirical research indicates a gender difference with regards to the nature through which the remittance is sent. Male migrants are more likely to follow self-interest, whereas female migrants remit more out of altruism (Chimhowu, 2005). It is interesting to note that our views align with Chimhowu, et al (2005). This is because migration is costly and the outcome of migration is some cases can be very rewarding. The combination of both Altruism and self-interest can result in a win-win Situation for both the migrant and the family.

Migration theories

The movement of people from one boundary within or outside can best be understood based on formulated theories that have been tested over time and space. Over the history of migration research, different theories have been propounded to explain migration flows between spatial units and the reason for the movement. Spatial distance and population size are crucial factors in the early theories of migration. Together, these two components make up the gravity model: the higher the mass of two objects and the smaller the distance between them, the stronger are the forces pulling them together (Windzio, 2018).

The theories highlighted below can be categorized into three basic levels; Micro, macro and meso levels. The micro level zooms migration from the individual decision point of view. At the macro level point of view migration is seen from different point of view. The Meso level has a combination of different decisions from both micro and macro. Essentially, some of the theories of international migration that explains the nature and need for change of geographical location can be grouped into the following;

Neo-classical theory

This theory on international migration is simply the most famous and oldest theory. The migrant has an intrinsic motive. It focusses and provides an insight view of the imbalances that occurs between the demand and supply of labor within a geographical location. Within a region migration is sure of happening if the supply of labor becomes elastic and the wages paid are meagre. Since most workers are interested in better pay they will move to regions that would provide lucrative wages. In lieu of this trend, remittances generation has become a motivation for labor-sending countries to encourage outmigration (Fall, 2016).

The new economics of labour migration (NELM)

This theory was built upon the criticism of the Neo-classical theory. In this theory migration is seen as collective decision and not an individual decision. The family or the household takes the responsibilities in supporting the migrant(s) to reach the country of destination and should be prepared in supporting the family in case of unforeseen circumstances like recession. In other words, a contingent plan is laid to support both the migrant when he/she experience unemployment or famine in the case of a rural beneficiary (ibid p.22). In the Gambian context, migration is viewed as a collected responsibility and the family supports the migrants for the latent functions of the remittances. The migrants do embark on series of projects home that would provide source of income for the family and contingency for the migrant as he/she returns home. Some of the projects includes commercial cars, real estates, grocery shops among others.

Dual labour market theory

The Dual Labor Market theory is attributed to the works of Piore (1979). In this context, migration occurs as a result of the enticement provided by the industrialized and developed economies to champion their development. In other words, the developed economies provide a lucrative wage to foreign workers. In addition, the theory highlights four main features that industrialized countries use to elucidate the pulling of labor from other countries, these are structural inflation, motivational problems, economic dualism and the demography of the labor supply. With this the migrants have no better choice but to migrate to the industrialize nations (ibid p.23)

METHODOLOGY AND ANALYSIS

The methodology employed in this research is based on review of secondary data. The data comprises of household survey involving five countries in sub Saharan Africa and Nepal. The first set of survey was based in the analysis of the five sub-Saharan countries followed by Nepal. Data collection was based on international migrants, no migrants and internal migrants specifically. The questionnaire includes six modules:

- Household assets and expenditure.
- Internal and international migration and remittances from former household members.
- Housing conditions
- Household roster
- Household use of financial services
- Internal and international migration and remittances from non-household members.

Table 1. Main sample characteristics

Country **Sending Country**	**Level of statistical representativeness**	**Households screened**	**Target sample**	**Households successfully interviewed**	**Total number of households by migration status of former household member**		
					Nonmigrants	**International migrant**	**Internal migrants**
Burkina Faso	10 most important provinces for the migration	9,177	2,106	2,102	745	662	695

Kenya	17 districts with the largest concentration of households with migrants	7,373	2,000	1,942	671	578	713
Nigeria	National representative	8,075	2,000	2,251	813	875	563
Senegal	National representative		2,000	2,100	700	700	700
Uganda	National representative	24,618	2,000	1,961	1,112	249	600

Source: Migration and Remittances Household Surveys in Sub-Saharan Africa: Methodological Aspects and Main (2011). Findings.file:///C:/Users/USER/Downloads/Plaza_Navarrete_Ratha_MethodologicalPaper.pdf

The demographic patterns can be reflected on the size of the household. Senegal, Nigeria and Burkina Faso have large household sizes as compare to other countries and this can be caused by the increase in the fertility rate and polygamous way of life.

Table 2. Summary data on households with and without migrants

Household characteristics	Burkina Faso	Ghana	Nigeria	Senegal	Kenya
Age (head of the household)					
Households with migrants in OECD countries	53	49	55	55	54
Households with intraAfrican migrants	53	57	51	49	51
Households with internal migrant	52	54	51	52	50
Households with no migrants	46	44	45	52	41
Gender of head (percent male)					
Households with migrants in OECD countries	72	48	80	52	70
Households with intraAfrican migrants	93	58	82	65	55
Households with internal migrants	91	56	75	85	60
Households with no migrants	95	75	81	92	79
Household size					
Households with migrants in OECD countries	7.9	3.8	8.5	13	4.1
Households with intraAfrican migrants	10.1	4.1	7.5	12.4	4.4
Households with internal migrants	8.7	4.3	8.9	8.8	4.3
Households with no migrants	8.4	4.3	7	8.7	4.2

Source: Migration and Remittances Household Surveys in Sub-Saharan Africa: Methodological Aspects and Main (2011). Findings.file:///C:/Users/USER/Downloads/Plaza_Navarrete_Ratha_MethodologicalPaper.pdf

In Senegal the average size is 13 for household members with international migrants and 8.7 for household with no migrants. The least average for household with international migrants are Ghana with 3.8 and Kenya with 4.1

Migrant demographics

The six survey countries which was selected based on household with or without migrants. It confirms most migration is international within and outside Africa and most of the migrants are male.

Table 3. Characteristics of migrants from select African countries

Characteristics/destination	Burkina Faso	Ghana	Nigeria	Senegal	Kenya
Age (middle 50 percent)					
Migrants in OECD countries	35	37	33	38	34
Intra-African migrants	32	35	28	35	33
Internal migrants	32	35	27	32	31
Gender (percent male)					
Migrants in OECD countries	79	70	72	80	57
Intra-African migrants	80	63	75	86	.
Internal migrants	92	62	62	74	61
Education (percent with given level of education)					
Migrants in OECD countries	52 secondary	61 secondary	45 tertiary	44 tertiary	47 secondary
Intra-African migrants	65 primary	45 secondary	38 secondary	48 primary	
Internal migrants	45 secondary	54 secondary	49 secondary	35 primary	43 secondary
Reason for emigration					
Employment	78	..	48	48	54
Education	8	..	29	29	38
Others	4	..	4	3	2

Source: Migration and Remittances Household Surveys in Sub-Saharan Africa: Methodological Aspects and Main (2011). Findings.file:///C:/Users/USER/Downloads/Plaza_Navarrete_Ratha_MethodologicalPaper.pdf

In Senegal and Burkina Faso most of the migrants within Africa only have primary level of education and migrants going to the OECD countries have higher level of education. The most common reason for emigration is to search for employment opportunities.
In south Africa the reason for migration can be seen below

Table 4. South Africa: Reasons for moving (%)

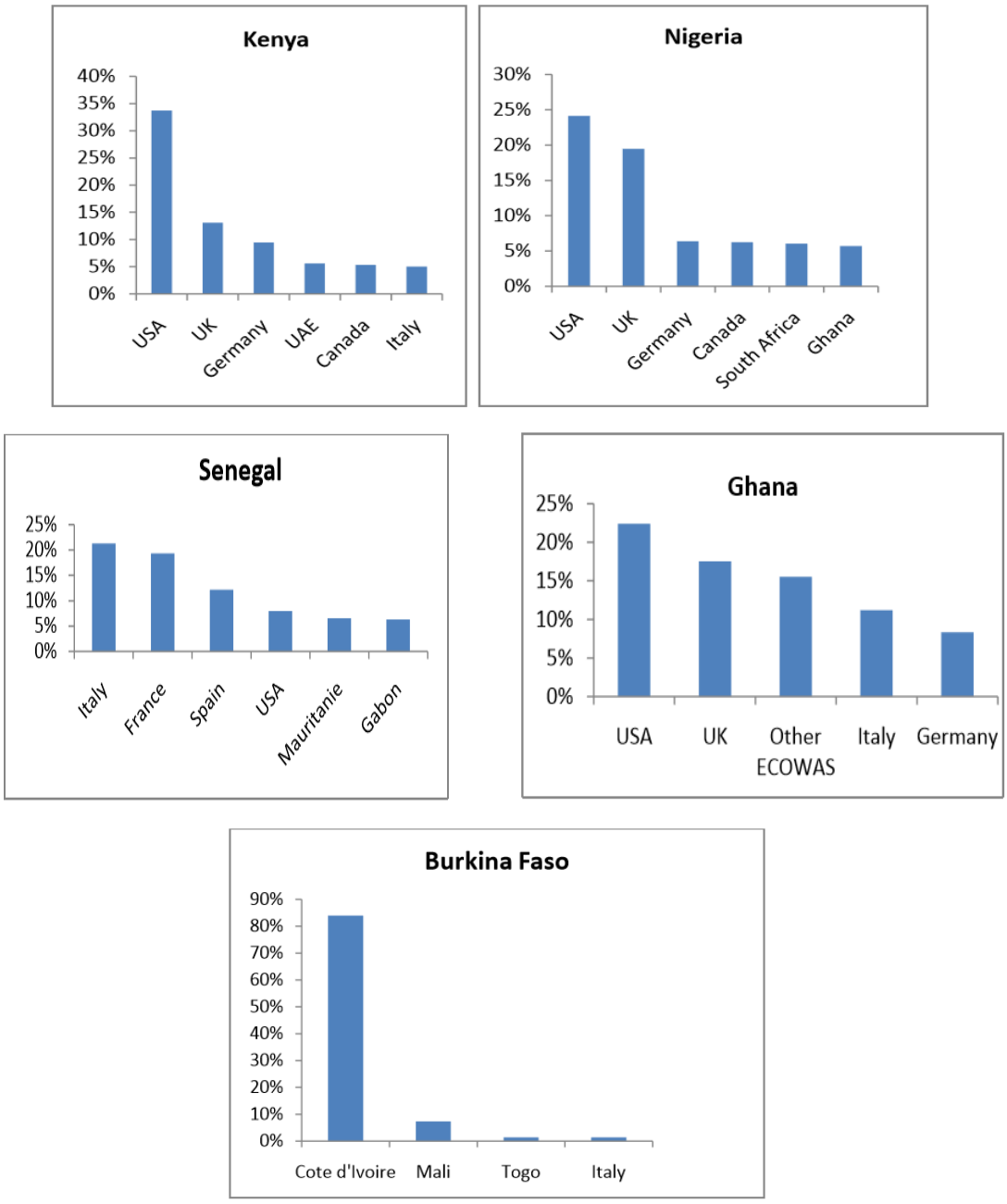
Reasons for immigrating	Percentage (%)
Economic	63
Conflict	13
Family	15

Education	5
Other	20
Total	100

Source: Migration and Remittances Household Surveys in Sub-Saharan Africa: Methodological Aspects and Main (2011). Findings.file:///C:/Users/USER/Downloads/Plaza_Navarrete_Ratha_MethodologicalPaper.pdf

Figure 1. Main countries of destination, per migrant-sending country.

Percentage of all international migrants



Source: Migration and Remittances Household Surveys in Sub-Saharan Africa: Methodological Aspects and Main (2011). Findings.file:///C:/Users/USER/Downloads/Plaza_Navarrete_Ratha_MethodologicalPaper.pdf

Table 5. Uses of remittances

Use of remittances by recipient households in select African countries, by source (percent of total remittances)

Burkina Faso				Kenya			
Use	Outside Africa	Within Africa	Domestic	Use	Outside Africa	Within Africa	Domestic
Construction of new house	25.7	10.1	2.6	Construction of new house	11.2	27.5	1.3
Food	23.5	34.9	48.7	Food	12.8	14.5	29.7
Education	12.4	5.9	9.4	Education	9.6	22.9	20.5
Health	11.3	10.1	12.5	Health	7.3	5.8	7
Business	10.4	2.6	2.4	Business	3.9	8.4	13
Clothing	5	0.7	0.7	Clothing	..	..	..
Marriage/funeral	2.1	3.9	3.1	Marriage/funeral	0.9	1.7	2
Rent (house, land)	1.4	0.6	1.7	Rent (house, land)	5.7	0.4	7.4
Rebuilding of house	0.3	1	1.2	Rebuilding of house	5.3	3.1	1.3
Cars/Trucks	0.1	0	0.1	Cars/Trucks	1.3	1	0.4
Purchase of land	0	1.4	0.1	Purchase of land	8.4	7	1.3
Improvement of farm	0	1.4	1.1	Improvement of farm	2.3	0.4	4.4
Investment	..	..	..	Investment	24.2	0.6	4.7
Other	7.7	24.9	16.3	Other	7.2	6.6	6.9

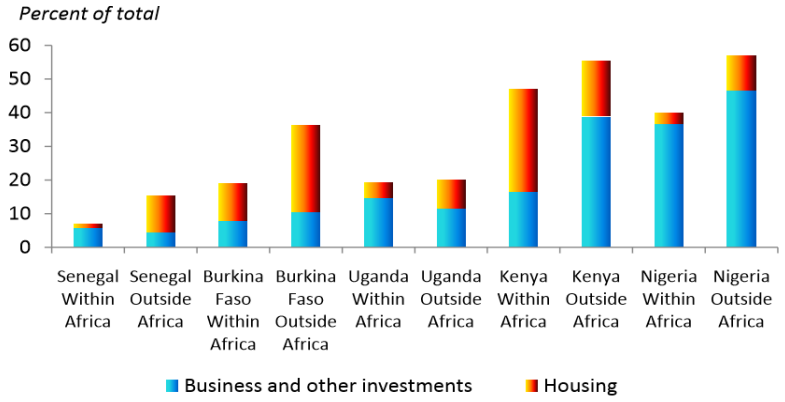
Uganda			
Use	Outside Africa	Within Africa	Domestic
Construction of new house	2.5	1.6	0.4
Food	7.6	9.7	12.4
Education	12.7	14.5	20.2
Health	6.3	14.5	24.8
Business	7.6	9.7	2.1
Clothing	..	..	..
Marriage/funeral	7.6	6.5	1.7
Rent (house, land)	5.1	8.1	4.5
Rebuilding of house	6.3	3.2	2.1
Cars/Trucks	2.5	0	0
Purchase of land	3.8	4.8	2.1
Improvement of farm	..	..	..
Investment	..	..	..
Other	38	27.4	29.8

Nigeria				Senegal			
Use	Outside Africa	Within Africa	Domestic	Use	Outside Africa	Within Africa	Domestic
Construction of new house	5.8	0	0.1	Construction of new house	7	0.7	0
Food	10.1	20.1	1	Food	52.6	72.6	81.9
Education	22.1	19.6	4.5	Education	3.6	2.3	4.6
Health	5.1	12	10.6	Health	10.7	7.3	2.9
Business	21.7	20.1	11.1	Business	1.3	5.7	0.2
Clothing	..	..	..	Clothing	..	..	..
Marriage/funeral	0.4	1	..7	Marriage/funeral	2.9	2.4	1
Rent (house, land)	4.4	4.9	..8	Rent (house, land)	1	..	2.2
Rebuilding of house	4.7	3.2	7	Rebuilding of house	4.2	0.7	0.1
Cars/Trucks	0	0	0.5	Cars/Trucks	0.2	0	0
Purchase of land	24.8	16.6	18.2	Purchase of land	3	0	0
Improvement of farm	..	..	..	Improvement of farm	..	..	..
Investment	..	..	..	Investment	..	..	..
Other	0.8	2.6	3.5	Other	13.5	8.3	6.9

Source: Migration and Remittances Household Surveys in Sub-Saharan Africa: Methodological Aspects and Main (2011). Findings.file:///C:/Users/USER/Downloads/Plaza_Navarrete_Ratha_MethodologicalPaper.pdf

The table below illustrate the used of remittances send by migrants within and outside of Africa. Senegal and Burkina Faso spend most of their remittances on food as compare to other countries. Remittances sent by migrants outside of Africa are spent mostly on education, physical investment, food and health.

Figure 2. Investments in business and housing funded by remittances from within and outside Africa



Source: Migration and Remittances Household Surveys in Sub-Saharan Africa: Methodological Aspects and Main (2011). Findings.file:///C:/Users/USER/Downloads/Plaza_Navarrete_Ratha_MethodologicalPaper.pdf

Remittances can be a source of investment for many economic activities and this can help increase the living standard of the receiving family and the nation at large. From the diagram above we can state that Nigeria (migrants outside Africa) uses most of their remittances on business and other investment whilst Burkina Faso (migrants outside Africa) uses most of its remittances on housing.

THE CASE OF NEPAL

Migration trend

International migration has become the most significant economic activity in Nepal as it has got long history of migration. Remittance in Nepal is higher than that of export receipts and official aid combined. Essentially remittances are valued in both the micro and macro level of the economy. The Nepal Migration Survey NMS (2009) puts the number of Nepali work migrants abroad at 2.1 million. It is interesting to know that some of the households have atleast one migrant abroad or a returnee. India alone has the highest population of Nepalese emigrants. Those who use the informal channel of migrating to India are estimated to be about 4 million. Most migrants are aged 20-44, and the out-migration is causing domestic labor supply shortages in many rural areas.
Furthermore, the International labour Organisation Country Office for Nepal (2017) state in 2011, 1.9 million Nepalis lived abroad, around 8.3 per cent of the total population. This rise in the trend was due to the lack of decent employment opportunities, particularly in rural areas of Nepal, and the prospects of higher earnings abroad entice Nepalis to migrate for work. Essentially 2013/14 saw a rise in the number of Nepalis working in abroad, about half a million labour permits were granted by the Government of Nepal for workers that persistently wanted to leave their current jobs for work in abroad. In 2008/09, the number of labour permits granted was 219,965 suggesting an increase of more than double in merely five years.

Remittances

The 2009 Nepal Migration survey estimates that foreign remittance in FY of 2009 to NPR 190 billion (US$2.5 billion) amounting to 20 percent of GDP. The destination of migrant determines the remittance the household members shall receive. For example, on average, households with a migrant in ―other developed countries receive the highest amount of annual remittance (NPR 311,000, or US$ 4,050) followed by the Gulf (NPR 163,000, or US$ 2,120), Malaysia (NPR 113,000, or US$ 1,470), and India (NPR 62,000, or US$ 800).
The poverty has immensely drop in Nepal to a certain level due to the influx of remittance. The education and consumption at the household level, remittance has improved. The added income is spent largely on consumption and education of children. Male members of remittance-receiving households also appear to be enjoying more leisure and working less.
Consumption has become a major driver of GDP growth. In FY 1996-2004 poverty declined from 42 percent to 31 percent. More than half of the decline is due to remittance. It is tentatively estimated that between FY 2004 and FY 2010, the poverty incidence declined further to 21 percent. Had there been no increase in remittance from FY 2004, poverty would have declined to just 27 percent.In addition to the Authors view, remittances are undoubtedly an impetus in alleviating poverty within the household

GAMBIA EXPERIENCE

The country has a low Human Development Index (HDI) of 0.452, giving it a rank of number 173 among 188 countries. Moreover, the unemployment level is high (54%), especially among young population 44.4% (UNDP, 2016). According to UNDP (2016), as of 2016, Gambia's per capita income was $1,700 per year.

The high unemployment rate and the fluctuation of the Gambian economy by the government has resulted into a high attrition rate of both the skilled and unskilled workers. It is estimated 2010 that the number of Gambians in abroad is 65,000 (or around 4 percent of the total population), the country's emigrant stock is small compared to other African countries. However, its skilled emigration rate (63 percent in 2000) was ranked among the top 20 worldwide and the second highest among African countries. Emigrants from The Gambia — both skilled and unskilled — send high levels of remittances to their family members at home. C. Kebbeh (2013). In addition to the works of C. Kebbeh (2013), the rise in the international trend of The Gambia could be attributed to the former President Jammeh's repressive regime and as such some of the youth have no option but to migrate for economic and political reasons.

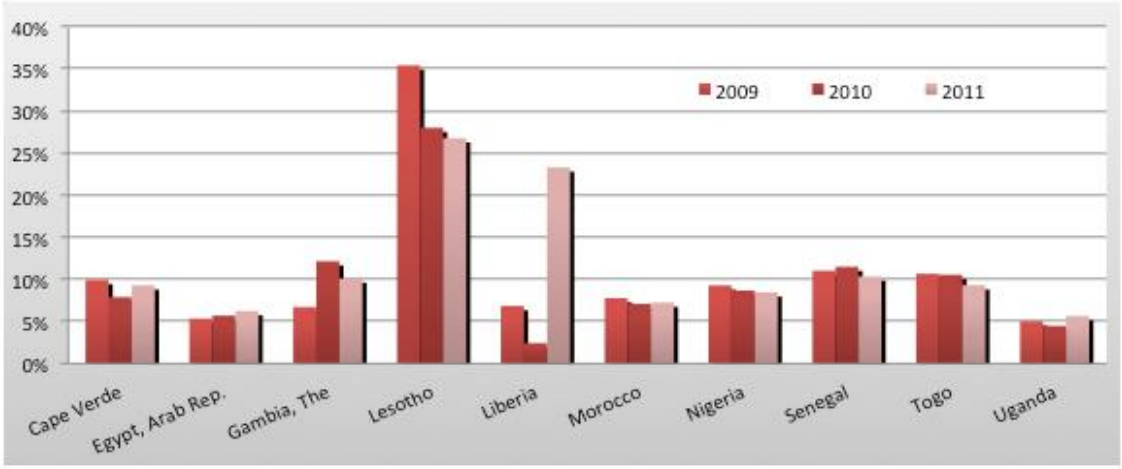
Table 6. Summary of Gambian refugees and asylum seekers in 2016

Destination Country	Refugees	Asylum Seekers
Italy	7723	6302
US	1425	931
UK	1308	197
Germany	227	9773
France	210	197
Sweden	139	152
Austria	124	254
Other	413	1063
Total	11569	18869

Source: UNHCR,2017.

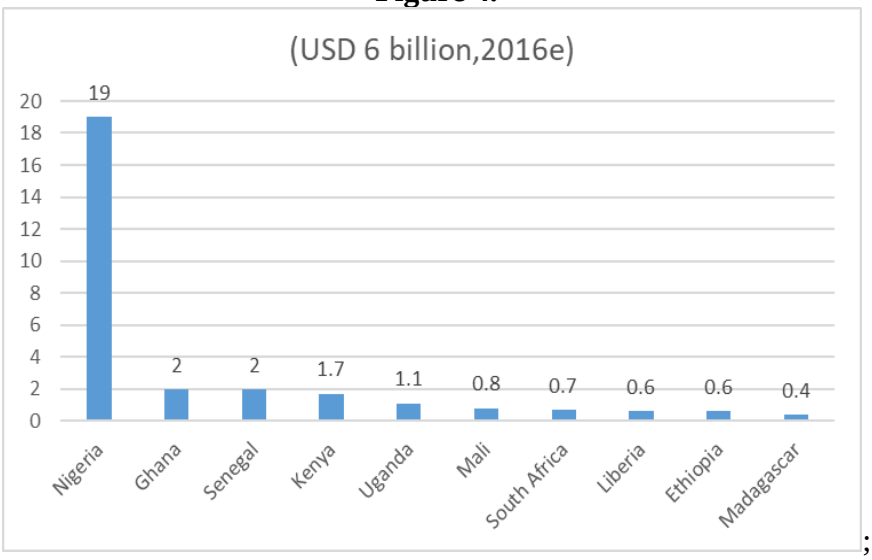
Figure 3. Remittances

During the past few years, incoming remittances as a share of gross domestic product (GDP) in The Gambia has been among the highest in Africa.



Sources: The World Bank, Wolrd Development Indicators. Available online.

Figure 4.



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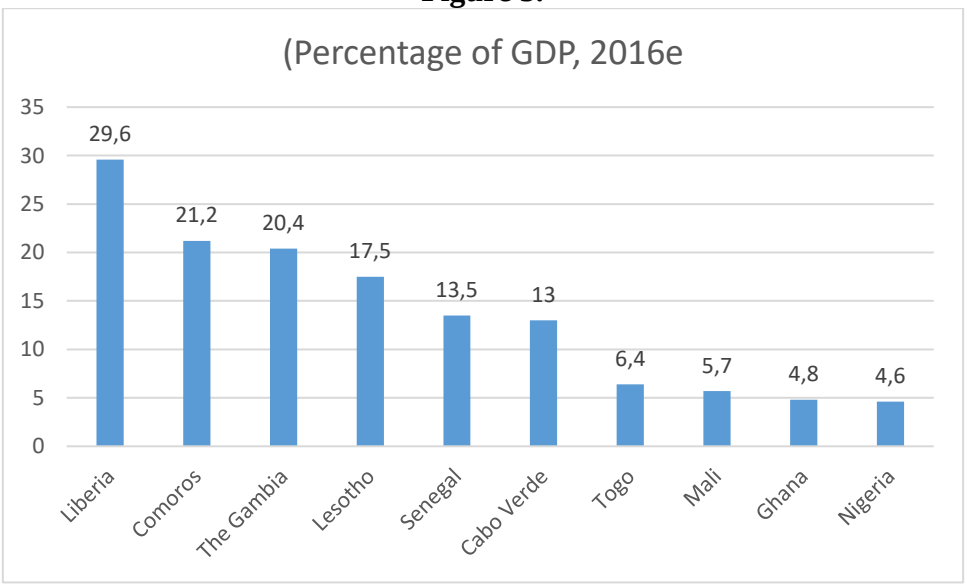
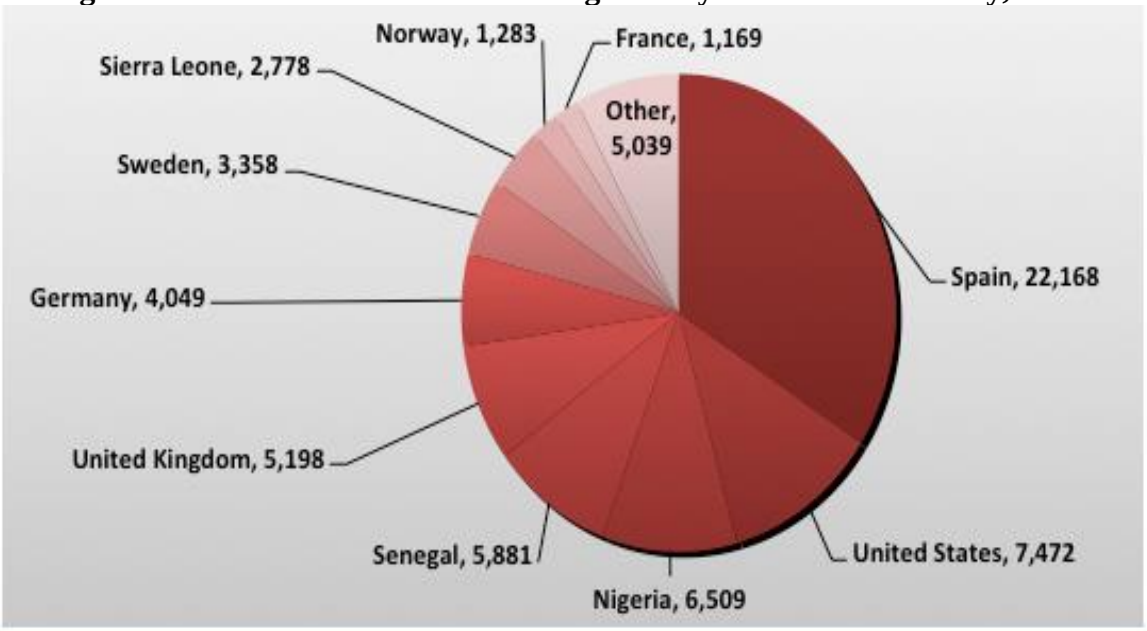
Sources: International Monetary Fund (IMF);World Bank Development Indicators,staff estimates.

Figure 5.



Sources: International Monetary Fund (IMF);World Bank Development Indicators,staff estimates.

Figure 6. Distribution of Gambian Emigrants by Destination Country, 2010*



Sources: The World Bank, 2010. Global Bilateral Migration. Available online. The Spanish Statistical Institute (Instituto Nacional de Estadistica). Available online.
**The figure for Spain is for 2012.*

THE POTENTIAL IMPACT OF MIGRATION/REMITTANCE IN GAMBIA

The manner in which the remittances are used in households differs. In most developing countries, a key impact of that remittances has played in the livelihood of the household is the reduction in the poverty level. The Gambia has got most of its migrants outside the African continent. This goes to indicate that if remittance inflow continues to rise and properly utilized, the status quo of the households and the country at large in terms of development will improve. The human development index of the country can improve partly due to the investment of the remittances at household level. Investing in key area like education, Health and business could save the families from the vicious cycle of poverty.

Brian drain can also be experienced by Gambia. The poor salaries couple with poor living condition could be a push factor for skilled workers abroad. Those that are educated in abroad may be prepared to stay and utilised their knowledge than in the Gambia.

The rural communities can become safe haven if part of the remittances is used in Agriculture. Most of the rural communities in the Gambia lack the able-bodied men as a result of migration both regular and irregular migration. Investing in Agriculture may mitigate the high rate of migration.

Remittances might not be very healthy if household fails to invest in business opportunities. In the long run remittances can make the household recipient to be over dependent on it. The over dependency creates a scenario of enjoying more leisure and working less which may become counterproductive to the Economy.

RECOMMENDATION

For the economy of the Gambia to experience good and sustainable economic growth, financial institutions and Government needs to collaborate in making the sending and receiving of remittances in a cheap, safe and reliable manner.

In addition, Education for all campaign so be made especially at the secondary and tertiary level. It is crystal clear that in Public schools in the Gambia education is made free. The diaspora should encourage their household members and invest in their tertiary education for a better improvement in the Human development index of the country especially in education.
Furthermore, the Government of the Gambia should create sound policies that would encourage the diaspora to invest in business opportunities that would plough back dividend to their investment.
Also, Government should formulate healthy and sound policies that attract foreign investors into the country in a bid to curb the high unemployment rate. The National development plan should focus more in improving the economy and reducing of the unemployment rate.
The government of the Gambia should create more job opportunities and invest into Agriculture and Agribusiness for its citizens especially the youth. More empowerment projects should be established for the youth. This in return will mitigate the high attrition of migration especially irregular migration.
The destination countries should help in supporting projects in the Gambia which will serve as impetus towards reducing unemployment rate and dependency on remittances.
Similarly, Government of the Gambia should establish a proper salary review of the whole sector of the economy. Since most migrants are economic migrants as review of salary may serve as a way of reducing the trend.
Finally, democracy should be championed to the core for citizens of the Gambia. Citizen should be free to exercise their democratic right without any fear of repression. When this occur the refugee and asylum cases might drastically reduce in destination countries.

CONCLUSION

From the review of the case studies and that of the Gambia experience of international Migration. It can be concluded that economic growth in the Gambia is greatly driven by the huge remittances sent from abroad as it plays a crucial role in the Country's GDP. The livelihood of the recipient communities are improved thanks to remittances. Agriculture is partly neglected due high attrition of the youth to abroad, mitigating this menace involves using a holistic approach by Government, international communities and relevant stakeholders. Migration and remittances can have both negative and positive impact to households and the country at large

REFERENCES

1. Admos O. Chimhowu, J. P. (2005). The Socioeconomic Impact of Remittances on Poverty Reduction. Dalam S. M. RATHA, Remittance Development Impact and Future Prospects (hal. 1-402). Washington, DC 20433: World Bank.
2. Akobeng, E. ((2016)). Out of inequality and poverty: Evidence for the effectiveness of remittances in Sub-Saharan Africa. The Quarterly Review of Economics and Finance 60 , 207–223.
3. Chami, R. F. (2003). Are immigrant remittance flows a source of capital for development? Washington,DC: IMF Working Paper 03/189.
4. Claire Naiditch, A. T. ((2015)). Remittances and incentive to migrate: An epidemic approach of migration. International Economics142, 118–135.
5. Cormoş, V. C. ((2014)). Mentality and Change in the Context of International Migration. Procedia - Social and Behavioral Sciences 149, 242 – 247.
6. HAAS, H. D. (2005). International Migration, Remittances and Development: myths and facts. Third World Quarterly, Vol. 26, No. 8,, 1269 – 1284, .

7. James T. Bang, A. M. ((2016)). Do remittances improve income inequality? An instrumental variablequantile analysis of the Kenyan case. Economic Modelling 58 , 394–402.
8. Karki, P. (2012). Impact Evaluation of Remittances: A Case Study of Dhanusha District. Janakpur: Nepal Rastra Bank, Janakpur.
9. MICHAEL A. CLEMENS, C. O. (2015). Reprint of: Migration and Development Research is Moving Far Beyond Remittances. World Development Vol. 65, 1–5, .
10. RICHARD H. ADAMS JR., A. C. (2013). The Impact of Remittances on Investment and Poverty in Ghana. World Development Vol. , 24–40.
11. Taylor, J. ((1999)). The new economics of labour migration and the role of remittances in the migrationprocess,. International Migration, 37 (1),, 63 – 88.
12. Thi Thanh Nga Bui, T. T. ((2015)). Microlevel impacts of remittances on household behavior: Viet Nam case study. Emerging Markets Review 25 , 176–190.
13. Vacaflores, D. E. (2017). Are remittances helping lower poverty and inequality levels in LatinAmerica? The Quarterly Review of Economics and Finance, 1-12.
14. Wickramasinghe, A. (Fall 2016). INTERNATIONAL MIGRATION AND MIGRATION THEORIES . Social Affairs. Vol.1 No.5, , 13-32, .
15. Windzio, M. ((2018)). The network of global migration 1990–2013 Using ERGMs to test theories of migration between countries. Social Networks 53 , 20–29.
16. Yang, D. (2008). International migration, remittances and householdinvestment: Evidence from Philippine migrants' exchange rate shocks. Economic Journal, 118(528), 591–63.

Internet

1. https://www.migrationpolicy.org/article/gambia-migration-africas-smiling-coast
2. https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---ilo kathmandu/documents/publication/wcms_543497.pdf

ASSESSMENT OF PLANT SPECIES ON COPPER CONTAMINATED SOILS AS POTENTIAL PHYTOREMEDIATORS

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ABSTRACT

This study explored the phyto extracting ability of five plant species found in the copper contaminated soils in abandoned mining sites of Consolidated Mining Corporation (CMI) in Marinduque, Philippines. The plant species were *Onychium silicolosum, Nephroplepsis brownie, Pityrogramma calomelanos, Saccharum spontaneum,* and *Acacia auriculiformis*. The copper content of plant samples was analysed using Atomic Absorption Spectrophotometry (AAS). The results were compared with the minimum standard value of 1000 mg/kg (ppm) bioaccumulated copper value to classify as phytoextractor. Among the five plant species, *Onychium silicolosum* is considered as potential species for phytoextractor giving a result value of 2006.22 mg/kg of copper.

Keywords: *phytoextractor, bioaccumulation*

INTRODUCTION

Excessive concentrations of heavy metals and other toxic elements in the biosphere is generally anthropogenic in origin. Human activities like mining and fossil fuel production results to environmental hazards like pollution of heavy metals in soil and water.
The negative impacts could exacerbated when these elements enters the food chain and damaged human and animal health as a result of biomagnification.
Removal of toxic elements in water and soil traditional methods are generally expensive and less successful (Pajevic et al 2014). Using plants to clean up the environment is an effective technology which is applicable in the restoration of contaminated soils and water.
Phytotechnology of using plants for cleaning up of contaminated sites is known as phytoremediation (Lazlo, et al 2005). Phytoremediation refers to the use of plants in the in the removal, reduction, immobilization and degradation of heavy metals in the soil (Sharaki, et. al. 2008). It is an emerging potentially effective technology in reclaiming contaminated areas because of its cost effectiveness, aesthetic advantage and long term applicability to wide range of toxic elements (William, 2008). Phytoextraction is the use of plant hyperaccumulators for the absorption of pollutants from the soil, their transport and accumulation in harvestable plant biomass.
Plants suitable for successful phytoextraction of heavy metals should be tolerant to high concentration of metals, and at the same time , be able to accumulate of essential and non essential metals in plant organs. Plant hyper accumulators species should be capable of accumulating and tolerating considerable level of heavy metals in their tissues particularly shoots. The selection of species as phytoremediator is an important aspect for the practical use of this technology because most plant hyperaccumulators have slow biomass production and slow growing (Gerardo and Kikuchi, 2009). It has been suggested that the most ideal species are those plant species growing in mine tailing areas as they have evolved sophisticated

adaption mechanisms to tolerate potentially toxic levels of metals in the soil (Mendez and Maier, 2008).
This field research activity was carried out to determine the phytoextracting ability of plant species growing in copper contaminated soils in an abandoned mining site.

RESEARCH METHODOLOGY

The Research Area. This reseach work is conducted in the abandoned copper mine site previously operated by Consolidated Mining Corporation located in Barangay Capayang, Municipality of Mogpog, Marinduque, Philippines. The abandoned mine site is operated for 27 years covered around 217 of hectares open pit type of mining. The area remains unattended since the mining operation ceased in 1996. The open-pit in the area is now filled with water and has become a source of irrigation for the adjacent rice farms. Although patches of shrubs, grasses, ferns and trees flourish in the surrounding area, significant portion of the exposed pile of copper-contaminated soil has no vegetation cover. The mining site poses danger to the surounding mangrove areas, rice farms and resident communities.

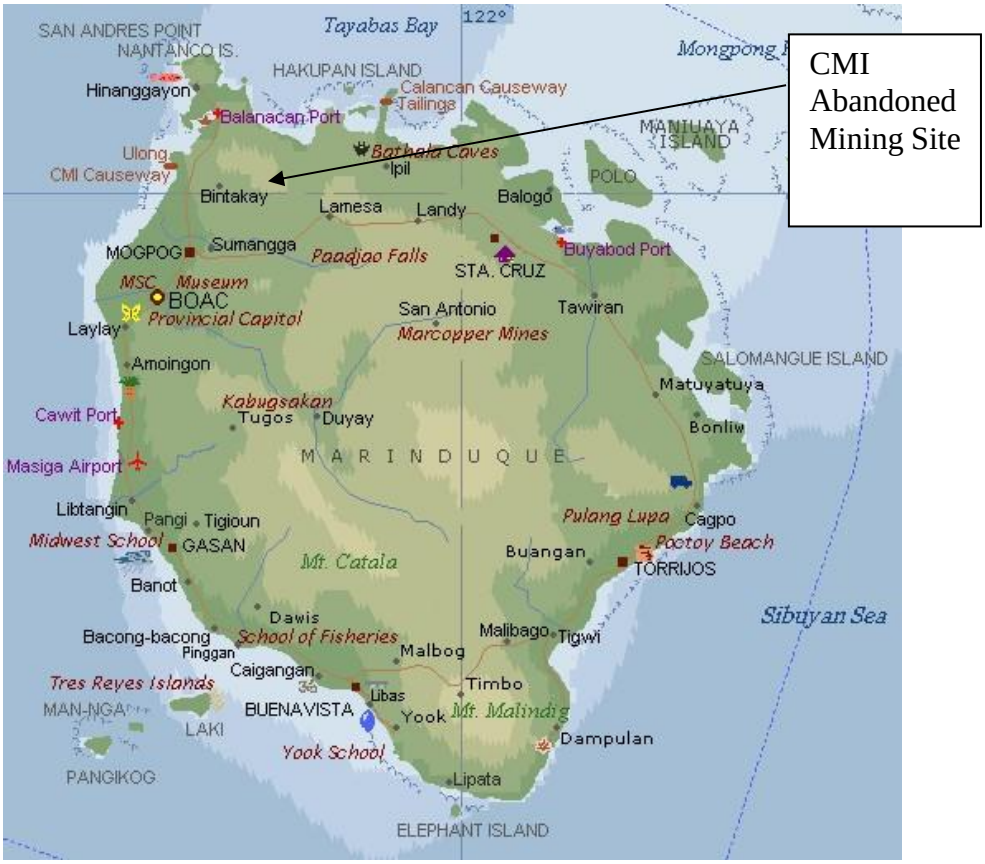


Figure 1. The map of Marinduque, Philippines were CMI mining operated from 1970 to 1996.

Soil Sampling. Soil samples were collected in three (3) sites and three (3) sampling points per site. Site 1 is 100 meters away from the dump site, Site 2 is 200 meters away from the dump site and Site 3 is 300 meters away from the dump site Surface soils were collected from 0-20 cm depth. Soils were mixed as composite samples and air dried. A 200 grams sample per site was taken for laboratory analysis. Copper metal concentrations were determined for selected soil samples using digestion with nitric acid, following centrifugation at a. 20,000 g and filtration through Whatman

No.42 filter paper. Concentrations of copper were analyzed by flame absorption spectrophotometry (AAS).

Plant Sampling. Vegetation cover in the mined out area was sparsely distibuted along patches and edges of mining sites. Plant samples were randomly collected in mixed clumps of trees, grasses and ferns. Five plant species that is abundant in the area were assesed in this study. Plant species were *Onychium silicolosum (Goldback fern), Nephroplepsis brownie (Swordfern), Pityrogramma calomelanos (Silver fern),* one grass species *Saccharum spontaneum (Kans grass)* , and *Acacia auriculiformis (Knife acacia)* a leguminous tree introduced from Australia which was previously planted by the mining company.

Plant samples of these plant species were also taken in adjacent sites. The area were considered as uncontaminated sites and serve as basis for comparison.

Ten sample plants per species for each cluster was gatherd. Whole plant samples were collected for analysis. Samples were washed thoroghly with tap water and distilled water to remove soil contaminants. The samples were air dried for 3 days and chopped into 1cm pieces. Equal parts of roots, stems and leaves were thoroughly mixed and weighed. A 200 grams representative sample for each species were brought to the laboratory for analysis. Extraction to determine the copper uptake is through wet ashing with nitric acid. It was centrifuged at a.10,000 g and filtration using Whatman No. 42 filter paper and copper uptke was determined by Flame Atomic Absorption Spectrophotometry (AAS).

RESULTS AND DISCUSSION:

Table 1. Levels of Copper in Soils in the CMI Abandoned Mining Site

Sites (Distance from the Tailing Piles)	Range of Copper Levels (mg/kg)	Mean Levels of Copper (mg/kg)
Site 1 (100 meters)	1053.33-**1109.31**	1079.12
Site 2 (200 meters)	438.26-586.63	505.19
Site 3 (300 meters)	**288.56**-346.33	317.61
Grand Mean		**633.97**

Based on the results of reading using AAS analysis, the levels of copper in the contaminated sites ranges from 288.56 to 1109.31 mg/kg. The mean value of copper observed present in the soil is 633.97 mg/kg. The levels of copper is very high compared to normal Philippine soils with copper levels which ranges from 5.2 to 30 ppm (Philippine Soil Recommends, 2006). The level of copper is 50 to 100 times higher than the normal soil. These findings is much lower than the result reported by Tulod et al (2012). who observed that the level of copper in the mining area could be as high as 2520 mg/kg (using AAS analysis). He also reported that the soil in the mining sites contain 4 ppm Pb, 13ppm As, 85 ppm Zn, 52 ppm Ni and 2.69 ppm Cd. However, this research work focused only on Copper, which is the most abundant heavy metal in the abandoned mining area. The results also indicated that as distance gets farther from the center of mining piles, the levels of copper decreases. The levels of copper in the soil is inversely proportional to the distance from the mining dump sites.

Soil samples analyzed for heavy metals in a contaminated area in El Paso, Texas, USA have higher levels of heavy metals. The soil contains 5,067 mg/kg of lead and 4,993 mg/kg of copper (Gardea-Torresdey, et al. 1996).

Table 2. Mean Levels of Copper in Plant Biomass between Uncontaminated and Contaminated soils

Plant Species	Uncontaminated Soils (mg/kg)	Contaminated Soils (mg/kg)
Onychium silicolosum	92.7	2006.2
Nephrolepsis brownie	157.3	734.8
Pityrogramma colomenalos	140.2	730.1
Acacia auriculiformis	22.6	247.2
Saccharum spontaneum	5.1	50.4

Levels of copper present in plant biomass were summarized in Table 2. The levels of copper in three fern species *Onychium silicolosum, Nephrolepsis brownie* and *Pityrogramma colomenalos* indicate the highest level of copper in the plant tissues. Onychium silicolosum gave the highest level of copper in its biomass with a mean value of 2006.22 mg/kg. It was followed *Nephrolepsis brownie* and by *Pityogramma colomenalos* with a value of 734.8 and 730.1 mg/kg of copper, respectively. Lowest level of copper in plant biomass were observed in *Saccharum spontaneum* (a grass species) with a mean value of 56.53 mg/kg. The accumulated levels of copper in all plant species were all above the normal copper requirements of plants.

Ferns have been reported to have higher affinity to bioaccumulate different types of heavy metals. *Pteris vitatta* L. (Chinese Bracke fern) was considered a phytoremediator species for its capacity to uptake high levels of arsenic (As).

Acacia auriculiformis (a leguminous tree species) has much lower levels of copper in its biomass (247.2 mg/kg) compared to fern species, but this tree produces higher biomass production. It has deeper root systems that can absorb heavy metals in deeper root horizons. It has also reported that it has symbiotic relationship with arbuscular mycorrhizal fungi that inhibits the uptake of heavy metals.

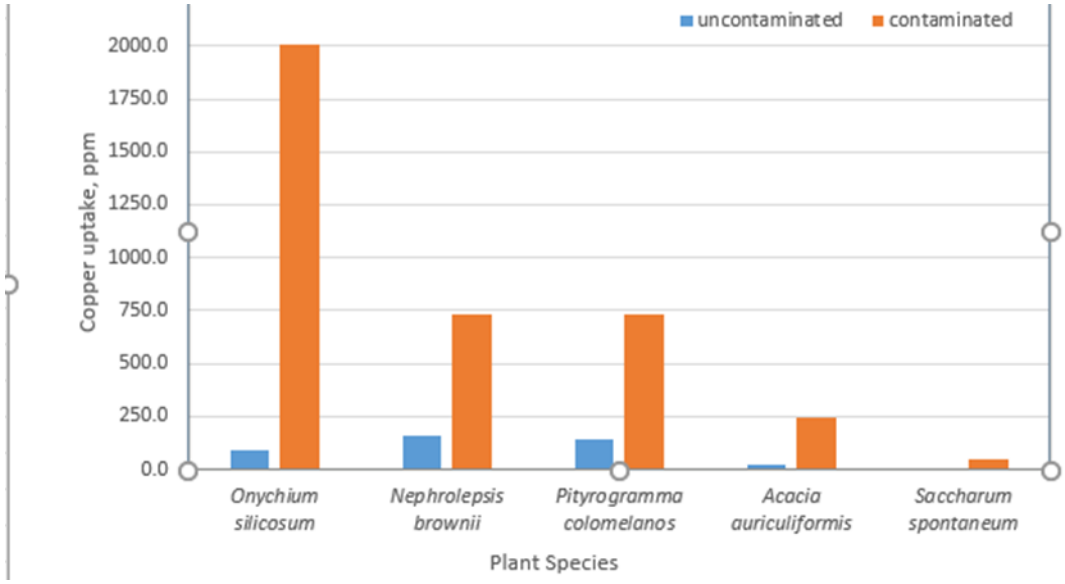
Larrea tridentata, creosote bush species, growing around a heavy metal contaminated area was able to absorb and stored in its roots, stems, and leaves of 953 mg/kg, 493mg/kg and 370 mg/kg of copper, respectively (Gardea-Torresdey, et al. 1996). In a similar research work conducted in Australia, three plant species were identified as potential use species for phytostabilization. Archer et al. (2004) selected *Cynodon dactylon* (couch), *Juncus usitatus* (Common rush), *Lomandra longifolia* (spiny-headed mat rush), for these three plant species can bioaccumulate high levels of lead (Pb) in their harvestable plant tissues.

Poplar (*Populus alba* L.), willows (*Salix viminalis* L.) and Black locusts (*Robinia pseudoacacia*) are common tree species that are used for phytoremediation.

D Lonardo et al (2011), as cited by Pajevic (2014), investigated the phytoextracting ability of *Populus alba* for As, Cd, Cu and Pb. He found out that there is higher metal content in roots than shoots.

Figure 1 showed that the levels of copper in plant tissues were found to be higher in plants collected from copper contaminated soils compared in plants collected from uncontaminated soils. This showed that the levels of contaminants in the soil have an effect in the increase of copper uptake of different plant species. The levels of copper in plant biomass from contaminated soils is five to twenty times higher than the normal soils. It showed that the higher concentration of soil contaminant, the higher metal uptake of various plant species.

Figure 2. Levels of copper in different plant species between contaminated and uncontaminated soils



Onychium silicolosum demonstrated the most promising results as phytoremediator among the five plant species investigated. It can accumulate significantly high levels of copper in its biomass. It can absorb 2006.22 mg/kg of Cu in its system more than 1000 mg/kg of Cu which qualify it as potential phytoremediator or hyper accumulator.

CONCLUSION:

Fern species showed higher copper uptake compared to other plant species. *Onychium silicosum* succeeded in its phytoextracting ability to be qualified as phytoremediator. This species of fern accumulated more than 1000 mg/kg of Cu in its biomass The growth rates of each plant species and their capacity to absorbs other toxic elements remains to be investigated to determine its total capacity as phytoaccumulator in cleaning the abandoned mining sites.

REFERENCES

1. Archer, M.J. and R.A.Caldwell (2004). Response of six Australian Plant Species to Heavy Metal Contamination in An Abandoned Mining Site. Water, Air, Soil Pollution 157:257-267
2. Gardea-Torresdey, J.L. et al. (1996). Determination of the content of hazardous heavy metals on Larrea tridentate grown around a contaminated area. Department of Chemistry, The University of Texas at El Paso, El Paso.
3. Gerardo, R. and R. Kikuchi. 2009. A field study on phytoremediation of a lead-contaminated soil by Eucalyptus globulus in an abandoned mine site. Geophysical Research Abstracts 11: 5804.
4. László, E., G. Mezosi, Imre Mecs, Imre Vass, Ferenc Foglein, and Laszo Bulik. (2005). Phytoremediation as program for decontamination of heavy-metal polluted environment. Volume 49(1-2), 75-76. Acta Biologica Szegediensis.
5. Mendez, M.O. and R.M. Maier. 2008. Review: Phytostabilization of mine tailings in arid and semiarid environments - an emerging remediation. Environmental Health Perspectives Technology 116(3): 1-6.

6. Pajevic S., M. Borisev, N. Nikolic, D. Arsenov, S. Orlovic, and M. Zupunski (2016). Phytoextraction of Heavy Metals by Fast-Growing Trees: A Review. A.A. Ansari et al (eds) Springer. Switzerland.
7. Philippine Soil Recommends, 2006. PCAARRD. Los Banos, Laguna, Philippines
8. Shahraki, S.A., A. Ahmadimoghadam, F. Naseri and E. Esmailzade. 2008. Study of the possibility of arsenic phytoremediation in the soil of Sarcheshmeh Copper Complex by native plants. Journal of International Mine Water Association 1-4.
9. Tulod, A.M., A. Castillo, W.M. Carandang, and N.M. Pampolina (2012). Growth performance and phytoremediation potential of Pongamia pinnata (L.), Samanea saman (Jacq) and Vitex parviflora (Juss) in copper contaminated soil amended with zeolite and VAM. Asia Life Sciences 21(2):499-522, 2012
10. William, J.S. 2008. The use of phytoremediation technology for abatement soil and groundwater pollution in Tanzania: Opportunities and Challenges. Journal of Sustainable Development in Africa 10(1): 140-156.

METHODOLOGY TO ASSESS THE SUSTAINABILITY OF ORNAMENTAL FISHING SECTOR IN THE ORINOQUIA REGION OF COLOMBIA

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ABSTRACT

Ornamental fishing is the main economic activity for several indigenous communities of the Orinoquia in Colombia, this region is the biggest point of capture, marketing and has the greatest biodiversity of this kind of fish in the country, whom are export to United States, Europe and Asia markets; however the capture, collect and marketing of ornamental fish are not controlled enough in Colombia, there is not a clear policy and planning in the fishing sector. The research project designed and developed a methodology to give data on the current and future situation of this sector, provide tools to make decisions, build public policy and implement sustainable strategies. The methodology is structured in 2 phases, the first one is an assessment of 5 aspects to ornamental fishing activity, these are social and environmental impacts, technicals used, stakeholders and policy regulations, in order to achieve an extensive characterization of this sector.
The second phase focus on the strategic foresight, based on "toolbox prospective" of Michel Godet; in this phase was identified the most influential variables in ornamental fishing activity in Orinoquia, and with these was designed future scenarios of the possible conditions of this sector in the next five years. The results reveal problems with the stakeholder in the chain of market, which is based on demand, low government control over environmental impacts in fishing areas, ornamental fish come exclusive in-situ capture; by identifying the most influence variables and future scenarios around aquaculture development, international marketing, biodiversity of fishing resource, control and monitoring.

Keywords: *ornamental fish, methodology, strategic foresight*

INTRODUCTION

This project propose a research methodology to analyze impacts (positive and negative) in several aspects as environment, social-economic, political and technical, that is essential to understand the development of any activity or project and analyse its sustentablility. The methodology is composed by 9 tools, some of them are matrix to qualify impacts, other to prioritize ítems or organized variables.
To develop the tools they were organized in 2 phases, the first one to obtain a holistic characterization and indentification of environmental, socio-economic and political impacts of the activity and stakeholders rol, in this case ornamental fishing in Orinoquia region. This phase was structured with 6 tools.
The second phase is about the strategic foresight with the design of future events and identification of trend and alternative scenarios in 5 years for the ornamental fishing activity, this phase uses 3 tools.
Along the explanation of this methodology is possible to identified the importance given to quantitative qualification in the assessment process; despite this research project on fishing focus on areas of social science and analysed social aspect, was considered necessary the

quantitative methodology, in order to understand the grade of impacts, could prioritize problems and strategies.
This kind of information is useful in planning process, building public policies and to develop sustainable programs of any economic activity, as fishing, because offer complete data, update the situation and give a holistic analysis.

METHODOLOGY

The design of this methodology used as basis the Integrated Environmental Assessment (IEA) of United Nation Environment Programme (UNEP), with the identification of holistic problems and driving forces. The IEA is a framework to assess environmenal impacts, risks and efects of an activity or project to develop, It has 5 question to answer with the assesment:

1. What is happening with the environment and why?
2. Which are the consequences for environment and humanity?
3. What is it doing and are effective these measures?
4. Where will we go?
5. Which measures could take to achieve a sustainable future?

And a second basis was the theories of strategic foresight of school of prospective o Michel Godet with several software programs design to analyse stakeholders, variables and future scenarios. The strategic foresight focus on planning scenarios, design actions and strategies to anticípate the future, considering the rol of each stakeholder involve, identifying keys variables, and reducing uncertainty of future situations.

Phase 1

1. **Characterization of the current situation of capture, collect and marketing of ornamental fish in the Orinoquia**:
   a) In this step was collected the information about environmental, social, governmental and technical aspects of fishing activity in the Orinoquia Region, using databases, scientific papers, official statistics, and was interviewed a expert panel on this sector, to get more accurate information; the panel comprised environmental and fishing authorities, NGO, indigenous communities, traders and researchers.
   b) Field visit: direct observation in fishing areas of Orinoquia and the town of Inirida, the main point of collect and market of ornamental fish.

2. **Identification and prioritisation of problems in capture, collect and marketing of this fishing activity**, taking into account the previous characterization was identified the problems in environmental, technical, political and socio-economic aspects and for the priorization of them was used the Importance matrix , created by Vicente Conesa Fernandez, which qualify impacts around the activity according to 8 criterial:
   - Probability (Po): Certainty or likelihood of the impact happen
   - Intensity (In): level of damage
   - Extension (Ex): influence area or distribution of the impact
   - Frequency (Pc): period of the impact happen
   - Persistence (Pt): time the impact remains
   - Reversibility (Rv): capability of the resource to return to its initial state after generation of the impact

Those criterial have scales of qualification, given by the importance matrix of Vicente Conesa, most of them between 1 and 3, being 1 less harmful and 3 the most damage. After obtaining the value of those criterial was applied the next equation.

CI = -/+ (Po (In + Ex + Pc + Pt + Rv + Rc))

With this assessment, the matrix shows the significance or importance of each problem, classified them in accordance with their value of assessment.

Table 1. Scale of impact assessment – Importance matrix

Problem or impact Significance	**Assessment**
High	13- 18
Médium	8-12,9
Low	1,8-7,9

Source: Notes of operative instrument. Universidad Distrital Francisco José de Caldas. 2013.

For this research project, the problems with a significance equal or more than 13 was selected as priorities to address to achieve a sustainable management.

3. **Analytical framework- Description of driving forces**: to understand the conditions of these those priorities problems over environment and communities was considered necessary describe the state and their consequences, identifying the driving forces and pressures.

   Driving Force Matrix Pressure- State- Impact- Answer (DFPSIA) is a tool used in IEA methodology to analyze the interaction between human activities and environment, it integrates environmental impacts and their impacts over human welfare, establishing causes-efects relations.

   - ❖ Driving Forces: fundamental process in the society that generated direct impact on environment.
   - ❖ Pressures: Human activities with change on environment, could be desired changes or involuntaries.
   - ❖ State: Changes as consequences of a natural or anthropogenic way.

4. **Environmental assessment Input- Process-Output (IPO) and Ecological matrix**
   In this step , first was identified the impacts and effects of each activity involve in ornamental fishing, with the flowchart IPS, which is possible describe row materials, equipment, supplies, labour force, among other, these are imputs incorpórate in process that generate outputs, identified as:
   - Aspect: actions of the activity that could change the environment.
   - Impact: Immediate and direct change on environment, could be adverse or with profit.
   - Efect: Consequence of impact.

Table 2. Flowchart design of Input- Process-Output (IPS)

Activity	Input	Process	Output		
			Aspect	Impact	Efect
Capture					
Transport					
Collect					
marketing					

The further step was qualify the impacts of activities with the algorithm of ecological matrix, which consists of 8 criterial:

EQ = -/+ (Pr ((De x Mg x a) + (Du x b))

Being **a** and **b** constant, the value for **a** is 0,7 and for **b** 0,3

- Type: define if the impact is positive (+) or negative (-) to environment
- Presence (Pe): Certainty of the impact happen.
- Development (De): speed of impact occurrence
- Magnitude (Mg): amount of damage or profit on environment
- Duration (Du): period of impact existence.

Presence and development are qualify in a scale of cero (0) to one (1), and magnitude and duration use a scalte between one (1) and ten (10).

Table 3. Ecological matix qualification of environmental impacts

Rank	Qualification
Very high	9 - 10
High	7 - 8,99
Medium	5 - 6,99
Low	3 – 4,99
Very low	1 – 2,99

Source: Notes of operative instrument. Universidad Distrital Francisco José de Caldas. 2013.

5. Social impact assessment of ornamental fishing

According to Franks 2012 the assessment of social impacts is a process that allows to understand the changes induced by some projects and / or economic activities, thus, obtain better results for society. A social impact is something that is experienced or felt by an individual, social group or economic unit, those are the effect of an action (or lack of action) and could be positive or negative.

Social impact assessment helps: identify key issues from the perspective of those with the potential to be impacted by the projects; predict and anticipate changes; and to use this understanding into systems and strategies in progress to respond proactively to the consequences of development.

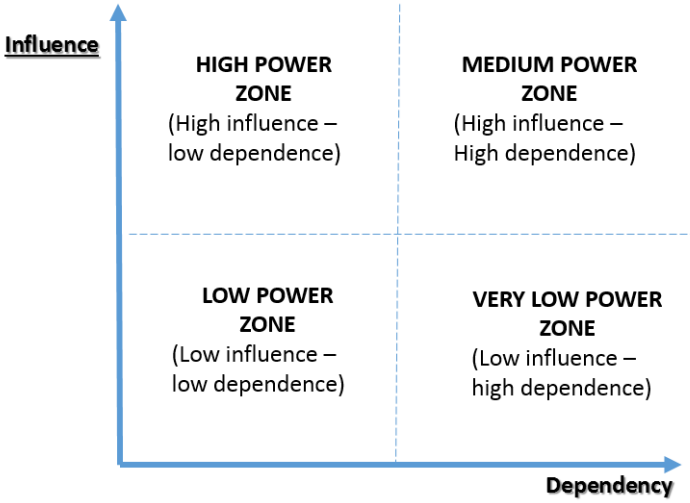
For this step the methodology of this project used the Social Impact Assessment (SIA) tool, SIA is a process to understand and answer social problems related on development, with this is possible identified, avoid and improve results in communities. The scheme used was composed by 3 aspects (Economic change, socio-environmental change, process of change) each one with specific areas to describe the conditions and design measurement indicators.

6. **Analysis of political instruments in capture, collect and marketing of ornamental fishing**
   Colombia does not have a fishing policy, therefore was necessary identified laws, decrees, resolutions and agreements apply to this activity in the country, and with those instruments was analysed 3 performance criterial (compliance, scope, magnitude) with the priorities problems identified before, with the aim of recognize the relevance of politic instruments in fishing sector.

7. **Analysis of stakeholders in capture, collect and marketing of ornamental fishing**
   First was described the stakeholders involve in all chain from capture to marketing, included public institutions, associations, academic sector, etc., for this was taking into account the characterization of the first step.

   As a second part, was established a hierarchy with all stakeholder, measuring them on dependence and influence over fishing activity, and was located them in a plane split in 4 areas

Figure 1. Plane of stakeholders dependency and influence



Source: authors

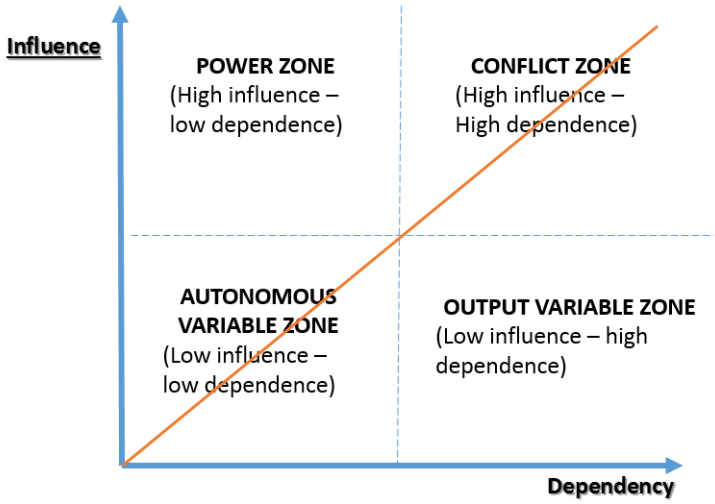
Was used the free software MACTOR, offer by the toolbox prospective of Michel Godet; this software let to build a matrix with the qualification of stakeholders and put them in the respective zone in the plane.

Phase 2

1. **Identification of influence variables on ornamental fishing activity**
   For this recognition was considered the characterization, stakeholder hierarchy and impacts approached in the previous steps; was described and analyzed if the variable will affect the future of the fishing activity in the country.
   The list of variables considered was assessed with MICMAC, the prospective software of Michel Godet, which allows do diagnostics of present, médium term and future, defining the variables hierarchy and giving bases to create strategies.

   MICMAC creates a cross - impact matrix by rating variables on their influence (over other) and the dependency of other; after this, the software delivers the plane of influence and dependency, located the variables in 4 possible zones.

Figure 2. Plane of variable – influence and dependency



Source: authors

Those variables located near to the slope (red line in the figure 3) are considered strategic and selected to design the future scenarios.

2. **Design and analysis of future events in ornamental fishing activity in the Orinoquia**
   In this step was defined the possible future events for the fishing activity in Orinoquia region; according to the most influence variables identified previously, was described the possible events in five years time horizon, one event for each variable, and those were analysed with arguments for and against, for the purpose of have clarity of their consequences and can qualify in the best way.

3. **Identification of trend scenario and alternate scenarios**
   The trend scenario describes the situation that could happen in the future if the current situation remains and the strategic variables are not modified in the projection. This scenario is the point of reference for knowing other future situations. (Mojica; 2005).
   To identify the trend scenario it is necessary to make a probability rating of each of the events of the step above, taking into account that if the current situation is maintained, what would be the probability of realizing the event. The qualification allows observing the strength of the tendencies (events), whether it is strong, moderate, weak, doubtful or unlikely.

Table 4. Criterial of events qualification

Intervals of probability qualification	Meaning	Type of trend
90% a 100%	Highly likely	Very strong
80% a 89%	Likely	Strong
70% a 79%	Likely	Moderate
60% a 69%	Doubt	Weak
51% a 59%	Doubt	Very weak
50%	Doubt	Doubtful
40% a 49%	Unlikely	
30% a 39%	Unlikely	Unlikely
20% a 29%	Highly unlikely	
10% a 19%	Higly unlikely	Highly unlikely

Source: Mojica Francisco, La construcción del futuro – forecasting y prospectiva llevados a la cámara. 2005.

After this qualification of events, is necessary do a binary code,assigning zero (0) or one (1) to each event, according to their probability of occurrence; the binary code created with all events is used further on to identified the alternative scenarios.

Table 5. Binary code for events

Event probabilty	Binary code
≤ 50%	0
51%.	1

The events and that trend scenario (the situation if all will be the same in five years), are the bases to identified the most probable future scenarios in this fishing actiity, to do this was used SMIC-PROB-EXPERT software of Michel Godet toolbox.
SMIC is a prospective software that evaluates changes in the probability of occurrence of a determined set of events, helps to reduce uncertainty and its results can be used as a basis for the production of scenarios. (Ruvalcaba 2014).
The information about events descriptions, their probability and binary code, stimate above in the trend scenario, have to be upload into the software SMIC, which qualify and analyse:

- Simple probability: rating assigned to each event individually
- Conditional probability of realization: The event probability of occurrence is qualified if another event happens.
- Conditional probability of non-realization: The probability of occurrence of an event is qualified if another does not happen.

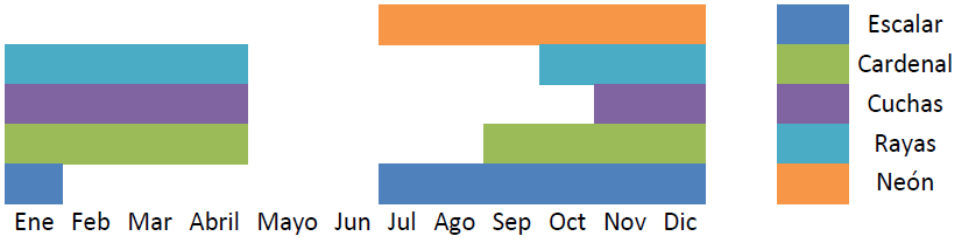
With these, the software SMIC generates all the possible combination of events, these combinations are the likely future scenarios, and the software gives to each them a binary code of identification, furthermore shows the ranking of scenarios according to their probability of occurrence.

RESULTS

The characterization presents information about ornamental fishing biodiversity in the Orinoquia region, mainly the area of Inirida, that is the most important point of collect and

marketing in the country. “In this area has been registered 470 fish species, joined in 224 genders, 40 families and 10 orders, highlighted these biologic biodiversity as the higher wealth knowing in the Orinoquia” (Von Humboldt institute, 2009).
Was found that the collectest ornamental fish species there are Cardenal, Neón, Escalar, Estrigata mármol, Corredora, river rays (Motora y Guacamaya), Mataguaro, Sapuara, and several species of cuchas (Punto diamante, Punto de oro, Atabapo, Bandera, Panaque and a kind of cucha that is endemic of this region knowing as Cucha cebra), because of the particular physical and chemical conditions of water and soul in Orinoquia, there are several species of fish that are exclusive of there.
The capture and collection depend on the 2 factors the demand of international markets , which defind fish to be collected in situ and the season in the year to capture different fish species, detailed below:

Figure 3. Calendar of fishing in Iniria, Orinoquia



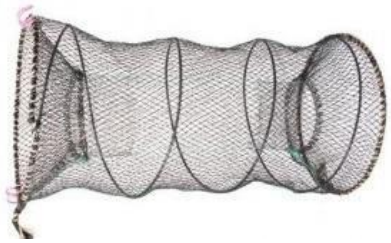
Source: authors

The biological information of each fish was organized by data sheets with the scientific name, common name, family, photo, feeding, distribution, habitat and reproduction, in total 11 data sheets of Cardenal, guacamaya ray, neon tetra, escalar, estrigata mármol, motora ray, sapuara, cucha atabapo, cucha point of gold, cucha diamond point and cucha paneque real.
About technical aspects, was identified traditionals methods depend on the season (summer or raining time) to capture fish directly in rivers, like traps, nets or just with hands; some of these techniques are Cacure, Nasa (net in hand), careta (similar to snorkelling mask), harpoon, barbasco roots (fish numb) and chinchorro.

Figure 4. Nasa

Source: authors

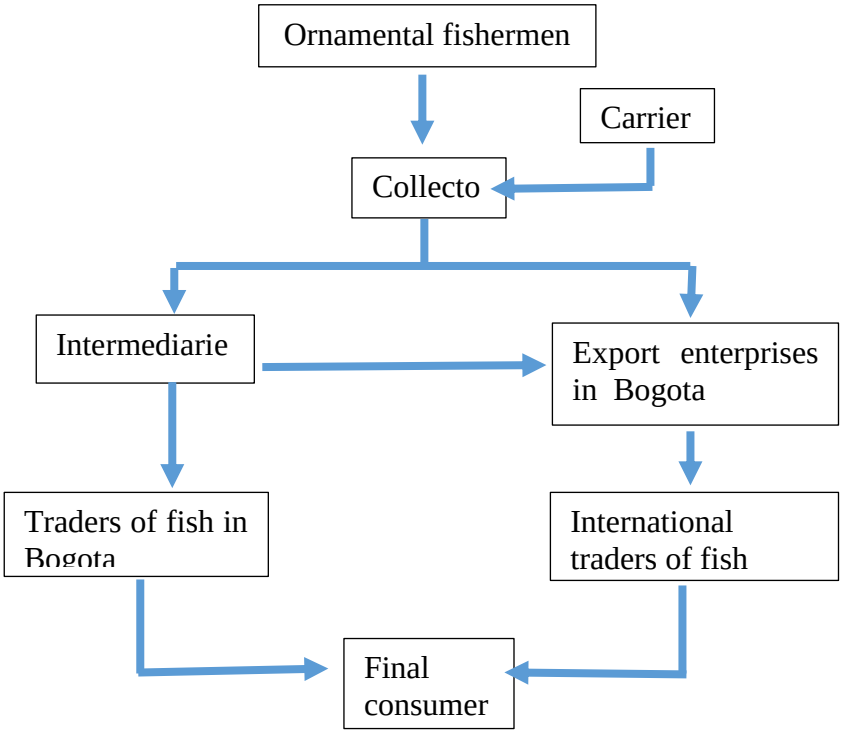
Figure 5. Chinchorro



source: http://www.picanpesca.com/es/product/nasa-extrafuerte consultado: 12/dic/2015. 4:20pm.

About the stakeholders of this activity was found 20 fishing communities register with the government authority, a few group of traders in the region and exporters in Bogota, showed several intermediaries between fishers and final consumers.

Figure 6. Chain of stakeholders involves in capture, collect and marketing of ornamental fish



Source: authors

Identification and priorisation of problems

Using the importance matrix were qualified 17 problems related with capture, collect and marketing of ornamental fish, which were identified from the initial characterization; after this process 11problems got a qualification above 13 points, these are consired the most signaficative aspects to approach.

Table 6. Prioritary problems

Aspect	Prioritary problems	Qualification
Biological	Lack of biological information of ornamental fish in the area	14
	Damage of ecosystems because of capture of ornamental fish in-situ	13
Technical	Lack of aquaculture techniques to native species.	17
Socio-economic	Fish smuggling	18
	Low associativity	16,8
	Communities with low environmental awereness (indigenous and settlers)	17
	Shortage of road and means of transport	16,9
	Inequality trade relations	17
Politic - govermental	Faults in control and monitoring	16
	Faults of institutional cooperation	13,8
	Lack of territorial planning, contemplating fish resource	18

Taking into account these prioritaries problems was done the driving forces scheme, describing the capture, collect and marketing presures in politic, environmental, social and economic aspects; also identified the state of consequences, this descriptive information about the current conditions, is a complement for the characterization of the activity.

Environmental assessment

In Input, Process and Output (IPO) flow diagram was identified 15 activities (inputs) involve since capture until marketing of ornamental fish; with the further qualification in the ecologic matrix was selected 6 activities as the highest negative impacts.

Table 7. Activities associated with ornamental fish that generate the highest impact

Activities with high impact	Qualification
Capture	5,76
Transport to the area of collect fish	6,17
Collected	5,68
Preparation and transport to Bogota	6,32
Acopio de peces en Bogotá	6,12
Comercialización (Exportación)	5,76

Social assessment

In this step was described social impacts of capture, collect and marketing ornamental fishing, each one with a measure indicator organized by

1. Social and cultural change
    - Population and demography
    - Social infrastructure and service
    - Crime and social order
    - Culture and costums
    - Work
    - Gender and vulnerable groups

2. Economic change
    - Distribution of profits
    - Infrastructure

3. Social-environmental change
    - Pollution
    - Access to resources
    - Disruptions

4. Process of change
    - Commitment with the communities
    - Participation
    - Community Development

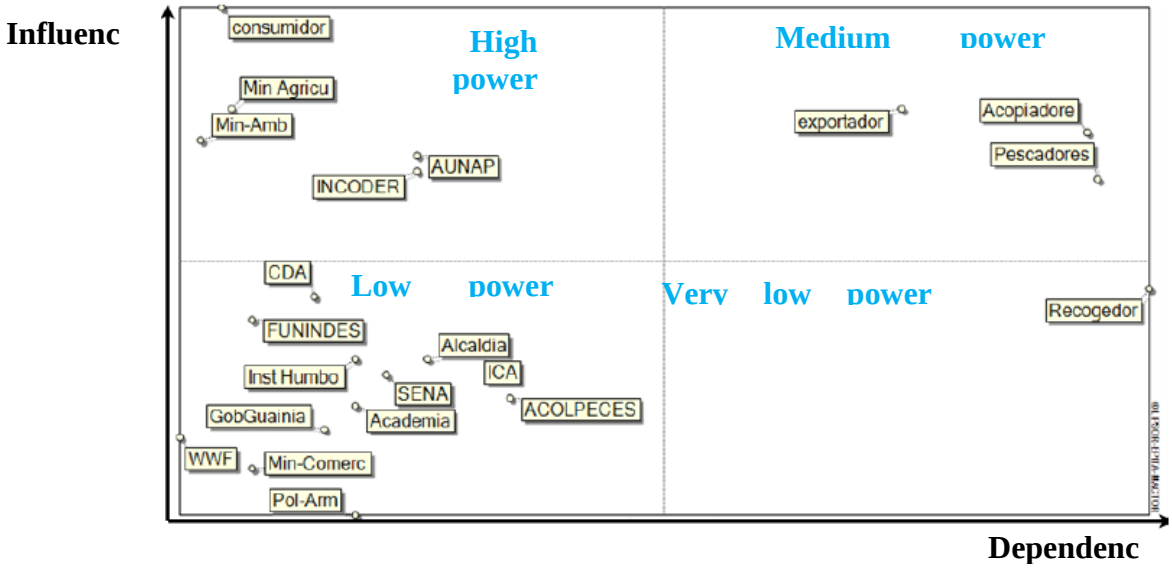
Analysis of political instruments

Was identified 20 political instruments related with ornamental fishing activity, started with the politic constitution of Colombia, a public policy of biodiversity and ecosystems services,4 laws, 4 decrees, 5 resolutions and 4 agreements, all of these with a qualification of compliance of 2,26, scope 2,05 and magnitude of 1,65, that means politic instruments have partial compliance, the scope of those instruments is for 3 or 4 prioritary problems of the sector, and the magnitude is low.

Analysis of stakeholders

21 stakeholders were identified, as directly actors in the marketing chain as public institution, education sector and NGO's with interest in this economic activity. After do the importance matrix qualification the software MACTOR designed the plane with the 4 zone

Figure 7. plane of stakeholders dependency and influence



Source: Authors

In the high power zone, were located consumers and governmental authorities (agricultural ministery, fishing authority, environmental ministery), as the powerest actors in this activity, in the case of consumers, was because the trade relationship focus on consumers request, they established the kind and amont of ornamental fishing to be capture and sell.
In the medium power zone are the exporters, collectors and fishermen, who have high influence but at the same time strong dependency on the consumers requests and governmental policies. For the zone of low power were located the majority of ONG, academic intitutions in the region and other entities with interest in ornamental fishing; and in the last one the very low power zone is the occasional transporters of fish, between fishermen and collectors.

Identification of influence variables on ornamental fishing activity

Taking into account the previous characterization and assessments, was identified 10 variables with important influence in the activity, describing the component that belong and the explanation of the currect situation and the possible one in five years.

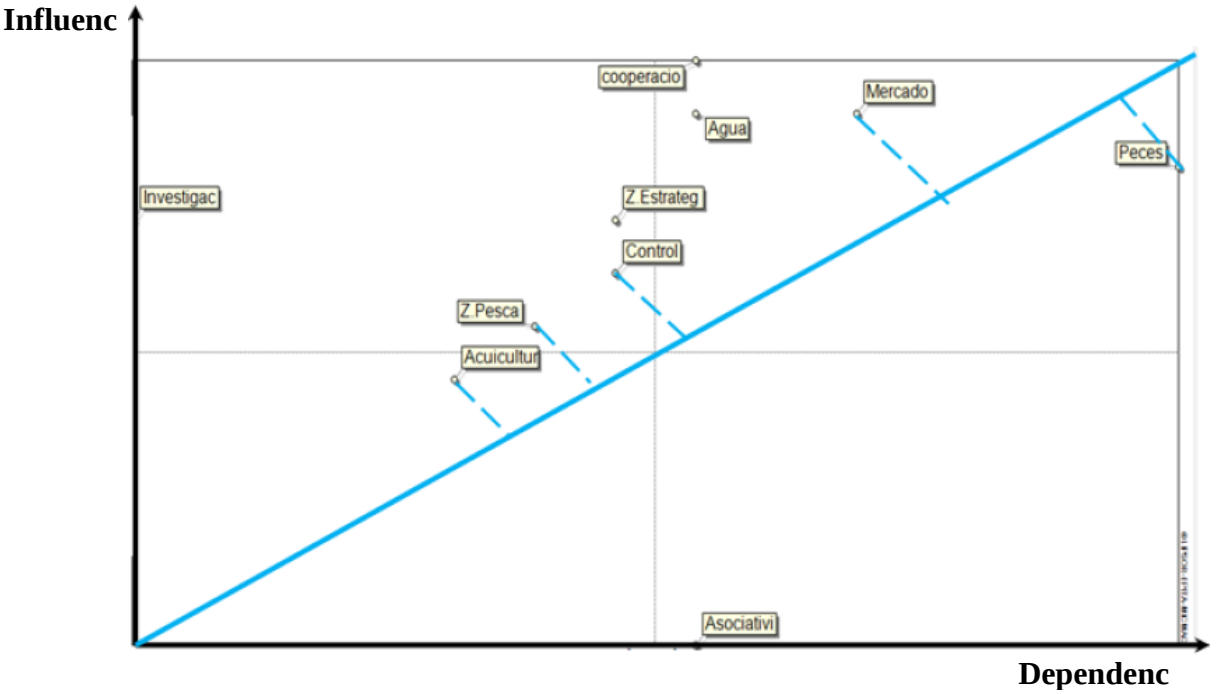
Table 8. Variable identified for ornamental fishing in Orinoquia

Component	Variable	Consist of
Biological	Fish	Availability of fish resource in source of water of the area
Social - economic	Market	Participacion of Colombian ornamental fish in international markets
Environment	Water	Quality and water volume
Technical	Aquaculture	Development of aquaculture with technological package to reproduce ex situ
Social-economic	Associativity	Organization of fishermen and collectors to trade the fish
Environmental	Fishing areas	Identification of new fishing areas
Environmental	Researching	Achieve knowledge of biological aspects of species and general conditions of ecosystems.
Environmental	Strategic areas	Ramsar - wetland protection
Political	Control	Control and monitoring of fishing, collect and marketing.

Source: Authors

These variable were qualified according with influence and dependency of each one and with the software MICMAC was prioritized the 5 variable with high impact on the activity according with the plane of dependency and influence.

Figure 8. Variables plane of dependency and influence



Source: Authors

This plane shows that the variables are located, mainly in the conflict and power zone, just 2 variables were in different, aquaculture in the autonomous zone and associativity in output zone. Considering the variables near to the slope line was identified the prioritary or most influence variables: fish (biodiversity), market, control, fishing areas, and aquaculture.

Design and analysis of future events in ornamental fishing activity in the Orinoquia

With the 5 influence variables was described a possible future event for each one, taking into account a time frame of 5 years, a current situation and a hypothesis of a change or breakdown in the variables trends. These are the bases to elaborate the scenarios.

Table 9. Future events from the influence variables

Variable	Number	Event What likely is than in five years…?
Aquaculture	E1	The region has a specialist center to study biology of ornamental fish and develop techniques to reproduce species with aquaculture conditions.
Fishing areas	E2	The current 15 fishing areas used, are keeping with development plans, programs and strategies of protections.
Control	E3	The governmental authority is consolidated as a supervisory body with presence in all areas, with total register of fishermen and collectors
Market	E4	Colombia is located as the first exporter of ornamental fish in Latinamerica, and is in the 10 most important exporter countries in the world.
Fish	E5	The inventory of ornamental fish in the area increase 20%, and biological knowledge of species.

Table 10. Qualification of events to elaborate trend scenario of ornamental fishing activity

Event	Qualification	Type of trend	Binary code
Aquaculture (E1)	35%	Unlikely	0
Fishing areas (E2)	65%	Likely – Weak	1
Control (E3)	83%	Very likely – strong	1
Market (E4)	40%	Unlikely	0
Fish (E5)	50%	Doubtful	0

Identification of trend scenario and alternate scenarios

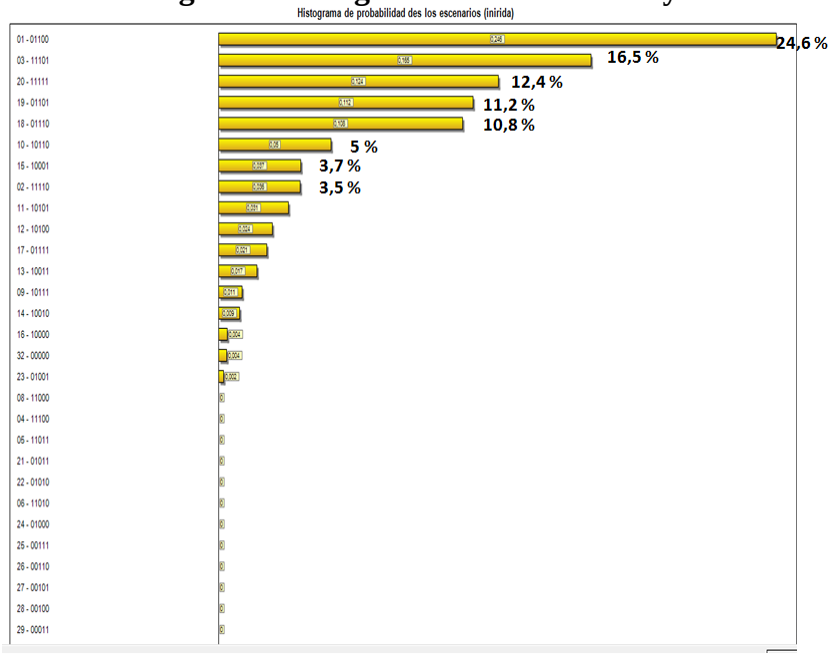
The previous qualification table shows that the most probable events to happen in 5 years are control and fishing areas, and the rest of events (aquaculture, market and fish) have very low trend; according with this, the trend scenario for the capture, collect and marketing of this activity in Oriniquia, if all conditions do not change, will be define by the above qualification, with the binary code of probability 01100. The desciption to the trend scenario is:

Scenario name: Fish in situ (01100)

Ornamental fish in Orinoquia are obtain by the capture directly in the river and natural ecosystem, all fish come from capture in-situ, the control focus on towns of the region where fish are collected and send to Bogota. About the information of biological aspects and aquaculture techniques, is not increasing, because need more invesment and planning,

The capability of other countries to develop aquaculture with ornamental fish, let them to trade more species and high amount of fish, as consequence Colombia reduce its participation in international markets since not handle the new trend and requests.
With the definition of trend scenario, the next step was qualified the events in the software SMIC PRO-EXPERT, this software generated 32 scenarios with all possible combination of occurency of the 5 events, and for each one the likely of happen, the next graphic shows all scenarios and the odds of them

Figure 9. Histogram of scenarios likely



Source: authors

The histogram show that the first five scenarios gather 75,5% of likelihood of occurrence, and the reccomendation is focus on them; for that reason, taking into account the binary code of each one, that shows the events that happen and not, was assigned a characteristic name.

Table 11. Alternative scenarios

Scenario	Name	Likely	Accumulated
01100	Fish in-situ	24,6%	24,6
11101	Fish breeding	16,5%	41,1
11111	Orinoquia fishing	12,4%	53,5
01101	Manage and control	11,2%	64,7
01110	Market strength	10,8%	75,5

Source: authors

The first likely scenario in 5 year is the trend scenario, that described the situation if all conditions keeping the same way, the next 4 scenarios are alternatives if some conditions change.

CONCLUSION

- Prospective methodologies offer informations to decision makers about the possible alternatives of development in any project or activity, with this, stakeholders can

identify if they go in the correct way or could take actions to change situation and avoid impacts before happen.

- To achieve a sustainable management of the ornamental fishing activity is necessary to identify, analyse and take measures on social, environmental, economic and political aspects, because all are articulated as a systems and any economic activity involves those resources; is not possible analyse only fish resource since this interact with and holistic system.
- Ornamental fishing is an important economic activity in isolated areas of Orinoquia region, developed mainly by indigenious communities that doing this in several small groups of business, but generate positive and negative impacts in environmental and social aspects, as was identified in the respective assessments.
- If the trend scenario described above will be real in 5 years, is possible that this activity in the Orinoquia will reduce its participation in regional economy, because would have less requests of exports, the demand of international markets is being cover by countries with aquaculture production.
- The most influence variables of this activity are focus on diversity of ornamental fish, demands of international markets, governmental control on the way of develop the activity, management of fishing areas in natural ecosystems and the need of develop aquaculture techniques with endemic species.

REFERENCES

1. FRANKS DANIEL; Evaluación del impacto social de los proyectos de recurso; International mining for development centre, Australian Goverment, University of Queenlands. 2012; p.p 6.
2. UNITED NATIONS ENVIRONMENTAL PROGRAM (UNEP) AND INTERNATIONAL INSTITUTE FOR SUSTAINABLE DEVELOPMENT (IIDS). Manual de capacitación para evaluaciones ambientales integrales. 2009. p.p 474
3. RESEARCH INSTITUTE OF BIOLOGICAL RESOURCES ALEXANDER VON HUMBOLDT. Biota Colombiana Vol. 10, Volumen especial de la Orinoquia. Bogotá: Instituto Alexander von Humboldt. December, 2009.
4. RUVALCABA Fernando; Taller Prospectiva estratégica, técnicas de prospectiva. 2014.
5. MOJICA Francisco, La construcción del futuro – forecasting y prospectiva llevados a la cámara. 2005. p.p225.

CO_2 EFFLUX FROM AGRICULTURAL SOILS

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ABSTRACT

Agricultural lands may act as either a source or a sink for atmospheric greenhouse gases, three main greenhouse gases:carbon dioxide (CO_2), methane (CH_4), and nitrose oxide (N_2O). (NH_4NO_3) application can have a significant effect on soil carbon (C) pools and plant biomass production.
in our experement we conducted soil samples from kartal which is a cropland and EC site to the lab directly and we put this soil into PVC tubes divided to planted and not planted soils and they were kept under favorable conditions , For the field measurment we used LI 6400 gas analyser to measure the CO_2 efflux , SWC measurement and soil T, and for the lab measurement we used Picarro G1101i gas analyzer to measure CO_2 efflux and thier isotopic composition (^{13}C and ^{12}C), and for the microbiological part we used FDA method for the measurement of microorganisms activity in our soils .
Our main gaol was to identify: The effect of the amount of N fertilizer (NH_4NO_3) on soil CO_2 emission, the effect of soil moisture on soil CO_2 emission and to identify the enzyme activity of microbial populations

Keywords: *source, sink, greenhouse gases, CO_2, N_2O, CH_4, EC site, SWC*

INTRODUCTION

Over the last few decades, climate change has been studied by researchers in different disciplines, who have predicted an increase in the temperature of the atmosphere and oceans mainly due to the emissions of greenhouse gases (GHG) such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), troposphere ozone (O_3) and chlorofluorocarbons (CFCs) (IPCC, 2007).
For the past two centuries and especially after the Industrial Revolution, emissions of GHG have increased dramatically due to increased industrial and transportation activities associated with the use of fossil energy sources and land use changes (IPCC, 2007).
In this sense, the Intergovernmental Panel on Climatic Change (IPCC, 2007) reported that the global atmospheric concentration of CO_2 has increased from a pre-industrial value of about 280 to 379 ppm in 2005, exceeding the natural range over the last 650 000 yr (180 to 300 ppm, as determined from ice cores), and that the annual CO_2 concentration growth rate was larger during the last 10 yr (1995 to 2005 average: 1.9 ppm per year).
Natural sources of CO_2 basically correspond to the respiration process of terrestrial and aquatic organisms. An estimated 60 Pg C yr-1 (1 Pg = 1 x 1015 g) is emitted to the atmosphere by autotrophic respiration and a similar amount is emitted as a result of heterotrophic respiration (Relay and Grace, 2007), where the CO_2 emission result from soil respiration is 10 to 15 times greatter than the CO_2 emission from fossil fuels (Raich and Schlesinger, 1992).
The emission of CO_2 due to volcanic activity is relatively minor on a global scale, accounting for 0.02 to ion growth rate was larger during the last 10 yr (1995 to 2005 average: 1.9 ppm per year. When the increasing in the levels of atmospheric CO_2 have prompted research assessing

the contributions of industrial, agricultural, and environmental practices to current and potentially continued increasing levels of CO_2 Various management practices on agriculture land can have an impact on soil C content.

Agricultural practices that affect soil C include tillage system, cropping system, N fertilization, and many other practices. It is estimated that soil contains approximately 1.4 × 1012 Mg of C in organic matter and surface litter (Schlesinger, 1991). One of the pathways to lose soil C in a row cropping system as a result of management practices (i.e., tillage, N fertilization, etc.) is the emission of CO_2 from soil. Generally, sources of CO_2 from a soil system can be attributed to biological and chemical activity within the soil. Soil respiration involves organisms metabolizing substrates producing CO_2 within the soil matrix (Anderson, 1982).

Carbon dioxide loss from soil can also be associated with microbial decomposition of organic matter and root respiration (Witkamp and Frank, 1969; Edwards et al., 1970; Fritz et al., 1978; Singh and Gupta, 1977; Hanson et al., 2000).

The mechanism of soil CO_2 emission to the atmosphere, however, involves the movement of CO_2 through soil pores, and release from the soil system can be measured at the soil surface (Rolston, 1986). Factors such as soil temperature, soil moisture, cropping system, and N availability can all influence soil microbes and their activity.

Carbon dioxide (CO_2), methane (CH_4) and nitrose oxide (N_2O) (Vergé et al.,2007), having measurable fluxes between the atmosphere and the biosphere. Soil comprises the largest terrestrial store of carbon (C), housing more than two thirds of terrestrial C .The terrestrial-atmospheric surface flux of carbon dioxide (CO_2) arising from the decomposition of soil organic matter (SOM) through heterotrophic respiration drives soil organic carbon (SOC) losses in many soils (Raich and Schlesinger, 1992).

when the soil organic matter and litter derived respiration belong to the heterotrophic soil respiration component (Moyano et al., 2009). This decomposition is attributed mainly to soil bacteria and fungi. On the other hand, some of the soil fungi using recent photosynthetic assimilates are contributing to the autotrophic respiration component (Risk et al., 2008b).

While the soil respiration includes components of an autotrophic-heterotrophic continum from roots through the root-associated (rhizospheric and mycorrhizal) to non-root associated (heterotrophic) microbial components and the quantity of the soil produced CO_2 is highly dependent on plant carbon uptake (Högberg and Read, 2006).

CO_2 production by autotrophic and heterotrophic components show large diel and seasonal variability (Fassbinder et al., 2011; Moyes et al., 2010). For the microbiological measurement the FDA is a simple method for measuring total microbial activity in a range of environmental, including soils. The enzymes responsible for FDA hydrolysis are plentiful in the soil environment. Non-specific esterases, proteases and lipases, to hydrolyse FDA, are involved in the decomposition of many types of tissue. The ability to hydrolyse FDA thus seems widespread, especially among the major decomposers, bacteria and fungi (SchnuÈrer and Rosswall, 1982).

In this study our main goal is to identify the different effect of the amount of the mineral fertilzer (NH_4NO3) on soil CO_2 emission, and to dermine the effect of soil moisture on soil CO_2 emission and the last aim is to identify the enzyme activity of microbial populations in our soil

METHODS

Site description

Kartal (47.658°N, 19.532°E),which is a EC station situated in Mid hungary and has continental climate, close to the headquarters of the the Gödöllő Experimental Farm Ltd. due to the easy accessibility. Crop rotation: 2013-2014 winter wheat, 2015 sunflow.

Sampling

Concerning the sampling we did it in two soils planted and not planted cropland ,and from Kartal site we conducted soil samples from the top of 15cm layer to lab and we put it into PVC tubes of 20 height and 10 cm diameter , the tubes were filled to 15 cm with th soil (about 1200 to 1300 g of soil) and we used the remaining space as chambers for the emission of CO_2 and N_2O measurements.

Conservation

We did a normal freezing for the conservation of the samples for the microbiology measurement , but for the soil analysis and the CO_2 flux measurment we conserved the samples in the room temperature

Lab studies

Our manipulation experement was divided into two periods , the first contained a series of 27 pots and the second contained 30 pots :bare soil (9 pots) and the other pots were planted with weat plants .
NH_4NO_3 fertilizer was applied on the surface of the soil : fisrt series : 0kg/hec, 50kg/hec, 100 kg/hec, second series : 0kg/hec, 75kg/hec, 150kg/hec treatments at the begining of the study period .

Gas exchange measuring systems

These measurements will be conducted in controlled environment for easier separation of the effects of abiotic (soil water content 20-25%, air temperature 20°C , 12 hours of light ...) and biotic (CO_2 uptake, transpiration, photosynthesis) variables on soil CO_2 .
Plant photosynthetic activity and growing could have influence on the soil CO_2, but in opposite directions: assimilated CO_2 will increase root respiration.
The sampling for the CO_2 efflux of the soil samples and additional measurements were conducted each week during a 5 weeks long study period .
Closer chamber technique was used for measuring the emission of the greenhouse gas and the isotopic composition of CO_2 efflux was also measured, for the CO_2 measurement we connected the chambers to a Picarro G1101-i gas analyser for 20 minutes
For the field measurement we went to cartal site every 15 days and we used the LI-6400 gas analyser for the measurment of CO_2 efflux, SWC and soil tempreture.

Eddy covariance setup

The EC system in our study site measured the CO_2 and H_2O fluxes continuously.
The sum of the different CO_2 fluxes (photosynthesis and respiration) is called net ecosystem exchange (NEE) and can be measured by the eddy covariance technique, which is based on high frequency (10 Hz) measurement of wind speed and concentration of CO_2/H_2O.
And for the activity of microbial populations and the estimation of overall microbial activity in our soil samples we used the fluorescein diacetate (FDA) hydrolysis essay .
Plant scale CO_2/H_2O flux measurements are planned together with soil CO_2 efflux, isotopic (^{13}C) measurements and microbial activity . Plant individuals will be planted into field soil samples in small pots and these soil samples will also be analysed for microbial activity.

CO2 flux measurements

Leaf photosynthesis and transpiration will be measured by portable photosynthesis systems (LI6400). $^{13}CO_2$ concentration of the CO_2 efflux of the different soil components will be measured by cavity ring-down spectroscopy (Picarro G1101-i gas analyser) .
Keeling-plot approach can be used to calculate the isotopic signals .Differences in the photosynthetic discrimination of $^{13}CO_2$ in C3 and C4 plants can also be used to produce distinct isotope signatures allowing the partition of components (Fassbinder et al. 2011). A home-made soil efflux measurement system (Nagy et al. 2011) will be used for the continuous measurements of soil GHG effluxes and the isotopic composition of CO_2 efflux.

Microbial activity

In this part we used the FDA which is a simple method for measuring total microbial activity in a range of environmental, including soils. The enzymes responsible for FDA hydrolysis are plentiful in the soil environment. Non-specific esterases, proteases and lipases, which have been shown to hydrolyse FDA, are involved in the decomposition of many types of tissue. The ability to hydrolyse FDA thus seems widespread, especially among the major decomposers, bacteria and fungi (SchnuÈrer and Rosswall, 1982).
The fluorescein diacetate (FDA) hydrolysis assay measures the enzyme activity of microbial populations and can provide an estimate of overall microbial activity in an environmental sample. The assay is considered non-specific because it is sensitive to the activity of several enzyme classes including lipases, esterases, and proteases.
Activity of these enzymes results in the hydrolytic cleavage of FDA (colorless) into fluorescein (fluorescent yellow-green).

RESULTS AND DISCUSSION

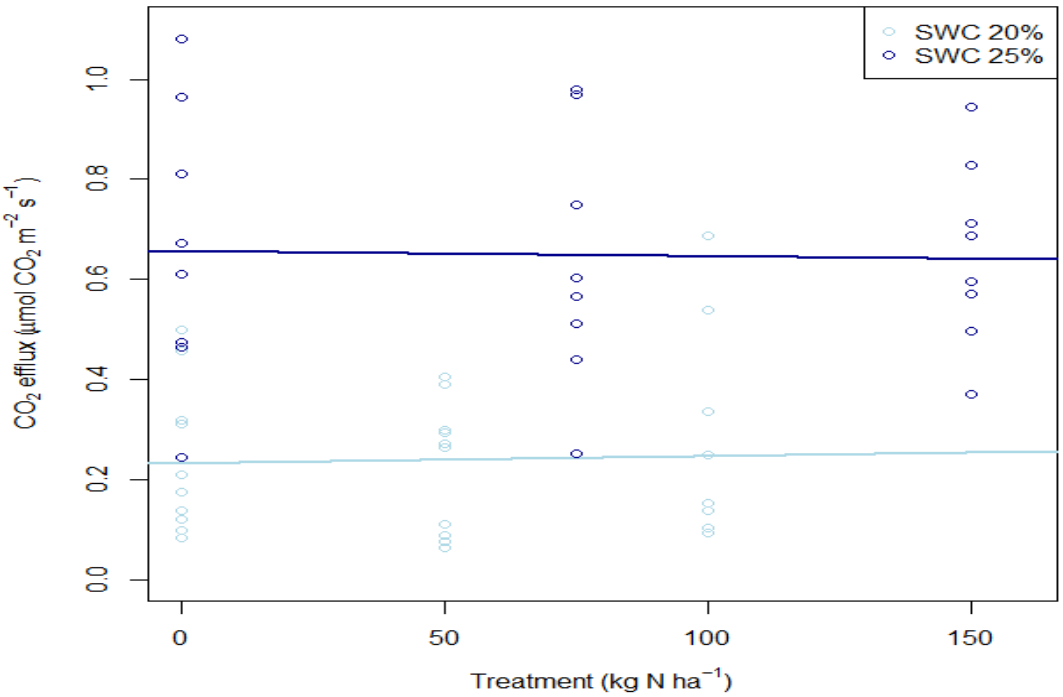

Figure 1: CO_2 efflux of the different treatments and at two different soil moisture levels 20 and 25%

We found that the soil CO_2 efflux was significantly higher at the higher soil moisture level (25%), and it was lower at the lower soil moisture level (20%) but it was not affected by the increasing fertilizer amount (0kg/hec, 50kg/hec, 100kg/hec,150kg/hec) . The higher soil moisture affect the CO_2 efflux by increasing both the decomposition of the soil organic matter and the respiration of the root and the rhizosphere.

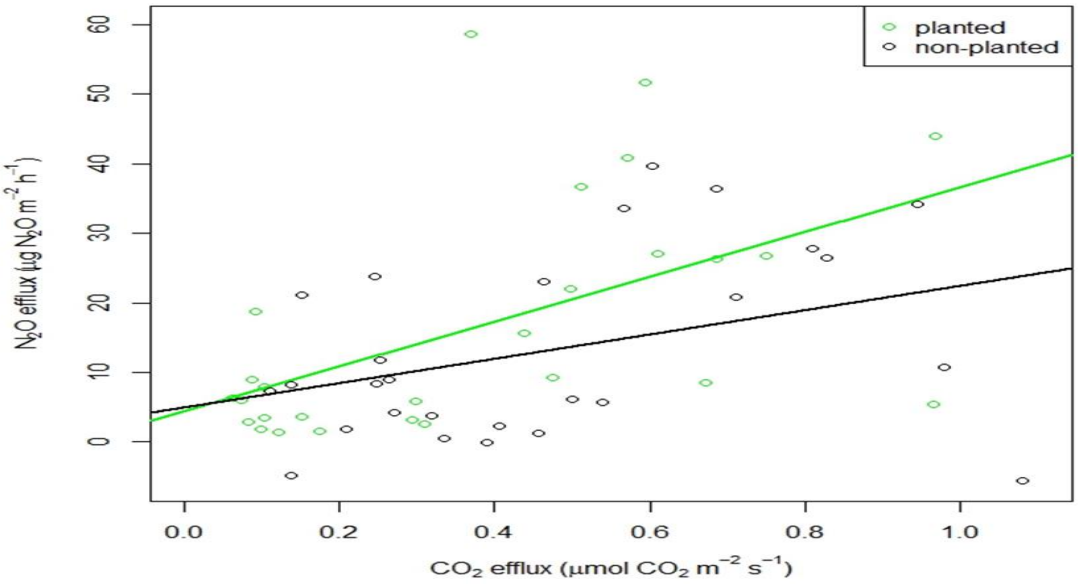

Figure2 : CO_2 and N_2O efflux of planted and non-planted soil samples
The equation and statistics for N_2O & CO_2:
Planted: N_2O=4,4+32,3 CO_2, R2=0,26, p<0,05
Non-planted: N_2O=5,0+17,5 CO_2, R2=0,13, p=0,05

In this figure Higher efflux was observed both for CO_2 and N_2O in planted soil rather than in not planted soil for the CO_2 this higher flux is the result of soil organisms respiration included respiration of plants, roots, rhizosphere ,microbes and fauna .
And we found a significant linear regression between the CO_2 and N_2O effluxes both for the planted and the non-planted soil samples.
Concerned the N_2O efflux it is a share work .

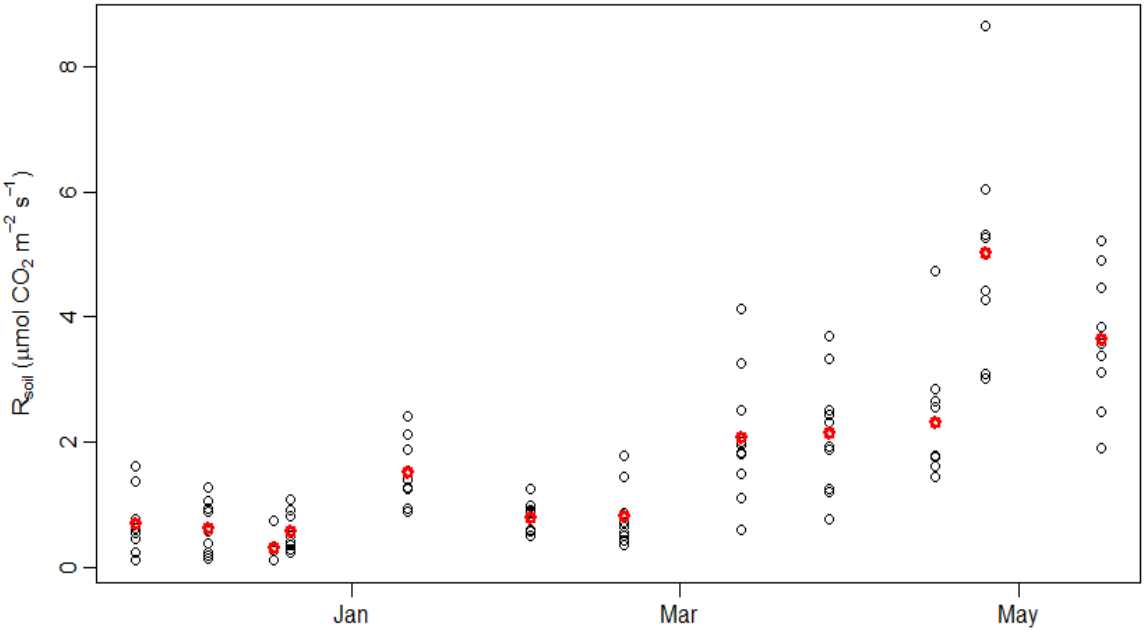

Figure 3 : field measurement by LI 6400 gaz analyser(November-may2018)

This field measurment showed that the soil respiration was lower in the winter period and its begin to increase with the temperature in the beginig of the spring period spetially in May it reach the maximun value (5 µmol CO_2 m^{-2} s^{-1}) and we still measure the soil respiration

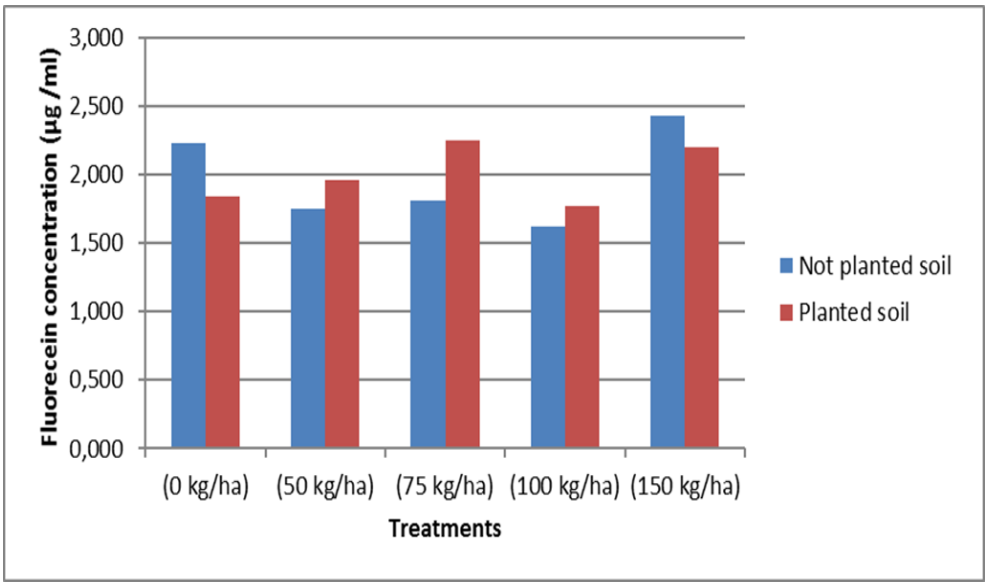

Figure 4 : Fluorescein concentration (µg/ml) in the different treatments

Soil enzymatic activity based on FDA measurements showed that there are no significant result because there are no differences between the treatments, therefore our further aim is to use

another tests to measure and to detect the number of the bacteria , fungi, and the actinomycets in our soil

CONCLUSION

In the present study we can say that there are an effect of soil water content with different levels (20-25%) on the soil CO_2 emission which effect the decomposition of the soil organic matter and the respiration of the root and the rhizosphere but we found that there are no effect of the mineral fertilizer NH_4NO_3 with different treatment on the soil CO_2 emission and concerned the microbial avtivity we didnt find any significant result .

REFERENCES

1. 1-Anderson, J.P.E. 1982. Soil respiration. p. 831–866. In A.L. Page (ed.) Methods of soil analysis: Part 2. Chemical and microbiological properties. Agron. Monogr. 9, 2nd ed. ASA, Madison, WI.
2. 2-Edwards, C.A., D.E. Reichle, and D.A. Crossley, Jr. 1970. The role of soil invertebrates in turnover of organic matter and nutrients. p. 12–172. In D.E. Reichle (ed.) Analysis of temperate forest ecosystems. Springer- Verlag, New York.
3. 3-Fassbinder JJ, Griffis TJ, Baker JM (2011) Interannual, seasonal, and diel variability in the carbon isotope composition of respiration in a C3/C4 agricultural ecosystem. Agric For Meteorol 153:144–153. doi: 10.1016/j.agrformet.2011.09.018
4. 4-Fritz, P., E.J. Reardon, J. Barker, R.M. Brown, J.A. Cherry, R.W.D. Killey, and D. McNaughton. 1978. Th e carbon isotope geochemistry of a small groundwater system in Northeastern Ontario. Water Resour. Res. 14:1059–1067.
5. 5-Hanson, P.J., N.T. Edwards, C.T. Garten, and J.A. Andrews. 2000. Separating root and soil microbial contributions to soil respiration: A review of methods and observations. Biogeochemistry 48:115–146.
6. 6- Högberg, P. and Read, D. J.: Towards a more plant physiological perspective on soil ecology, Trends Ecol. Evol., 21, 548–554, doi:10.1016/j.tree.2006.06.004, 2006.
7. 7-IPCC. 2007. Climate change 2007: The physical science basis. Summary for policymakers. Contribution of working group I to the fourth assessment report of the Intergovernmental Panel on Climate Change (IPCC). p. 1-18. In S. Solomon et al. (eds.) Cambridge University Press, Cambridge, UK.
8. 8-Moyano, F., Atkin, O., Bahn, M., Bruhn, D., Burton, A., Heinemeyer, A., Kutsch, W. L., and Wieser, G.: Respiration from roots and the mycorrhizosphere, in: Soil Carbon Dynamics: an Integrated Methodology, edited by: Bahn, M., Heinemeyer, A., and Kutsch, W. L., Cambridge University Press, Cambridge, 234–288, 2009.
9. 9- Moyes AB, Gaines SJ, Siegwolf RTW, Bowling DR (2010) Diffusive fractionation complicates isotopic partitioning of autotrophic and heterotrophic sources of soil respiration. Plant Cell Environ 33:1804–19. doi: 10.1111/j.1365-3040.2010.02185.x.
10. 10-Nagy Z, Pintér K, Pavelka M, et al. (2011) Carbon balance of surfaces vs. ecosystems: advantages of measuring eddy covariance and soil respiration simultaneously in dry grassland ecosystems. Biogeosciences 8:2523–2534. doi: 10.5194/bg-8-2523-2011.
11. 11-Raich, J.W., and W.H. Schlesinger. 1992. The global carbon dioxide flux in soil respiration and its relationship to vegetation and climate. Tellus Series B-Chemical and Physical Meteorology 44B:81-89ford, UK.
12. 12-Reay, D., and J. Grace. 2007. Carbon dioxide: Importance, sources and sinks. p. 1-10. In D. Reay et al. (eds.) Greenhouse gas sinks. CAB International, Walling.

13. 13-Risk, D., Nickerson, N., Creelman, C., McArthur, G., and Owens, J.: Forced Diffusion soil flux: A new technique for continuous monitoring of soil gas efflux, Agr. Forest Meteorol., 151, 1622–1631, doi:10.1016/j.agrformet.2011.06.020, 2008.
14. 14-Schlesinger, W.H. 1991. Biogeochemistry: An analysis of global change. Academic Press, San Diego, CA.
15. 15-SchnuÈrer, J., Rosswall, T., 1982. Fluorescein diacetate hydrolysis as a measure of total microbial activity in soil and litter. Applied and Environmental Microbiology 43, 1256±1261.
16. 16-Singh, J.S., and S.R. Gupta. 1977. Plant decomposition and soil respiration in terrestrial ecosystems. Bot. Rev. 43:449–528.
17. 17- Vergé, X. P. C., De Kimpe, C. and Desjardins, R. L.: Agricultural production, greenhouse gas emissions and mitigation potential, Agric. For. Meteorol., 142, 255–269, doi:10.1016/j.agrformet.2006.06.011, 200718-Witkamp, M., and M.L. Frank. 1969. Evolution of CO2 from litter, humus, and subsoil of a pine stand. Pedobiologia 9:358–365
18. 18-Witkamp, M., and M.L. Frank. 1969. Evolution of CO2 from litter, humus, and subsoil of a pine stand. Pedobiologia 9:358–365

EXAMINING PRICE VOLATILITY ALONG THE MEAT SUPPLY CHAIN: THE CASE OF FINLAND

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ABSTRACT

During the last 20 years, agricultural commodities were facing a dramatic change in price behavior. Moreover the price fluctuation of agricultural commodities has raised the need for more investigations into the agricultural commodity price volatility. The persistence in volatility causes a continued uncertainty. Then, higher price volatility should be mitigating by higher costs of managing. Thus, higher costs of risk mitigation would eventually translate into higher consumer prices. This paper investigates the price volatility of producer and consumer meat prices and to capture the volatility spillover along Finnish meat supply chain. We have applied GARCH models in analyzing the conditional heteroskedasticity of the prices and estimating whether the price volatility is transmitted from one price level (Producer) to the other price level (consumer), using monthly price indices covering the period from January 1999 to June 2018. GARCH models have been used to model the time-varying pattern of agricultural commodity prices, since they allow the previous shocks and previous volatilities to affect the current volatility. Results of this study may have implications for meat producers and consumers, which could imply cross-hedging strategies for producers and could assist the government to adopt policy options to mitigate the price volatility consequences, in order to protect both sides; consumer and producer. We test the presence of time-varying correlation among two price level of pork and beef market using the DCC model.

Keywords: *Meat, DCC-GARCH model, volatility, time varying, Finland*

INTRODUCTION

Price is the main mechanism, which links agricultural (farm) product prices, producer (processor) food prices and consumer (retail) food prices. Due to many reasons, the Agricultural commodity market quantities and prices are often random which leads the risk and uncertainty into the process of market modeling and forecasting. In particular, volatility was quite stable until 2003, but it presents a sudden upward jump during that year. A possible explanation for that jump is the 2003 CAP reform. The Common Agricultural Policy (CAP), which took place in 2003, had as aim to stabilize commodity markets and to support EU market liberalization and rural development. It has introduced policies to make EU agricultural industries more competitive and market-oriented and to protect the EU markets and to regulate price volatility(Borawski, Beldycka-Borawska, & Dunn, 2018).

The price volatility examines the relative uncertainty of prices in farm-retail meat markets as well as the degree by which price uncertainty in one supply chain level influences price uncertainty in the other level. Higher price volatility discriminates the market participants to forecast prices which could have negative effects on their welfare. Meat prices are used in this study because they have been associated with varying degrees of volatility. Therefore, it is reasonable to believe that the conditional variances associated with meat prices would not have remained constant during this period and, as a result, an appropriate model should allow the

conditional variance to reflect this sort of behavior. The Finnish retail sector is dominated by two retail companies (i.e., S-Group and Kesko) they present more than 80% of market share in 2012, when the share of the third-largest retail company (i.e., Suomen lähikauppa, formerly Tradeka) diminished to about 7% in 2012 (Jansik, Irz, &Kuosmanen, 2014). Recently, the appearance of discount chains as well as the increasing role of the big retail companies' own private labels has contributed to the structural change in the Finnish food-processing and retail sector.

This paper aims to examine the volatility of producer and consumer prices of meat and test time-varying correlations across these prices.
Among the studies examining price volatility, Rezitis (2003a) who investigated causality, price transmission, and volatility spillover effects between producer and consumer prices in lamb, beef, pork, and poultry markets in Greece using a bivariate GARCH model and Rezitis (2003b) who investigated volatility spillover effects across consumer meat prices for lamb, beef, pork and poultry.(Apergis & Rezitis, 2003)(Rezitis, 2003).
In our research, a multivariate generalized autoregressive conditional heteroskedasticity (MVGARCH) models, named DCC (Engle, 2002) have been adopted because of their abilities to capture the leptokurtic, autocorrelation features of financial time series. Moreover, they are known to proffer a time-varying variance-covariance matrix which reveals various pieces of information about volatility and correlation.

METHODOLOGY

DCC GARCH (1,1) model:

Originally GARCH models enabled to model conditional variance for individual assets or indices. However, some early applications of the models showed that the capital markets should not be analyzed separately but also interdependences between them should be taken into account. That problem was solved after introduction of DCC-GARCH models that enable to analyze interdependence among markets by estimating the time-varying conditional correlation (Engle, 2002).
In this research DCC-GARCH model was applied as it enables to analyze the interrelations among prices by estimating the time-varying conditional correlation for given pairs of prices for each type of meat (pork, poultry and beef).
The DCC model assumes that first difference of the price is conditionally multivariate normal with zero mean and covariance matrix Ht. The prices can be either zero mean or the residuals from a filtered time series. In our study we use the constant to define the conditional mean of prices, as defining in equation (1).

$$\Delta P_t = \mu + \varepsilon_t \qquad (1)$$
$$\varepsilon \backslash \Omega_{t-1} \sim N(0, H_t)$$

$$H_t = D_t R_t D_t \qquad (2)$$

H_t is n*n matrix of conditional variance of ε_t, time t
D_t is n*n diagonal matrix of conditional standard deviation of ε_t time t.
R_t is n*n matrix of conditional correlation of ε_t time t

This is an estimation model in two stages. The first step is to estimate the conditional variance with univariate GARCH for each series. In the second step then uses the standardized residuals obtained in the first step to estimate the parameters of the matrix of dynamic correlations. This

model includes conditions allowing the covariance matrix to be definite positive at all times and the covariance to be stationary
In this research, we use the simplest form of the DCC-GARCH model in order to measure the volatility persistence of previous periods and to analyze the volatility transfer relations between the consumer and the producer in Greece and Finland, the DCC-GARCH (l,l) bivariate model is:

$h_{11,t} = \alpha_{0,1} + \alpha_{11}\varepsilon^2_{1,t-1} + \beta_{11}h_{11,t-1}$ (3)
$h_{22,t} = \alpha_{0,2} + \alpha_{21}\varepsilon^2_{2,t-1} + \beta_{22}h_{22,t-1}$ (4)
$Rt = Q_t^{*-1} Q_t Q_t^{*-1}$ (5)
$Q_t=(1- \alpha_{DCC} - \beta_{DCC}) Q + \alpha_{DCC} \varepsilon_{t-1} \varepsilon'_{t-1} + \beta_{DCC} Q_{t-1}$ (6)

The two equations (3) and (4) are derived from the following equation:

$h_{i,t} = \alpha_{0,i} + \sum_{q=1}^{Qi} \alpha_{iq} \varepsilon^2_{i,t-q} + \sum_{p=1}^{Pi} \beta_{ip} h_{i,t-p}$ (7)

where $\sum_{q=1}^{Qi} \alpha_{iq} \varepsilon^2_{i,t-q}$s is short-run persistence of prices (first difference log prices) its own past shocks and $\sum_{p=1}^{Pi} \beta_{iq} h_{i,t-p}$ is the long-run persistence of the GARCH effects of past volatilities.
The dynamic conditional correlation coefficients (ρij(t)) between prices i and j are calculated by:

$\rho_{ij}(t) = Q_{ij}(t)/ (\sqrt{Qij(t)\ Qjj(t))}$ (8)

Data

The present research study is conducted using monthly prices indexes (2010=100) of producer (Pp) and consumer prices (Cp) for beef, pork and poultry in Finland are obtained from the national statistical service of Finland for Finnish data. The sample contains 162 observations, for each country, running from January 2005 to June 2018.

EMPIRICAL ANALYSIS.

Prior to estimating DCC-GARCH model, we check the stationarity of each analyzed series to ensure its appropriateness. All three unit-root tests (ADF, PP, and KPSS) supported the evidence of the unit-root presence in the series. Thus, the tests were re-run on the series after they were differenced in levels. The results showed that all the differenced series are stationary. The ADF test results are reported in table1.
Second test was applied, ARCH test, to check the autocorrelation and the heteroskedasticity of the residuals. Based on the results of the ARCH-LM test, we concluded that the variances of all analyzed series vary over time, and therefore, univariate GARCH (1,1) models needed to be fit for each series. Table 2 summarizes the ARCH test result
In the next step we use univariate GARCH results for each series to fit a DCC-GARCH model

Test results

Table 1. Unit root test results (ADF test)

	PpBeef	PpPork	PpPoultry	CpBeef	CpPork	CpPoultry
ADF (level)	-2,85	-3,22	-3,09	-2,61	-2,14	-2,23
ADF (first difference)	-6,49***	-4,28***	-4.05 ***	-5,012***	-4,31***	-5,31***

*** Significant at 1% **Source:** Our calculation basing on R software

Table 2. ARCH-LM test results

Variables	PpBeef	PpPork	PpPoultry	CpBeef	CpPork	CpPoultry
ARCH TEST	95.5***	118.34***	132.9***	331***	189.6***	633***

*** Significant at 1**%** **Source:** Our calculation basing on R software

DCC GARCH model

DCC (1, 1)-GARCH (1, 1) is adopted to examine the time varying conditional correlation between producer price and consumer price of beef, pork and poultry meat. In the estimation of parameters of DCC-GARCH model the maximum likelihood method with a t-distribution was applied.

Table 3 displays estimation results for the DCC (1, 1) model for the pork beef and poultry price indices. At first sight, the sums of α11 and β11 of producer price of pork are fairly close to 1 and statistically significant at 1%, indicating rather high persistence in conditional variances. Moreover, the mean values of conditional correlation coefficients ρ 12 which reflect unconditional correlation are very low (0.238, 0.239 and 0.071) for the three types of meat.

However, the statistically significant βDCC at 5% significance level implies that the DCC model is favorable model.

Table 3. Bivariate DCC(1,1)-GARCH estimation results

Parameters	PpPork/CpPork	PpBeef/PpBeef	PpPoultry/PcPoultry
Ω	0.083	0.054*	0.123
α11	0.153**	0	0.304***
β11	0.807***	0.981***	0.694***
Ω	0.0001	0	0
α22	0	0	0.009*
β22	0.999***	0.998***	0.98***
αDCC	0.061	0.01	0.02
βDCC	0.88***	0.962***	0.39*
αDCC+ βDCC	0.941	0.972	0.410
ρ_{12}	0.238	0.239	0.071

Source: Our calculation basing on R software

Furthermore, in the bivariate DCC (1, 1) estimation, the sums of αDCC and βDCC are equals to 0.941, 0.972 and 0.410 respectively for pork, beef and poultry meat. Therefore, αDCC + βDCC <1 proves the process described by the model is said to be mean reverting. The implication behind this is that after a shock occurs, the correlations will in time return to the long-run unconditional level.
The DCC parameter β is statistically significant in all cases. If we for all price indices pairs, we can argue, that behavior of current variances $\alpha > \beta$ also consider that is more affected by magnitude of past variances as by past price innovations. The sum of the DCC parameters ($\beta + \alpha$) is larger than zero (meaning that conditional correlation between the pairs of indices prices is not constant); actually, values close to 1 are observed, for pork and beef meat, indicating that conditional variances are highly persistent and only slowly mean-reverting (Lebo and Box-Steffensmeier, 2008).

CONCLUSION

The present paper examines the price volatility relationships of Producer and consumer prices based on the specification and estimation of a multivariate DCC (1,1) GARCH (1,1) model. The empirical results indicate that pork, poultry and pork meat prices (producer and consumer) exhibit significant levels of persistence of past volatilities, which implies that the volatility shocks take a long time to die out. The consumer price poultry meat has the lowest level of volatility impact with 70%. Findings and results are follows: there is a significant volatility effect exhibited in both price indexes (consumer and producer). Evidence is found to prove that there is mean-reverting process in the time- varying conditional correlation among the producer and the consumer prices of poultry meat. In contrast, the shock in correlation between producer and consumer price of beef and pork meat, tend to persist for a long period.

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REFERENCES

1. Apergis, N., & Rezitis, A. (2003). Mean Spillover Effects in Agricultural Prices: The Case of Greece. Agribusiness, 19(4), 425–437. http://doi.org/10.1002/agr.10071
2. Bollerslev, T. (1986) Generalized autoregressive conditional heteroskedasticity,Journal of Econometrics, 31, 307–27.
3. Borawski, P., Beldycka-Borawska, A., & Dunn, J. W. (2018). Price volatility of Polish agricultural commodities in the view of the common agricultural policy. Agricultural Economics (Czech Republic), 64(5), 216–226. http://doi.org/10.17221/138/2016-AGRICECON
4. Dickey, D. and Fuller, W., 1979. Distribution of the Estimatorsfor Autoregressive Time Series with a Unit Root. Journal of the American Statistical Association, Vol. 74, No. 366, pp. 427-431.

5. Dickey, D. and Fuller, W., 1981. Likelihood Ratio Tests for Autoregressive Time Series with a Unit Root. Econometrica,Vol. 49, No. 4, pp. 1057-1072.
6. Engle, R. F., and Kroner, K. F. 1995 "Multivariate simultaneous generalized ARCH", Economic Theory, 11, 122–150.
7. Engle,R. 2002 "Dynamic conditional correlation: A simple class of multivariate generalized autoregressive conditional heteroskedasticity models", Journal of Business and Economic Statistics, 20(3): 339-50
8. Enlge,R.F. and Sheppard, 2001 "Theoretical and empirical properties and dynamic conditional correlation multivariate GARCH" University of California, San Diego, Department of Economics discussion paper 2001-15
9. Hammoudeh S.M., Y. Yuan, M. McAleer et M. A. Thompson (2010). « Precious metals-exchange rate volatility transmissions and hedging strategies », Inter·na-tional Review of Economies f3 Finance, vol. 19, no4, p. 633-647.
10. Khaligh Khiyavi, Parisa, Reza Moghaddasi, Behruz Eskandarpur, and Nasser Mousavi. 2012. "Spillover Effects of Agricultural Products Price Volatilities in Iran (Case Study: Poultry Market)." Journal of Basic and Applied Scientific Research 2 (8): 7906–14. http://www.textroad.com/JBASR-August, 2012(3).html.
11. Khan, M Akhtar, and Glenn a Helmers. 1997. "Causality, Input Price Variability, and Structural Changes in the U.S. Livestock-Meat Industry." Western Agricultural Economics Association Meeting, Reno, Nevada, 2–16.
12. Latvala, T., M. Niva, J. Mäkela, E. Pouta, J. Heikkilä, L. Koistinen, S. Forsman-Hugg, and J. Kotro. 2011. "Meat Consumption Patterns and Intentions for Change among Finnish Consumers." Change, 1–12.
13. Lebo, J.M., Box-Steffensmeier, J.M. 2008. Dynamic conditional correlations in political science. American Journal of Political Science, 52(3): pp. 688–704.
14. Lian, Yimin, libo. 2015. Exogenous impacts on the links between energy and agriculturalcommodity marketsEnergy Economics 49 (2015) 350–358
15. Ling, X., Dhesi, G. 2010. Volatility spillover and time-varying conditional correlation between the European and US stock markets. Global Economy and Finance Journal, 3(2): 148 – 164.
16. Liu, Xing. 2011. "Horizontal Price Transmission of the Finnish Meat Sector with Major EU Players." MTT Discussion Paper 1. http://ageconsearch.umn.edu/bitstream/114380/2/Liu_Xing_27.pdf
17. Piot-lepetit, Isabelle, and Robert M Barek. 2011. "Methods to Analyse Agricultural Commodity Price Volatility." Methods to Analyse Agricultural Commodity Price Volatility, 1–11. doi:10.1007/978-1-4419-7634-5.
18. Rezitis, Anthony N. 2012. "Modeling and Decomposing Price Volatility in the Greek Meat Market." International Journal of Computational Economics and Econometrics, Forthcoming.
19. Rezitis, A. (2003). Mean and volatility spillover effects in Greek producer-consumer meat prices. Applied Economics Letters, 10(6), 381–384. http://doi.org/10.1080/1350485032000081299
20. Rezitis, A. (2003). Mean and volatility spillover effects in Greek producer-consumer meat prices. Applied Economics Letters, 10(6), 381–384. http://doi.org/10.1080/1350485032000081299
21. Rezitis, A. N. (2018). Empirical analysis of price relations along the Finnish supply chain of selected meat, dairy, and egg products: A dynamic panel data approach. Agribusiness, 34(3), 542–561. http://doi.org/10.1002/agr.21536

22. Silvennoinen, A., Teräsvirta, T. 2009. Multivariate GARCH models. In: T. G. Andersen, R. A. Davis, J.-P. Kreiss in T. Mikosch (Ed.), Handbook of Financial Time Series, (Springer: New York), pp. 201-229
23. Tse, Y.K., Tsui, A.K. 2002. A Multivariate Generalized Autoregressive Conditional Heteroscedasticity Model with Time-Varying Correlations. Journal of Business and Economic Statistics, 20(3): 351-362. 395
24. UCHEZUBA, I.D., A , JOOSTE, and J . AND WILLEMSE. 2010. "Measuring Asymmetric Price and Volatility Spillover in the." Retrieved in June 2013 from http://ageconsearch.umn.edu/bitstream/96434/2/179briol.pdf, 1–26.
25. Xiaojun SONG. 2009, Multivariate GARCH Models for the GreaterChina Stock Markets
26. Xiao, L., Dhesi, G. 2010. Volatility spillover and time-varying conditional correlation between the European and US stock markets. Global Economy and Finance Journal, 3(2): 148-164
27. Zheng, Yuqing, Henry W. Kinnucan, and Henry Thompson. 2008. "News and Volatility of Food Prices." Applied Economics 40 (13): 1629–35. doi:10.1080/00036840600892910.
28. Zivot, Wang. 2006, Modeling Financial Time Series with S-PLUS
29. Zhang, S.Q, Paya.I, Peel.D 2009 " Linkages between Shanghai and HongKong stock indices ", Lancaster University Management School Working Paper 2009/012

COMPARATIVE ANALYSIS OF AGRICULTURAL AND RURAL DEVELOPMENT POLICY IN SERBIA AND MEXICO

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ABSTRACT

The definition of agriculture has been changed; it does not simply include only plant and livestock production anymore. Today, agriculture is a strategic sector that includes farming, but additionally to food, raw material production, and service providing. Agricultural policy is the group of government decisions which are related to domestic agriculture and imports of foreign products. (Feher & Beke, 2018).
The subject of this paper is examining the trends and presenting current situation of agriculture in two countries: Serbia and Mexico; with policy overview. Since these two differ much; the goal is to after observation of agriculture, agricultural and rural development policy, get a conclusion about potential in two countries, their possible collaboration and share of successful examples of the improvement in agricultural sector. Special attention will be given to the comparison of two countries and their raspberry production sector, with suggestions and ideas for the future which are based on available databases. This analysis includes observation of characteristics of agriculture, farmers, rural areas, foreign partners in order to compare conditions in two countries, and try to draw conclusions about differences and similarities if they exist.
The aim of this research is to analyze and evaluate the current situation in both countries, bring certain conclusions, and give recommendations for the future creators of strategies.
As the main source for information in this paper were used FAO and OECD database, data from National Agricultural census, and other adequate domestic and foreign literature.
The methods and techniques used in the research are data analysis, description and comparative method, graphical summary of data and their table representation. Furthermore, since two analyzed countries differ (area, population, climate), this paper will include relative indicators, e.g. contribution so the results would be comparable. The results of the analysis will provide information about Serbia's and Mexico's potentials and challenges, which can be observed separately or at the same time, which depends on interest of future development. Since two countries are located far away from each other, this paper aims to bring them together by providing proposals for future collaboration, knowledge and experience transfer.

THE CURRENT STATE OF AGRICULTURE IN SERBIA AND MEXICO

General information about Serbian agriculture

Republic of Serbia is a country located at the crossroads of Central and Southeast Europe, with the population of approximately seven million people. Total area of Serbia is 88.361km, with average population density of 91/km. Agricultural land covers about 60% of the total area, and 45% of the total territory is utilized agricultural area. It means that there is about 0,56 ha o agricultural land per capita, and approximately 0,46 ha of arable land per capita.
Serbia has very favorable natural conditions, like land and nature for agricultural production. Serbia climate is between a continental climate in the north, with cold winters, and hot, humid summers with good distribution of rainfall, and a more Adriatic climate in the south with hot,

dry summers and autumns. Serbia produces a lot of different types of apples, different kinds of grapes, plums, peaches, pears and berries (Census, 2012).
According to data from Agricultural Census (2012) in Serbia, there are 1,3 million of farmers who make up 16% of the total population. Agriculture in Serbia is an important sector of Serbian economy with an annual potential of twelve billion EUR in exports. Serbian farmers produce different agricultural products, mostly grains, fruits and vegetables which constitute an important part of Serbian GDP (share of agriculture: about 12% for 2016) and exports. One of the most significant is definitely production of raspberries. In fact, Serbia is one of the biggest producers of raspberries in the world. In the last few years it has been in the top 5 producers of raspberries besides Poland, Chile, Russia and Mexico. Other fruit produced in Serbia worth mentioning are apples (about 178.000 tons in 2012), grape (263.000 tons) and plum (391.000 tons).
Of the 631.552 agricultural holdings in Serbia, almost half of these are less than 2ha with a further 36% between 2-10ha. Serbian terrain varies from the flat and rich lowlands of Vojvodina (in the north) for crop and vegetable production, to mountainous in Central Serbia suitable for sheep and cattle breeding, and fruit and wine production (Census 2012).
According to Agricultural and Rural Development Strategy of the Republic of Serbia (2014) general estimate is that the existing plantings are extensive, since the biggest part of orchards and vineyards are more than twenty years old. Thanks to the initiative of the private sector, raising number of intensive plantations is registered. First of all, this refers to apples and cherries. One of the problems of fruit production is the lack of certified planting material and adequate modern equipment for the production. The production in protected areas is negligible, with the exception of apples grown under the counter grids and production of different types of strawberries indoors.

Table 1. Average utilized agricultural area per holding in Serbia

Indicator	Republic of Serbia
Average farm size	5,4
Structure of farms by size (%)	
< 2ha	47,9
2-5ha	29,4
5-10ha	14,3
> 10ha	8

Source: Census, 2012

Data from Table 2 shows that the structure of farm size is extremely unfavorable. The smaller the farm, the more difficult the use of modern technology and mechanization. Even though there is a difference between regions, this indicator remains negative, especially because more than 76% of total farms own less than five hectares.

General information about Mexican agriculture

Since pre-hispanic time, Mexico has been practicing agriculture (Pope, et al., 2001); during the colonial period, farming was focused on large private properties; after Mexican revolution the farming was based in a communitarian property of the land, called ”ejido”. The division of the land was equal between the farmers[1] and the conditions to own a piece of land were: do not rent it, do not sale it and cultivate the land.

[1] This kind of communitarian division of land made the fragmentation of the utilizable ground for production because several persons are owners of it but they have few parcels: less than 5 ha.

The division of land wasn´t any stronger in the late XX century. One of the reasons is that Mexico has been through the change from a rural country to an industrialized one. Furthermore, migration from the countryside was a determining factor for less land division among farmers. Due to specific geographic characteristics of the Mexican territory, rural settlements are usually dispersed and sometimes it was very difficult to reach them. The infrastructure in these areas is almost unchanged during several decades: lack of health services, inadequate education opportunities and cultural activities. According to the OECD (2007), at the beginning of this century the rural areas comprised more than 80% of the Mexican territory which was home for 23-37% of the national population who were working principally in agriculture. However, its contribution to the GDP was only about 2%. Poverty and inadequate socio-political conditions have been constant so there were not many options to improve the life or rural inhabitants.
Another problem is that the governmental inversions were offered only for small-holders and large-scale producers but not for the middle size producers. Also, the tendency to primarily support agricultural projects to develop the rural area has neglected the multi-sectoral phenomena that affected the countryside, which comprises 196.438ha of national territory; with utilized agricultural area of 106.705ha (FAO, 2014).
The production of following crops is significant according to Mexican Agricultural Census data (2007): eggplant (23,83 tons), green chili (32,079 tons), strawberries (83,468 tons) and raspberries (54,332 tons). The production of raspberries sets Mexico in the top five producers in the world. Even the production of certain crops is pretty high, generally the agricultural production is still weak, and the development of modern production remains one of the main challenges.

GENERAL OVERVIEW OF AGRICULTURAL POLICY IN SERBIA AND MEXICO

Agricultural policy in Serbia

Bogdanov (2007) explained that Serbia has a long tradition of policy in the area of rural and regional development. The experience is present from the era of the SFRY when there were regional imparities in the development of the republics. This was characterized by heterogeneity in natural resources as well as in the productive, economic and organizational structure of agricultural production; still, long tradition does not automatically mean that policies in this area had a clearly concentrated vision for development. The mechanisms for the implementation of policies related to rural and balanced territorial development were not sufficiently linked, stable and sustained. Therefore their combined effect failed to create a major impact. Extensive development and the prevalence of sectoral over structural criteria over a decade long period provided:

- Uneven development,
- Poor regional allocation of economic activity and population and
- Deep polarization of development between individual areas.

Reforms of the Serbian agro-business sector began in the 2000s, a whole decade later than in other transitional countries. The first years brought big changes in comparison to the policies of the 1990s. The first reform-oriented government dedicated most of its attention to strengthening institutional capacities. The greatest challenge in this period was to decrease the space for grey market activities and to establish a stable market of basic agricultural products. Between 2004 and 2007 there were positive changes noted. In terms of introducing CAP (Common Agricultural Policy of the EU) elements, like direct payments and rural development policy. It was established a farm register, too. From 2008 the implementation of agricultural policy has been continuously changing: payments to producers were delayed, regulations changed several times per year, and this brought to the creation of an unstable economic

environment for agriculture. Furthermore; the agricultural policy monitoring system has not been created, which made it difficult to estimate the effects on the sector's improvement. In 2014 Serbia started a new phase of the European integration process – accession negotiations for the EU membership. From then, Serbia has been facing few challenges: the reform of the overall institutional arrangements and agricultural policy as well as preparing to absorb the pre-accession assistance from the EU funds. The challenges that food production is facing and the multidimensional impact of agriculture on social and economic structures indicate that the government cannot avoid its leading role in socially responsible and structurally sustainable development (Bogdanov & Rodić, 2014).

Current agricultural policy is based on few documents governing the functioning of agricultural and rural development support:

- *Law on Agricultural and Rural Development Subsidies* (adopted in 2013) - determines the types of agricultural and rural development subsidies (direct payments, rural development measures and special grants), eligibility requirements, and minimum amounts per subsidy.
- *The Agricultural and Rural Development Strategy for 2014-2024* (adopted in 2014). This Strategy defines the direction of Serbian agricultural and rural development over the next ten-year period, considering the EU integration process.

In 2015 the European Commission adopted *Instrument for Pre-Accession Assistance for Rural Development (IPARD)* for Serbia which sets the way for the EU support for Serbian rural development program during the next six years. This program includes:

1. Investments in physical assets of agricultural holdings - grants for farmers producing milk, meat, fruit and vegetables;
2. Investing in physical assets for processing and marketing of agricultural and fishery products for micro, small and medium-sized enterprises processing milk, meat, fruit and vegetables;
3. Agro-environmental measures – for organic farmers;
4. Implementation of local development strategies;
5. The development of private rural tourism facilities and
6. Technical assistance (Bogdanov, 2015).

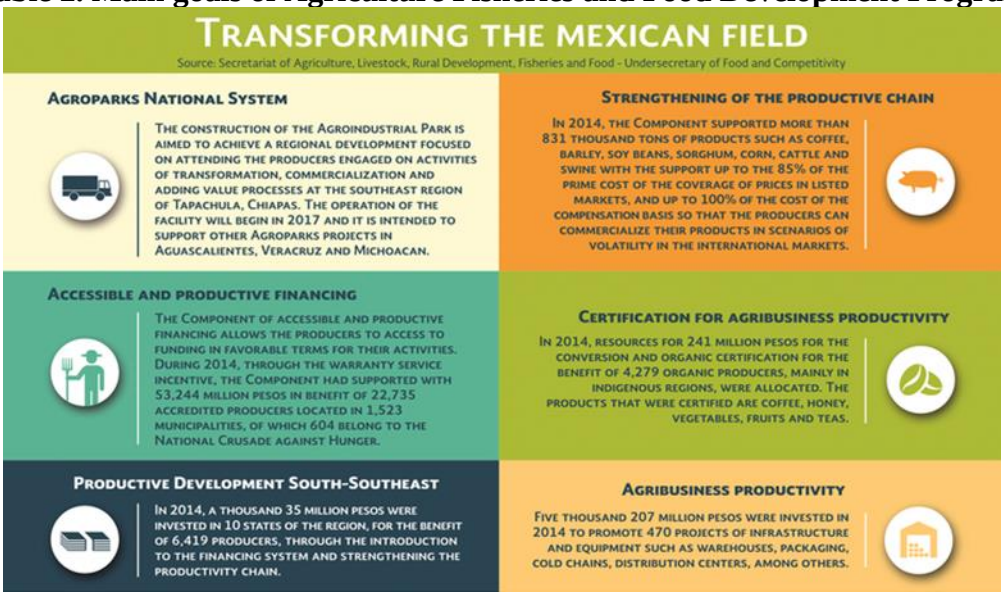
Agricultural policy in Mexico

Back in time, Mexico was primarily a rural country, and this characteristic was supposed to be changed during the process of the industrialization. However, the pace of the change was like that the urban areas were priority when it came to the development, mostly because of the inadequate public policies in Mexico. Since 2000's rural policy of Mexico have experienced several changes connected to the support policies. Mexico's agricultural policies have been through a series of changes in the past few decades. It had changed from price support and general consumption subsidies, then those measures were eliminated, while many internal conflicts occurred during the industrialization of the country. The countryside was not developing successfully, even though the government tried to improve the conditions of these areas with the economic support to different international organizations or agreements (positive example, NAFTA[2] agreement), so the public policy could reach certain goals. Today, support is based on a flat rate payment to the following farmers: subsistence growers, transition growers

[2] North America Free Trade Agreement

and commercial growers. The criteria are based on how many hectares of (irrigated land) they own (*Available at: https://fas.org/sgp/crs/row/R45038.pdf*).
In 2001 *Law for sustainable rural development* was created as a good initiative in order to upgrade Mexican policy. The simultaneous work of SAGARPA[3] and SEDESOL[4] implied the improvement of projects for the country side like PDR (Program of Rural Development) and Micro Regions Strategy. This was the beginning of paying attention to the particular priorities of each region, (OECD, 2007) but in general the principal aims were to improve agriculture activities and poverty alleviation.
In order to alleviate poverty in rural areas the current government made a structural reform which is called Agriculture Fisheries and Food Development Program 2013-2018 (from SAGARPA). The main points of this program are represented in Table 2.

Table 2. Main goals of Agriculture Fisheries and Food Development Program



Source: http://unctad.org/en/PublicationsLibrary/ditctncd2012d2ppt_en.pdf

According to INEGI[5] in 2014 the share of agriculture in total GDP of Mexico was about 3%. This sector employs 13% of the national population. On one hand, this percentage does not look that significant, but on the other Mexico is 12th world's largest exporter of products (Calzada Ravinosa, 2016). In the national market agriculture activities represent 12.7% of the national volume and around 40% of it comes from fruit and vegetables production, e.g.: maize, avocado, tomato, raspberries, mango and grapes.
The contribution of agricultural activity to Mexican economy is weak. Figure 1 represents percentage of Agriculture in total GDP from 1965 to 2016.

[3] Secretaria de Aricultura, Ganaderia, Desarollo Rural, Pesca y Alimentacion - Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food in Mexico
[4] Secretaria de Desarollo Social – Secretariat of Social Development in Mexico
[5] Instituto Nacional de Etadistica y Geografia – National Institute of Statistics and Geography in Mexico

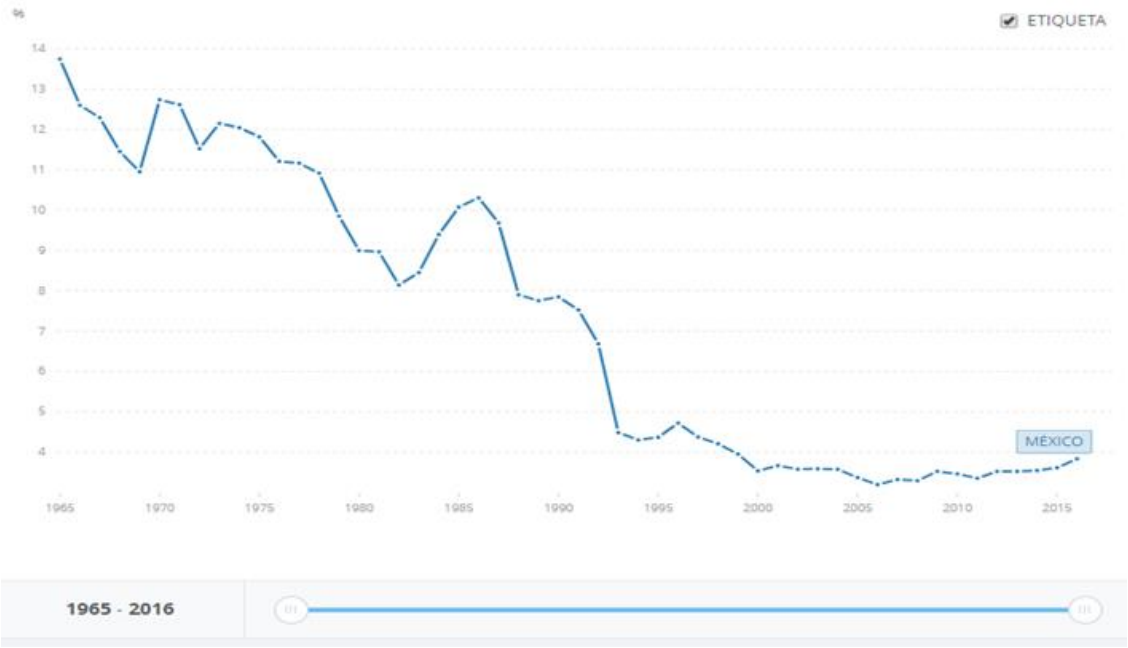


Figure 1. Share of agriculture in total GDP of Mexico (1965-2016)

Source: https://datos.bancomundial.org/indicador/NV.AGR.TOTL.ZS?end=2016&locations=MX&start=1965

According to Fox & Haight (2010) Mexico's lack of a pro-poor agricultural policy seems to reflect negative representation of low-income producers in the policy process. Some of Mexico's largest, traditionally partisan peasant organizations have allied themselves with agribusiness interests in order to preserve current farm subsidy policies and increasing governors' discretionary funding.

INEGI data (2014) shows that in Mexico there are about 8,8 million farmers, who actually represent small percentage of the total Mexican population. Moreover, the average employment in the agricultural sector has decreased during last decades.

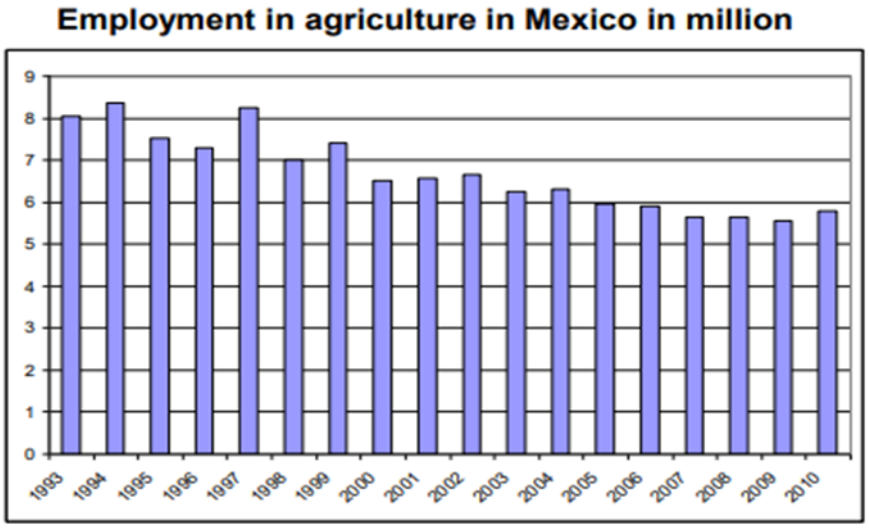


Figure 2. Mexico Agriculture employment: perspective and outlook

Source:http://unctad.org/en/PublicationsLibrary/ditctncd2012d2ppt_en.pdf

Even though the employment opportunities in the region are not coming primarily from the agricultural sector, there is a need for creating more jobs related to agriculture, since many producers have less than 5 hectares – and those farmers still account for two-thirds of Mexico's agricultural employment. This means that until now the population in the rural area is still keeping the (family-communitarian) agriculture tradition and the reminiscences of "ejido" distribution.

The modification of rural public policies is necessary in order to create good living conditions in the area.

According to the OECD (2007), some of the key challenges for Mexico's rural policy are:

- Poverty alleviation
- Provision of basic public services
- Strengthening and diversification of rural economy
- Better exploiting and preserving untapped cultural, natural and energetic resources.

Besides that, rural policy should be based on:

- A territorial perspective
- Multi-sector perspective
- Improvement of country's competitiveness
- Effectively targeting.

Consideration of these factors would be helpful in order to make the policies and projects useful to change the unsuccessful approach for the rural areas of Mexico.

COMPARISON OF SERBIAN AND MEXICAN AGRICULTURAL AND RURAL DEVELOPMENT POLICY AND POTENTIAL COOPERATION IN RASPBERRIES PRODUCTION

According to the previous discussion in this paper, there is a general conclusion that rural development policy in Serbia and Mexico should be more supportive when it comes to the medium-size and small producers, especially because rural areas are considered extremely heterogeneous in both countries. There are some similar problems in both countries, (even they differ if observed individually) the lack of economic and social opportunities and undeveloped infrastructure in rural areas. However, in each case there are lots of opportunities to improve the economy and social conditions on the countryside. For instance, the production of raspberries because two countries are great producers. It is important to mention that creation of adequate policy for raspberry sector would be a very good example, since it is about permanent crops which require intensification, modernization and prices stability.

Raspberry is one of the most demanded berries on the global market, according to FAO (2014), and in the past years the production of this fruit has increased to 80million tons.

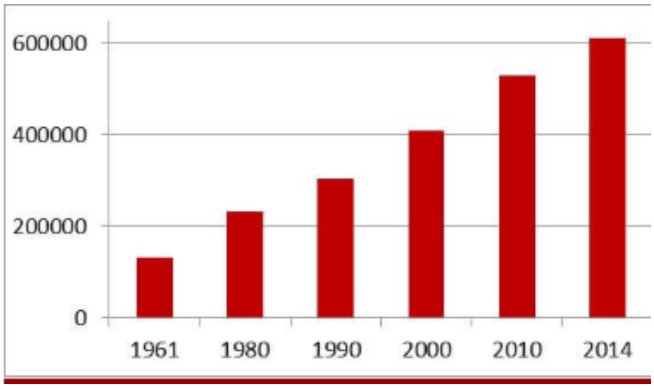


Figure 3. The increase of berries production in the World (1961-2014)

Source: FAO, 2014

Top five countries, which produce raspberry, are presented in Table 3. It is notable that together Serbia and Mexico make approximately 16% of the total world's production of raspberries, and our idea is to represent characteristics of this particular sector in both countries in order to make an analysis for the potential cooperation in the future.

Table 3. Biggest producers of raspberries in the world

Country	Raspberry production (m/t)	% of World Total
Russian Federation	144.000	23,5
Poland	125.859	20,5
United States of America	103.510	16,8
Serbia	61.715	10
Mexico	35.627	5,8

Source: FAOSTAT, 2017

From the Figure 4 it is possible to conclude that Serbia and Mexico belong to those regions with huge production of raspberries – America and Europe. The share of these two continents is about 98% of total World's production; other continents' production is negligible.

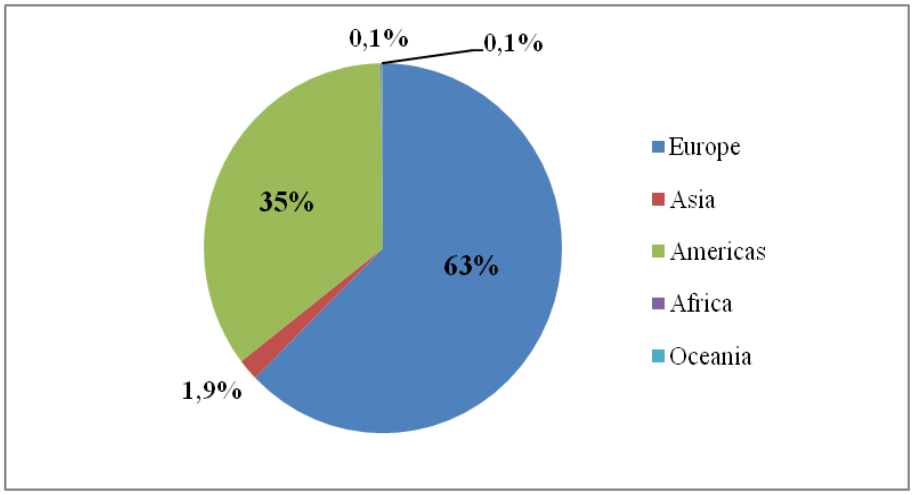


Figure 4. Production of raspberries shared by region

Source: FAO, 2016

Trends of raspberry production in Serbia

According to data from Census (2012), there are about 11.000ha under raspberries, and there is a constant increase in the last period. Data from FAO show that the production in 2015 was about 61.000 tons of raspberries, and the average yield per hectare was 5,6 tons. For Serbia, this production is extremely important because of its export potential. About 30% of total fruit export belongs to raspberries, and the biggest amount is exported mainly to the EU market (Parausić & Simeunović, 2016).

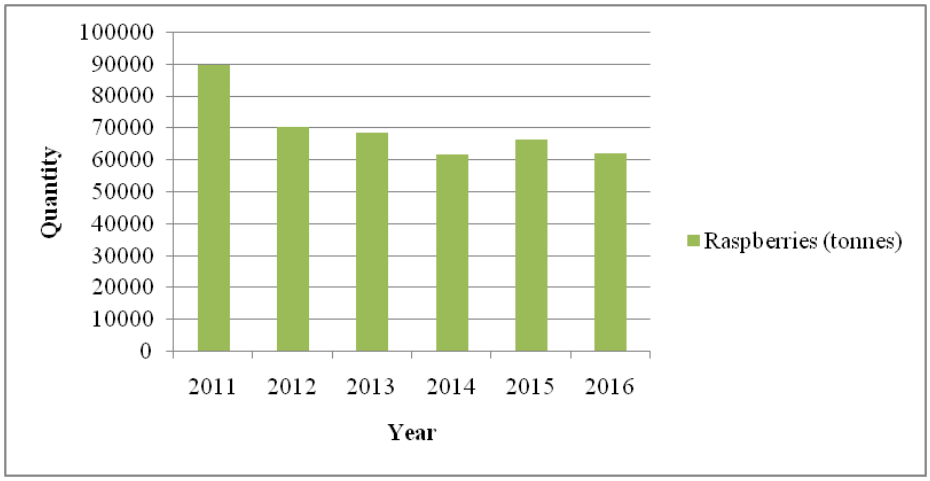


Figure 5: Production of raspberries in Serbia (2011-2016)

Source: FAOSTAT, 2016

From Figure 6 it can be concluded that production of raspberries in Serbia is pretty stable during last five years, but there is noticeable decrease if first and last observed year are observed. It seems that weather conditions, lack of adequate equipment for this type of sensitive fruit had their impacts which resulted in lower production.

Trends of raspberry production in Mexico

Mexico possesses excellent land and climate conditions for production of raspberries; and even if the farmers' traditional knowledge is absent, there are still small (family farm) producers who own enough equipment and knowledge about how to improve the cultivation, harvest and the sale of fruits. The benefit of raspberries production is maintained due to the interest in reaching high and fast profit, intensive use of labor force and large exportation possibilities.

The country is in the top five exporters and in the past few years this crops provided around 110 000 jobs and a revenue of 900 million dollars. The production is growing fast; in 2003 fruit from 3.750 hectares was collected. In 2014 the surface of berries collected had increased to 17.512 hectares and the crops represented 3.1 percent of the total value of agricultural production in Mexico (INEGI, 2014). Figure 6 shows eth production of raspberries in the last five years in Mexico.

The following conclusion could be drawn: In Mexico there is positive result in raspberries production; the total production has risen for about 100.000 tons in five years period.

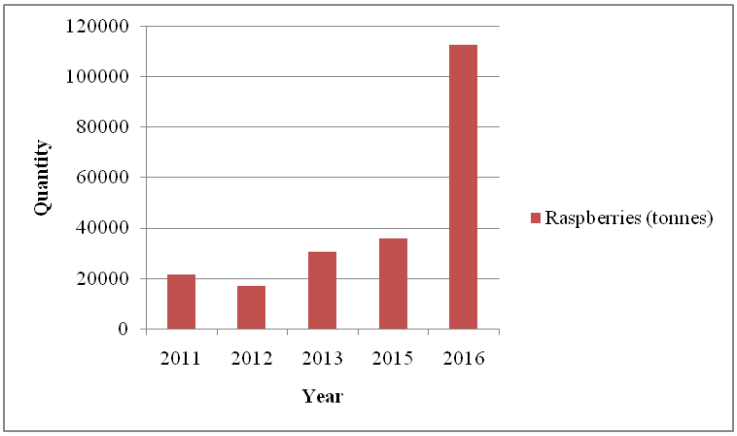


Figure 6: Production of raspberries in Mexico (2011-2016)

Source: FAOSTAT, 2016

From these figures it can be seen that berries production is not only highly profitable; additionally, there is the opportunity to increase market opportunities and export potential. However, the market of berries can be affected by external factors that farmers cannot reduce or stop, the risk is present in any type of production.
Because of this, in order to support domestic producers of berries, it is important to develop innovative solutions that guarantee the plant health of these crops. In this sense it is possible to use Serbian experience from the production, e.g.: small farms production, professionals working in high quality seeds, cooperation between producers in order to maintain the price, etc. Mexico has their own conditions but the use of small producers who will work together could lead to the improvement of the revenue from raspberry production, and could improve the rural economic conditions, too.

Table 4: Comparison of raspberry sector in Serbia and Mexico, with policy overview

Indicator	**Serbia**	**Mexico**
Average yield in 2016 (t)	5,6	18,1
Area under raspberries (ha)	11.000	6.208
Average production in last 5 years (t)	70.000	43.440
Government support	Protected designation of origin, keeping stable prices when needed	Creation of new trade agreements and improvement of exports
Policy proposal	Support for producers in order to: build recognizable brand, provide virus-free planting material, improving the quality of collecting, get higher percentage of irrigation, shade nets	Support for producers in order to: increase organic production, follow market diversification, develop new varieties
Key outcome	Competitiveness of the sector (ability to face Poland, Russia)	Competitiveness of the sector (ability to face U.S., Chile)

Source: Authors' calculation based on FAO & IRO data

Both Serbia and Mexico are members of International Raspberry Organization (IRO), with eleven other countries, also significant raspberry producers. Table 4 shows basic indicators of production from both countries, with review on policy and government support. It can be concluded that for example, according to IRO information, Mexican raspberry sector is in a better condition, since its yield in 2015 was 15t, which is three times higher than that achieved in Serbia.

Key potentials for the improvement of raspberry production (higher income and better export opportunities)

According to Parausić & Simeunović (2015), Serbia is top exporter of frozen raspberries, next Poland and Chile, from total exported quantity about 93% is frozen, while a smaller amount is chilled (7%), and exported fresh. The amount exported makes 90% of the total production, thus around 10% remains in Serbia for the use by the processing industry, or is sold in open green markets and supermarkets. Serbia mostly provides raspberries for the Western European market (Germany, France and Belgium). Since raspberries require specific land and climate conditions,

in case of Serbia there is one region where almost whole production is concentrated, it is in Šumadija and Western Serbia region. About 95% of total area under raspberries is located in this region, and 93% of total Serbian raspberry producers are situated it he mentioned region. There are positive examples in this case, about cluster initiative among producers in the region, since clusters are important in developing countries and transition ones, where they could be significant tool for shifting the focus of competitiveness, from traditional to "fresh" sources of sustainable agriculture. However, one of the most important things which could lead to the accomplishment of many goals is definitely finding a way of successful food processing that automatically will improve farmers' income, value of the product, access to the market and rural development in general. This should be the first step in order to provide a positive change and a good example. There is a state that the lack of machinery, technology and equipment in raspberry production, trade and processing is marked as one of the problems in this particular sector. Besides this other problems include: lack of innovation in modernization and improvement of crop cultivation technology; lack of knowledge about the functioning of fruit and vegetables foreign markets; insufficient support for farmers, SMEs from the government, government agencies (e.g. Regional Development Agency of Šumadija and Pomoravlje); loans are expensive and financial market is underdeveloped, unstable and unpredictable measures of agricultural policy are present (Parausić & Simeunović, 2015). Having all this in mind - key potentials and problems for the production, it can be concluded that Serbia is on a good way to maintain or even improve the top raspberry producer position if the adequate programs and project for farms/farmers, cooperation initiatives, would be supported and conducted. Until now, in Serbia there is no specific policy which would affect raspberry producers directly. The only thing that differs from other fruit sectors is that government, in particular years, helps the producers when the price of raspberries is not favorable, with direct support to the prices, by subsidizing. There is an expectation that after the implementation the measures from the EU (since one of the priority areas Serbia has chosen is fruit sector), the changes in this sector will be noticeable in the following years.

In case of Mexico and its raspberry sector according to IRO (2016) three regions with the biggest production of raspberries are: Jalisco, Baja California and Michoacan, from which two are situated close to each other (South Western part of Mexico), and the Baja California region is located in the Northern part of the country. Export of fresh raspberries is mostly oriented to the U.S., even they are important producers, but the consumption in the U.S. is high. Mexico export of raspberries was primarily focused on fresh fruit, around 31% from the total production. Frozen raspberries were not that significant, with the share of total production about 4% (other 65% of production is connected to other types of berries). It is noticeable, that like in case of Serbia, the level of processing (especially export oriented production) of raspberries is low. Until recently, raspberries were not considered as a major crop, but due to the high profitability of growing this kind of fruit, short investment recovery time, generally good quality of raspberries and the high potential for developing exporting markets, raspberry sector is gaining strength every day. Mexico has good physical, climatic and geographic conditions to produce raspberries even when the production is not possible in the U.S. and Canada, which makes this production more attractive. Government of Mexico is considering using berries in general as an agricultural productive reconversion, mainly because of: fast return on investment, intensive workforce required, good quality of products, and strong potential for export to other markets (internal market yet to be developed). The production model of Mexican raspberries is a little bit better than in Serbian case. This means that in Mexico, the production is on higher level, because 80% of raspberries are grown under protected area, packaging is well organized and food safety requirements are fulfilled. There is also and initiative about the increase of organic production of raspberries. Some of the ongoing challenges for this sector are: market diversification, scarce of workforce and organic incorporation. Another thing different from

Serbia is that Mexico has established front of 15 most important berry producers and export companies from the regions mentioned before, which is called "Aneberries" and was incorporated in 2010. The purpose of this organization is to connect export and companies that produce berries in order to work on the improvement of food safety, quality, export markets, collaboration with authorities at different levels, etc. Some of the specific achievements of "Aneberries" are: enhancing the support for modernization of irrigation and for Macro tunnels for production field through different governmental structures and rural Mexican banks; Worked jointly with SAGARPA and National Service of Seed Inspection and Certification on intellectual property issues; realization (with the University of Guadalajara) of the study of "Distribution of micro-organisms pathogenic and indicators of microbial contamination in production units of raspberry, blackberry and strawberry"; formation of the Phytosanitary Commission (through hiring field inspectors). General conclusion is that SAGARPA does not provide direct financial support to its produce growers; support is directed mainly to rural and/or entrepreneurial development, including production by new farmers and women, and also domestic feeding programs. The highest level of support is visible in case of sugar, corn and milk producers. However, there is information that Ministry of Mexican agriculture has spent certain amount of money in order to build shade houses, macro and micro tunnels for different types of crops, including raspberries.[6]

Our conclusion from the analysis of raspberry sector in both observed countries is that, with at least two changes the sector improvement would be positively affected. First, the cooperation between small producers (since small scale farms are strongly represented) is crucial, because raspberries are usually produced in a region with specific land and climate characteristics, which means the producers are already close enough to collaborate. It would lead to cheaper inputs for the production, better raspberries price in the future, efficient use of mechanization and representation in the country's government (e.g. Ministry of agriculture would (re)consider measures if more people are for/against those). In case of organic production it would be significant too, since this type of production is increasing in the last decades. The producers would exchange their experiences about raspberries and their protection, fertilization in an environmentally friendly and safe way. Serbian producers could learn a lot from Mexican example in case of establishment a unique representative organization to improve the raspberry sector in general. Type of production, food safety, packaging, collecting are extremely significant in case of Serbia, and Mexican experience and achievements could be positive guide how to use resources, organize people and get benefits.

The second change implies more efficient processing of fruit, which could be truly significant in the export sector. Our opinion is that government should support producers (or cooperatives, clusters, organizations) in order to make their production more diverse by providing not only financial resources (subsidies for production or per hectare), but also organizing educational seminars (Serbian and Mexican producers can change experience, positive and negative circumstances they faced during production), because raspberries are type of fruit from which various types of products could be made; for instance, juice, jam, compote and wine. Since both countries produce and export mainly unprocessed raspberries, this proposal is crucial in order to take advantages of products with higher value, adequate quality, with good package and market appearance. Furthermore, the development of products with geographic origin and tradition is possible. In general, our conclusion is that two countries have the most important factors for the production of raspberries – favorable climate and land conditions, it only takes effort for the local and government representatives to collaborate, understand and support each others in order to achieve benefits for both sides.

[6] Available at: *https://fas.org/sgp/crs/row/R45038.pdf*

Even though in Serbia there is bigger area under raspberries, it seems that intensification of production is on a higher level in case of Mexico. This is exactly one more reasons why two different countries, so far away from each other should work on their collaboration. This is not only about the distance and cost; it is about experience, knowledge, strategies, etc. Although two countries have individual specific characteristics of land, rural areas, climate, there should be at least knowledge sharing center between observed countries. Furthermore, our policy proposal and support measures are a little bit advanced for Mexico's case, since they already have better growing and collecting systems, and the quality of product is better, according to IRO. In case of Serbia, there are still challenges like the improvement of planting material, equipment and adequate hygiene and working practice.

CONCLUSIONS

After summarizing key points of the paper, it can be concluded that Serbia is strongly connected to agriculture. If we observe climate, population, employment and activities it is clear that Serbia falls into agrarian countries. There are various crops grown in Serbia, from maize to raspberries, but there is no developed system of modern production in agriculture. Main characteristics of Serbia's rural areas there are unemployment (especially young people), rural poverty (affecting mainly women), and undeveloped social and physical infrastructure, but good environmental conditions. There is big share of small farms in Serbia, and this also represents a problem when modernization and application of technology should improve. In case of agricultural and rural development policy, they are supposed to be harmonized with the policy of the European Union, since Serbia is a candidate state. Today, the biggest share of total agricultural budget is of direct payments, and rural development measures are neglected. In general, this means Serbia should develop, organize and improve its agricultural sector, by creating adequate policies according to country's characteristics of rural areas. So far, Serbia has chosen four priority sectors of agriculture, and the implementation of this decision is about to happen. On one hand, there are many problems in Serbian agriculture and rural development sector, but on the other this country has certain potentials, e.g. favorable climate conditions, fertile land, and human capital living in rural areas, so maybe the right combination of these factors could be deciding not only for agriculture, but for the development of the whole Serbian economy.

In case of Mexico it is possible to conclude that the country is struggling to develop reasonable policy in order to improve the living conditions in rural areas. There is a need for the improvement of socioeconomic conditions in rural areas, with focus on production and cooperation. Diversification of activities in rural areas should be implemented, like in case of Serbia. Food processing, especially fruits and vegetables could lead to bigger export, and higher value of products which would be beneficial for farmers and for the countries. According to the national culture, there is still "ejido" types of agricultural land, and even when there are less of them than in the previous century, it still spread over the country.

It is important to empower small farmers who are part of Mexican tradition and support them to cultivate the land in a proper way in order to increase their production. At the same time it would be beneficial to make programs of cooperation where they work together as producers, each with their piece of land, to supply huge American demand.

On the other hand, the medium and large size producers are advantageous for the sector of agriculture in Mexico, since the new law and reform is designed to support those who have the possibility to produce a lot, so the challenge is to include the small size farmers because they can be competitive in the organic market which is one of the most expensive and prosperous.

Mexico's economy and institutions are capable to improve the development of rural areas. The biggest challenge is the real use of the resources (because of the corruption) as well as the

constant evaluation and update of programs and data bases so it could be possible to measure the productivity of the country.

Resolving the problem of poverty will not be possible if agricultural policy does not include family farms (ejido) and rural identity. In case of both countries it can be concluded that current weaknesses (like small producers) could be transformed into strengths if each country find the way to maintain their tradition, make their production more competitive, keep the export production potential of raspberries and improve the production of others significant regional crops. As two main potential processes in order to improve raspberry sector in both countries are establishment of cooperatives and diversification of the farm activities, in this case processing of raspberries. Mexico's position is quite better compared to Serbia, in case of organized representation of farmers. On the other hand, the situation about producing mainly primarily unprocessed raspberries is the same in both countries. The need for putting value of the products on a higher level comes out from demanding export requirements, from the markets that are important for these countries. The possibility of cooperation is possible in the common dialogue which would lead to the creation of new successful agricultural policies; and in certain cases the use of experience and knowledge from other country is cost beneficial in order to stop or reduce migration, poverty, and make better conditions for people living in rural areas[7].

REFERENCES

1. 1. Bogdanov, N. (2007). Small Rural Households in Serbia and Rural Non-Farm Economy. Belgrade: UNDP Serbia.
2. 2. Bogdanov, N., Rodić, V., (2014). Agricultural Policy and European Integration in Southeastern Europe. Budapest: FAO. (Available at: http://seerural.org/wp-content/uploads/2009/05/FAO-SWG-Book-12-11-2014_Final.pdf)
3. 3. Bogdanov, N. (2015). Ruralni razvoj i ruralna politika. Beograd: Poljoprivredni fakultet.
4. 4. (2014). Strategy of Agriculture and Rural Development for 2014-2024 period. „Službeni glasnik RS", broj 85/2014, Beograd: Ministarstvo poljoprivrede i zaštite životne sredine Republike Srbije.
5. 5. Feher, I., Beke, J. (2018). Agricultural and Environmental Policies. Godollo: Szent Istvan Egyetemi Kiado.
6. 6. Fox, J., Haight, L. (2010). Mexican agricultural policy: Multiple goals and conflicting interests. (https://www.wilsoncenter.org/sites/default/files/Subsidizing_Inequality_Ch_1_Fox_and_Haight.pdf)
7. 7. Merino, M. (2007). Los Programas De Subsidios Al Campo Las Razones Y Las Sinrazones De Una Política Mal Diseñada (Documento de Trabajo). Mexico City: Centro de Investigación y Docencia Económicas.
8. 8. Scott, J. (2010). Agricultural Subsidies in Mexico: Who Gets What? Mexico City: Centro de Investigación y Docencia Económicas. p. (67-118)
9. 9. Parausić, V., Simeunović, I. (2016). Market Analysis of Serbia's Raspberry Sector and Cluster Development Initiatives. Economics of Agriculture, 63, p. 1417-1431.
10. 10. Volk, T., Erjavec, E., Mortensen, K. (2014). Agricultural Policy And European Integration In Southeastern Europe. Buadpest: Food And Agriculture Organization Of The United Nations.

[7] Mexico and Serbia had two agreements which can be modified to cooperate together, those were: agreement on cultural exchange and Free trade agreement.

11. 11. Paredes Barceinas, F. (2002). Lessons from NAFTA: The Case of Mexico's Agricultural Sector. Final report to the World Bank. World Bank. (Available at: http://web.worldbank.org/archive/website00955A/WEB/PDF/YUNEZ_TE.PDF)
12. 12. Insua Llambi, I., Correa Perez, E. (2007). Nuevas ruralidades y viejos campesinismos. Bogota: Cuadernos de Desarrollo Rural, 59, p.(37-61)
13. 13. OECD (2010), OECD Perspectives: Mexico Key Policies for Sustainable Development, OECD Publishing, Paris (http://www.oecd.org/mexico/45570125.pdf)
14. 14. OECD (2007), OECD Rural Policy Reviews Mexico, OECD Publishing, Paris (https://read.oecd-ilibrary.org/urban-rural-and-regional-development/oecd-rural-policy-reviews-mexico-2007_9789264011687-en#page1)
15. 15. Statistical Office of the Republic of Serbia (2012). Census of Agriculture 2012 in the Republic of Serbia. <http://popispoljoprivrede.stat.rs/>

Websites

1. http://www.inegi.org.mx/ (04.05.2018.)
2. https://www.export.gov/article?id=Mexico-Agribusiness (05.05.2018.)
3. http://pa.gob.mx/publica/pa070408.htm (05.05.2018)
4. http://pa.gob.mx/publica/pa07fb.htm (05.05.2018.)
5. http://sdwebx.worldbank.org/climateportal/doc/agricultureProfiles/CSA-in-Mexico.pdf (07.05.2018)
6. http://www.fao.org/faostat/en/#data/QC/visualize (07.05.2018.)
7. http://blogs.worldbank.org/europeandcentralasia/securing-serbia-s-farming-future (07.05.2018.)
8. https://oxfordbusinessgroup.com/overview/recovery-path-though-inefficiencies-linger-sector-growth-takes-positive-turn (07.05.2018)
9. https://rockfound.rockarch.org/mexico (07.05.2018)
10. http://www.fao.org/faostat/en/#data (08.05.2018)
11. https://datos.bancomundial.org/indicador/NV.AGR.TOTL.ZS?end=2016&locations=MX&start=1965 (08.05.2018.)
12. http://unctad.org/en/PublicationsLibrary/ditctncd2012d2ppt_en.pdf (10.05.2018.)
13. https://fas.org/sgp/crs/row/R45038.pdf (28.05.2018.)
14. http://www.internationalraspberry.net/home (28.05.2018.)yyyyyy

EVOLUTION OF VALUE CREATION, FROM PROFITABILITY TO SUSTAINABILITY

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ABSTRACT

The term 'creating value' is the basic of all kind of economic activities and it has been perceived in monetary terms for a long time. However, is it possible to say that this understanding remained same as it was before? Today it is well understood that development can not be successful and sustainable without involving social and environmental aspects. Therefore, as a part of any development operations, 'value creation' also gained new interpretations in paralel to evolvement of 'development' concept. Considering above mentioned progress, the study investigates how 'value creation' evolved by the time with the new requirements of modern society. The subject field is looking to investigate the impacts of economic, social and environmental development aspects on value creation and also tries to agglomerate assessment methods of sustainable value added.

Keywords: *Value creation, development, social development, sustainability, competition, environment, value added.*

INTRODUCTION

Creating value is the essence of both economic and development activities. Understanding and perception of development keeps being reconsidered along with indispensable needs of society. Today, competition and sustainability seem as one of the major drivers of development. Especially the importance of sustainability is getting better understood and it forms the backbone of United Nations Sustainable Development Goals (2017). These concepts affect every aspect of our life, from social formations to environmental issues but most importantly they shape numerous economic activities. Success of an economic entity is measured by its sustainability, integration in the meaning of globalization and competition power. In this context, the 'value chain' approach becomes prominent by the reason of its strong link with above mentioned concepts. From socio-economic point of view, the value chain offers great opportunities for developing countries, especially through the integration of regional clusters with each other or with global markets. Regions also can get economic, social and environmental benefits like income and employment increase or better use of resources by upgrading chain and creating value added.

This review primarily aims to present a conceptual framework of 'value added' and 'value chain' concepts in every aspect and how it has been evolved since it took part in research terminology, its roles and sustainability. Besides, it also determines to find out main causes of new dimensions. Finally, the study tries agglomerate assessment methods of sustainable value added.

The second chapter presents conceptual framework and it aims to emphasise latest perception of "added value" as a tool of sustainable development. The third chapter agglomerates assessment methods of sustainable value added. Finally, last chapter summarises the evolution

process of added value and so value chains and highlights the importance of social and environmental aspects.

ADDED VALUE CONCEPT

The basic definition of added value is the difference between a product's market sales price and the cost of input material (Lind,2005). Right alongside this simple definition, added value has more holistic and multidimensional framework. Value can be defined with quantitative dimensions such as financial numbers or currencies (Economic Value Added). However, it may also contain qualitative dimensions such as perceived gain composed of customer's emotional, mental, physical condition or social, economic and environmental factors (Sustainable Value Added).

Price Oriented Approach

Before the improvements in information and communication technologies of 21st century (information age or digital age), the definition of value was mostly emphasising supply side of the whole process. In his work "Strategic Challenges for Branding", Farquhar (1994) implied that a product survive in the future will be the ones that add value at the customer end of the supply chain. He described ``adding value'' as surrounding the "tangible" features with distinctive benefits perceived by customers as adding value. According to Jones (1986), added value forms the primary basis for differentiating a brand from a product.
Some scholars classified value and added value differently. According to Groönroos (1997), added value implies additional services while core value means product itself. He also put emphasis on "negative added value" that may occur if it subtracted from the core value. Ultimate users of products may not perceive an added value when they don't use extra services (Levitt, 1980). In this approach, value added is pictured as an augmentation that exceeds end user's expectation by providing over-satisfaction. By contrast, others defined it as brands' perception by customers in representing their actual and aspirational selves. Yet another point of view about added value is lays stress on increasing benefits or reducing sacrifices.

Customer Oriented Approach

The scope of value and the process of value adding activity are gained new interpretation with shifting from product and firm oriented view to personalised consumer experiences. With the improvements in communication and information technologies, interaction between producer and end user (customer) increased. Therefore, informed, networked, empowered, and active consumers could find the opportunity to co-create value with the firm. As value shifts to experiences, the market is becoming a forum for conversation and interactions between consumers, consumer communities, and firms (Figure 1). It is this dialogue, access, transparency, and understanding of risk-benefits that is central to the next practice in value creation.(Prahalad, 2004).

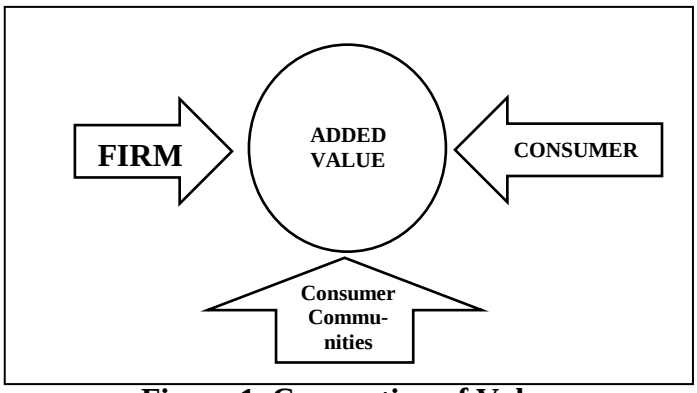

Figure 1. Co-creation of Value

Source: Author, based on Prahalad (2004).

From more holistic and strategic perspective, added value is defined as an outcome created by all the players in every step of a chain. This definition does not just focus on producer or customer sides but takes into account every actor in the whole process (Figure 2).

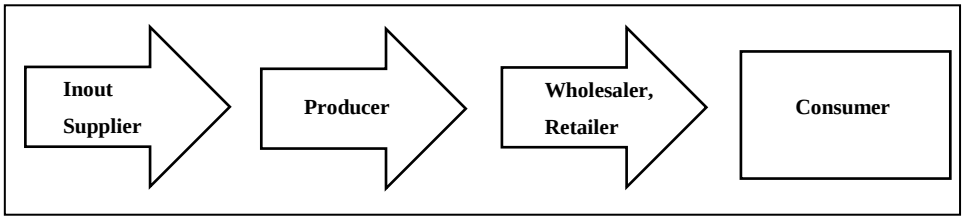

Figure 2. A Simple Value Chain

Source: Author

Brandenburger and Stuart (1996, p. 6) defined the added value of a player as ``the value created by all the players in the vertical chain minus the value created by all the players except the one in question". This definition explicitly views value from the perspective of all players (buyers, firms and suppliers) rather than just customers. Normann and Ramirez (1994) came up with the idea of replacing "added value" with "the co-production of value" whereby every chain actor jointly create value and complement each other's activity. This represents the value process as a "value constellation", contrary to Porter's (1985) "value chain" in which value was added step by step.

Value Chain Approach

The history and evolution of 'value chain' concept began with the term of 'commodity chain' which was introduced by Terence Hopkins and Immanuel Wallerstein in 1977. They defined it as a network of labour and production processes whose end result is a finished product (Hopkins&Wallerstein, 1986). The commodity chain terminology was a part of a wider tendency for a shift to the unit of development study analysis, from domestic industries to worldwide commodity chains. The concept gained a new aspect called 'value added' with Michael E. Porter's work, "Competitive Advantage: Creating and Sustaining Superior Performance". Porter dwelled on competitive advantage and described value activities as discrete building blocks of competition power (Porter, 1998). Accordingly, value chains contain several main activities like inbound logistics, operations, outbound logistics, marketing/sales and service. Besides that, firm infrastructure, human resource management, technology

development and procurement constitute supporting activities. A functional value chain requires good coordination between segments and hinge on services like finance, logistics, R&D and information technologies.

In 1990s, Gary Gereffi and others went further and improved a new framework named 'global commodity chains'. This term linked the 'value added chain' straight-forwardly to the global industrial system. After a decade, in 2000s, the term 'global commodity chain' changed into the term 'global value chain'. This new concept combined the analysis of trade and industrial organisation as a value added chain. Global value chains contain all the activities that turning raw materials into ultimate product for its end use. These activities include production, marketing and delivery of and output to the final consumer. The fact that these activities are increasingly spread over several countries is what makes these value chains 'global' (OECD, 2017). Global value chains are usually linked through long-term relationships and supported by foreign direct investments.

The significance of global value chains (GVCs) during the last two decades has dramatically changed the nature and structure of international trade, with many new implication options for policymaking. One of the most important features of GVCs is the transition of the trade tradition from trading goods to trading tasks in global production systems. This phenomenon has also been described as "the second great unbundling". The theoretical background is that the decrease in communication costs due to the IT revolution has enabled the international unbundling of factories and offices, which means that tasks can also be traded globally. In other words, countries no longer have to build or host the entire production chain; through the fragmentation of production, they can develop or attract productive capacity in a link of the chain where their comparative advantages fit the best. As a result, more and more intermediate goods, such as parts and components, are produced in sub stages in different countries and then exported to other countries for use in further production. This has significantly increased the complexness of international production systems, bringing many new challenges in terms of how to better understand the creation, transfer and distribution of value added, income and job opportunities in GVCs.

Social and Environmental Development and Sustainable Value Added

Environmental issues in global scale; such as climate change risks, biodiversity loss, freshwater decline and pollution have negative impact on human health. However, these factors also cause social and economic problems like food security, income disruption etc. Therefore, modern understanding of sustainable development now takes into account both environmental and social aspects besides economic growth. It includes issues of corporate social responsibility and citizenship along with improved management of corporate social and environmental impacts and improved stakeholder engagement.

Today sustainability takes significant part of policymakers' agenda. There are several reasons why this concept became more necessary recently. These are; (i) government regulations, (ii) community relations, (iii) cost and revenue imperatives, (iv) societal and moral obligations (Epstein, 2009). Sustainability consists of three main elements; economy, society and environment. It involves man-made capital (goods and services), human capital (labor force), natural capital (natural resources), and social capital (networks between individuals and institutions). The level of consideration of all these elements defines strength of sustainability. Low level sustainability refers that all kinds of capital are substitutable by each other so that any loss in one kind of capital can in theory be substituted by a surplus in other forms of capital. High level sustainability point outs critical levels or safe minimum standards for natural capital in order to avoid unrecoverable losses. Therefore, the sustainability of a business or of a value

chain is assessed to the degree of its social, environmental and economic performance (Figure 3).

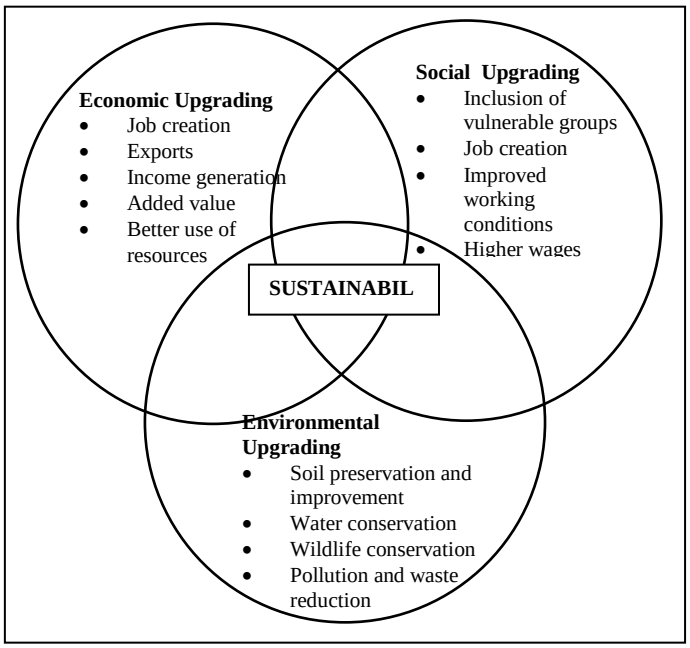

Figure 3. The Components of Sustainable Value Chain
Source: Author, based on Gereffi et al. (2011).

As previously described in "added value" definition, one way of finding out corporate contributions to sustainability is reducing the costs from the created benefits. To achieve this assessment, it is necessary to take into account both external and internal costs. Therefore, a business contributes to sustainability when the earnings exceed the total costs (internal plus external). The result is called "Green Net Value Added" (GNVA) that is a type of full cost accounting that incorporates total revenue, the cost of production, depreciation, and environmental externalities (Demeke et al., 2018). The external environmental cost here implies the cost caused by the company's economic activity. It is important to have same unit benefits and costs to measure green net value added. Therefore, social and environmental cost should be monetarised for calculation.

Besides social and environmental costs, sustainable value added takes into account both, corporate eco efficiency and social efficiency as well as the absolute level of environmental and social resource consumption (eco effectiveness and social effectiveness). As a result, sustainable value added considers simultaneously economic, environmental and social aspects. The overall result can be expressed in any of the three dimensions of sustainability. Eco-efficiency describes the degree to which a company uses environmental resources relative to its economic activity (Figge et al., 2004). There are different perceptions of "eco-efficiency" such as decreasing negative environmental impacts or it can also be a ratio of created value per environmental impact added. The latter considers the aggregate of all energy and material flows under consideration caused by economic activity weighted by their relative harmfulness to the environment. Increased eco-efficiency may contribute to achieve strong sustainability. However, sustainability will be weak if only one element (one of the economic, social or environmental elements) is being used and it will be strong when all elements are being used.

ASSESMENT OF SUSTAINABILITY

Although majority of existing studies on value analysis in the current literature are mostly investigates economic side of it, there are increasing number of studies on sustainability recently. The common understanding of these studies is sustainability shouldn't be acted only on the basis of economic results, whereas it should take into consideration non-financial factors. In parallel to this mindset, Yang (et al., 2017), suggested four basic concepts; (i) lifecycle thinking (where to look for value opportunities), (ii) multiple stakeholders (who to identify opportunities for), (iii) value uncaptured (how to identify value opportunities), and (iv) economic, social, and environmental value (what value consists of) that can be synthesized to present a conceptual framework for value analysis aimed at sustainability. By analyzing value captured and value uncaptured for all stakeholders across the product life cycle, companies can identify opportunities to create sustainable value that yield economic benefit and contribute to the environment and society. Therefore they developed a sustainable value analysis tool. Briefly the tool helps to analyse whole product cycle by conducting in person investigation with stakeholders and identifying "value captured", "value uncaptured" and "value opportunities" to reach the ultimate sustainable value assessment.
Sustainable Value Added takes into account both, the efficiency and the absolute level (effectiveness) of resource use. Sustainable Value Added is the extra value created when the overall level of environmental and social impacts is kept constant. As an indicator the absolute Sustainable Value Added would measure the residual value after VA of a company was adjusted for external environmental and social costs and opportunity costs. More formally, this is expressed by:

absolute Sustainable Value Added
= Value Added
-external environmental and social cost
+relative Sustainable Value Added (Figge et al., 2004).

On the other hand, Kassem (et al., 2016) mentioned about governance performance as another pillar of sustainability besides economic, social and environmental elements and he improved the common assessment method with several modifications. The common method calculates the value by using both financial and non-financial resources. This approach presents the created value (or created damage) as a result of using economic, environmental and social resources, compared to a benchmark. Improved method employs financial value and new data oriented analysis for evaluating the efficiency. Briefly, tools for sustainable value assessment may help to improve governance policies and also increase chances on defining, capturing new added value opportunities.

CONCLUSION

Concepts related to added value and value chain development have been debated in various fields such as business management, sociology, and development economics for a long time. Despite shifts in the terminology, the main ideas 'collaboration' and 'value added' remained same. Today, added value concept became one of the foremost preconditions of economic growth. An effective value chain enables to increase stakeholders' income and ensures sustainable development.
This study aimed to present a conceptual framework of value creation and also investigated the impacts of economic, social and environmental development aspects on value creation. As a result of it is understood that it is quite difficult to draw a plain picture for the changes of "added value" concept. Therefore, there is not a clear line showing that one era was closed and the

other started. The concept preserved its core meaning and kept is basic role as being an essential element of economic activity. However, it gained new additional aspects and evolved in parallel to social and technological improvements and ongoing environmental issues.
Resent researches about value added highlight that it is impossible to reach to sustainable level development without involving social and environmental solutions to the main economic activity, putting the "sustainability" to the heart of governance. They also underline the importance of creating shared values for business, society and environment.

REFERENCES

1. Diehl K. (2016), "Sustainability assessment of agro-ecological innovations at territorial and value chain scale", Conference Paper, IFSA 2016, Social and Technological Transformation of Farming Systems, UK.
2. Epstein M.J. (2009), "Making Sustainability Work: Best Practices in Managing and Measuring Corporate Social, Environmental, and Economic Impact", Berrett-Koehler Publishers.
3. Farquhar, P.H. (1994), "Strategic challenges for branding", Marketing Management, Vol. 3 No. 2, pp. 8-15.
4. Figge F., Hahn T. (2004), "Sustainable Value Added - measuring corporate contributions to sustainability beyond eco-efficiency", Ecological Economics 48, pp. 173-187.
5. Gereffi G., Barrientos S., Rossi A. (2011), "Economic and social upgrading in global production networks: A new paradigm for a changing world", International Labour Review. 150: 319-340.
6. Groönroos, C. (1997), "Value-driven relational marketing: from products to resources and competencies", Journal of Marketing Management, Vol. 13, pp. 407-19.
7. Hopkins, T. and Wallerstein, I. (1986), 'Commodity chains in the world economy prior to 1800', Review, p.157-170.
8. Jared G., Kentaro K., Raphaël B., (2017), 'How policies shape global food and agriculture value chains', OECD Publishing, Paris.
9. Jones, J.P. (1986), "What's in a Name? Advertising and the Concept of Brands", Lexington Books, New York, NY.
10. Kassem E., Trenz O., Hrebicek J., Faldik O. (2016), "Sustainability Assessment Using Sustainable Value Added", Procedia, Social and Behavioral Sciences 220, pp. 177-183.
11. Levitt, T. (1980), "Marketing success through differentiation of anything", Harvard Business Review, January-February, pp. 83-91.
12. Normann, R. and Ramirez, R. (1994), Designing Interactive Strategy. From Value Chain to Value Constellation, John Wiley & Sons, Chichester.
13. Per Lind, (2005), "Competitiveness through Increased Added Value: A Challenge for Developing Countries", Journal of Comparative International Management, Vol. 8 No. 1.
14. Porter, Michael E. (1998), 'Competitive advantage: creating and sustaining superior performance; with a new introduction', New York.
15. Prahalad C.K. (2004), "Co-creation Experiences: The Next Practice in Value Creation", Journal of Interactive Marketing, Vol. 18 Issue 3, pp. 5-14.
16. United Nations, (2017), "The Sustainable Development Goals Report", UN Department of Economic and Social Affairs (DESA).
17. Yang V., Vladimirova D., Evans S., (2017), "Creating and Capturing Value Through Sustainability", Research-Technology Management, 60:3, pp. 30-39.

GOVERNMENT SUPPORT OF FARMS DEVELOPMENT IN UKRAINE

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ABSTRACT

Agriculture is one of the priority sectors of the national economy. The development of the agricultural sector contributes to raising the material well-being of the population, strengthening the country's economic and food security, and increasing export potential.
Government support involves the formation of programs that determine the mechanism of this support. Government support programs are developed and implemented by a specially authorized body in the field of development of small and medium enterprises with the involvement of other central executive authorities and non-governmental organizations representing the interests of small and medium enterprises. Government support programs are approved by the Cabinet of Ministers of Ukraine in accordance with the procedure established by law. Government support of small and medium enterprises and infrastructure support for small and medium enterprises including financial, informational, consultative support, among them support in the field of innovation, science and industrial production, support for small and medium-sized enterprises engaged in export activities, support in the field of training, retraining and advanced training of management and personnel.
Along with the positive changes, it should be noted that some problems related to the practical realization by farmers of their right to state financial assistance. In spite of increasing financial assistance, agricultural production is developing very slowly. The reason for this is not only the lack of funding, the adverse weather conditions that have occurred in a number of regions this year, and the limitation of grain exports, but also some factors which are legal in nature.
First of all, it is about unclear conditions and complicated procedures for providing financial support, established by regulatory acts. It is on this occasion that many complaints from farmers come to the state. That is why, I would like to research in my article for a more detailed consideration of some issues related to the legal regulation of government financial support to farms.

Keywords: *government support, grant, budget subsidies, beneficiaries, tax support*

THE MAIN RESEARCH MATERIAL

In each country, in any society, agriculture is a vital industry of the national economy, since it affects the interests of every person, because the food production is the first living condition of the population. It also serves as a raw material base for other industries, including light and food. In agriculture, as well as in other sectors of social production, there is a constant development and, on this basis, the efficiency of agricultural labor is increasing, which allows a smaller quantity of labor to produce more agricultural products.
Agriculture is an important source of, firstly, consumer goods that are nowhere near replaceable; and secondly, additional labor for non-agricultural sectors: thirdly, the source of net profit. And, finally, this industry has a significant impact on the socio-economic development of society as a whole. Thus, in agriculture of Ukraine (taking into account profits realized in industry) creating more than 30% of national income and about 75% of the

consumption fund. In agricultural production, taking into account labor costs at private plots employed almost 6 million people.[12]

Agriculture as an industry has a number of features, which largely determine the performance of agrarian enterprises. At the same time, as in other sectors of the national economy, there are general economic laws, although they are manifested precisely in the light of these specific features. Knowledge, taking into account the features and skillful application of the mechanism of the laws can have a significant positive effect on the efficiency of economic activity of agrarian enterprises:

1. The feature is that the means of production here are living organisms - plants and animals that develop in accordance with biological laws. Therefore, in agriculture, the effect of economic laws is closely intertwined with the effect of natural laws.
2. Another feature is that the main means of production here are the land. If in the industry, with the exception of extractive industries, land is only a spatial operational basis, the location of enterprises, then for agricultural enterprises it is the main and indispensable means of production. The labor process and the production of products in agrarian enterprises are directly related to land, its quality and fertility, the nature of its use.
3. Agrarian enterprises operate in conditions of risk and uncertainty, as the production results are significantly influenced by natural conditions. And, consequently, the final results largely depend not only on the quantity and quality of the resources used, but also on the specific conditions under which production is carried out.
4. Production in agrarian enterprises operates on a large territory. Territorial mode of production associated with large amounts of traffic and engineering materials (seeds, fuel, fertilizers) and products (grain, sugar beets, potatoes).
5. An important feature of the work of agrarian enterprises is that the products produced by them continue to participate in the production process. As means of production, seeds and planting material (grain, potatoes, etc.), feed, as well as a significant part of the livestock population are used for the restoration and expansion of the main herd.
6. In agriculture, the working period does not coincide with the production period. Here the process of production carried out when there is a direct participation of people (plowing, sowing, care, harvesting) and when it occurs under the direct action of natural factors (growth, the formation of a crop).
7. Non-coincidence of the period of production and the working period determines the seasonality of production, which greatly affects the organization of labor, the effective use of technology, labor resources.
8. The feature of production in agrarian enterprises is also that in the industry a special role belongs to water resources. Water here is a real and indispensable element. In areas where its deficit is observed and water is supplied artificially, it increases the cost of production.
9. One of the main features is that in agriculture, as a rule, the means of production (tractors, cars, combine harvesters, agricultural machinery) are moving, and the objects of labor (plants) are in one place. This leads for large needs of energy resources and equipment.
10. The workers do not have a permanent place of work. They perform different types of work (planting, maintenance, harvesting forage, harvest) and therefore do not have a narrow specialization. [9]

These features can practically not be eliminated and require comprehensive analysis and their consideration in the formation of the material and technical base of the enterprise, organization

and management of production, determination of the economic efficiency of the use of production resources in order to increase the volume of production and its cheapening.
In Ukraine, in the early 80's of the last century, farming began to develop as a family-private form of farming in rural areas, with the exception of private peasant farms. During the twenty years of market transformation, farms have become an integral part of the agrarian economy. However, their further development requires serious government support and a well-balanced agrarian policy.
Financial support is provided to: a farmer owning and / or using not more than 500 hectares of agricultural land with a net income (revenue) from the sale of products (goods, works, services) for the last year to UAH 15,000,000. Also, an agricultural servicing cooperative consisting of not less than 20 members, among which there should be at least one farm, and the other - individuals, the ownership and use of each of which is not more than 100 hectares of agricultural land.
Budget funds directed in the following areas:

- partial compensation for cost of the seed purchased from seed producers of agricultural crops of domestic selection (in the amount of 80 percent of the value of seeds, excluding amounts of value added tax, but not more than 30,000 hryvnias per farm);
- partial compensation costs associated with extended agricultural advisory services (agricultural advisory services related to the provision of advisory services areas: agronomy, veterinary science, animal science, accounting, marketing, legal advice amounting to 90 percent of the cost, but no more than 10 000 UAH);
- financial support of agricultural servicing cooperatives (it is provided in the amount of 70 percent of the cost of the purchased equipment without consideration of the amount of value added tax, but not more than UAH 3,000,000 per one agricultural service cooperative);
- partial compensation for a cost of purchased agricultural machinery and equipment of domestic production (25 percent of cost of machinery and equipment is provided at the expense of the budget program of the - financial support of agricultural producers in the direction of "Partial compensation of the cost of agricultural machinery and equipment of domestic production", and 15 percent of the cost - at the expense of the budget program "Financial support for the development of farms");
- cheapening of loans (partial compensation of the interest rate on borrowed in the national currency by loans granted by the state bank for accrued and paid in the current year interest for using loans in the amount of 1.5 discount rate of the National Bank. Which operates on the date of accrual of interest but not higher than the amount, provided by a loan agreement reduced by 1 percentage point).[10]

The recipient can use the financial support for the above areas no more than once during the fiscal year.[3]
Thus, nowadays, financial support is provided on a competitive basis and irrevocably to newly established farms, farms with separate farmsteads, farms engaged in economic activity and located in mountain settlements in the polissya territories within one budget year, no more than two types of expenses related to:

1) development of land allocation projects for farm management;
2) payment of interest on the use of bank loans - at the rate of the NBU discount rate, effective on the date of interest accrual for the use of loans;
3) the acquisition of one tractor, combine, domestic lorry and foreign origin which is not produced in Ukraine according to the list approved by the Cabinet of Ministers of Ukraine, provided that they are further exploited by the farmer for at least three years

from the date of the state registration - in the amount of 30 percent without the amount of value added tax, but not more than 200 thousand hryvnias per unit of equipment;

4) construction and reconstruction of livestock buildings (including the production of design estimates) - in the amount of 30 percent without consideration of the amount of value added tax, but not more than 200 thousand hryvnias for one constructed or reconstructed object;
5) making insurance payments under compulsory insurance contracts, the types of which are specified in paragraphs 11 and 30 of part one of Article 7 of the Law of Ukraine "On Insurance" - in the amount not exceeding 50 percent;
6) training, retraining and raising the qualification of farm staff in agricultural educational institutions;
7) the expansion of scientific research on the problems of organizing agricultural production and the issuance of recommendations on the use of their achievements in scientific and technological progress.[10]

Financial support on a competitive basis on a turn-based basis is provided at a rate not exceeding 250 thousand hryvnias, with the implementation of the obligation to return budget funds:

- newly established farms and farms with separated farmsteads, farms engaged in economic activity and located in mountain settlements, in the polissya territories - from three to five years for the production, processing and marketing of manufactured products, production activities
- other farms - up to five years for the purchase of machinery, equipment, renewal of working capital, production and processing of agricultural products, construction and reconstruction of production and non-production premises, including residential buildings (with a total area of no more than 125 square meters), for the laying of perennial plantations, development of lending and service cooperatives. Including for payment of share contributions to unit funds of agricultural servicing cooperatives formed by farm households themselves or together with members of personal peasant farms, irrigation and land reclamation.

The purpose of the government policy in the field of development of small and medium enterprises in Ukraine is:

1) creating favorable conditions for the development of small and medium enterprises
2) provision development of small and medium enterprises in order to form a competitive environment and increase their competitiveness;
3) stimulation of investment and innovation activity of subjects of small and medium entrepreneurship;
4) assistance in the conduct of activities for small and medium-sized enterprises in the promotion of their products (works, services), the results of intellectual activity on the domestic and foreign markets;
5) ensuring employment of the population by supporting the entrepreneurial initiative of citizens.[10]

The main directions of the government policy in the field of small and medium business development in Ukraine are defined:

- improvement and simplification of the accounting procedure for tax purposes;
- the introduction of a simplified system of taxation, accounting and reporting for small businesses that meet the criteria set forth in tax legislation;

- involvement of small businesses in implementation of scientific and technical and socio-economic programs, the supply of products (works, services) for state and regional needs;
- provision of financial state support to small and medium enterprises through the introduction of state lending programs, provision of guarantees for obtaining loans, partial compensation of interest rates on loans, etc .;
- assistance in the development of infrastructure for supporting small and medium enterprises;
- guaranteeing the rights of small and medium enterprises in the course of state supervision (control) in the sphere of economic activity;
- facilitating the simplification of permitting procedures and procedures for the implementation of state supervision (control), obtaining permit documents for small and medium enterprises and shortening the term of such procedures;
- organization of training, retraining and professional development of personnel for small and medium enterprises
- implementation of mechanisms for promoting and encouraging the use of advanced technologies in the production of small and medium-sized enterprises, as well as technologies that improve the quality of goods (works, services).

Government support involves the formation of programs that determine the mechanism of this support. Government support programs developed and implemented specifically authorized in the field of small and medium enterprises involving other central executive bodies and public organizations representing the interests of small and medium businesses. Government support programs approved by the Cabinet of Ministers of Ukraine in accordance with the law.[8]
Government support of small and medium enterprises and objects infrastructure of support for small and medium enterprises includes financial, informational and consulting support, including support in the field of innovation, science and industrial production, support of small and medium enterprises, which carry out export activity, support in the field of training, retraining and advanced training of management personnel and personnel of business.
The main types of financial government support are:

1) partial compensation of interest rates on loans granted for implementation of projects of small and medium enterprises;
2) partial compensation of leasing, factoring payments and payment for the use of guarantees;
3) provision of guarantees and guarantees for loans of small and medium enterprises;
4) the provision of loans, including microcredits, for the commencement and conduct of their own business;
5) granting loans for the purchase and introduction of new technologies;
6) compensation of expenses for the development of cooperation between small and medium enterprises and large enterprises;
7) financial support for the introduction of energy-saving and environmentally friendly technologies;
8) other types not prohibited by the law of financial government support.[4]

In addition, the government support of small and medium enterprises in the field of innovation, science and industrial production is provided by:

1) providing financial support for the creation of infrastructure for support of small and medium enterprises in the field of innovation, science and industrial production, including business incubators, innovative business incubators, scientific and technological centers, technology transfer centers;

2) promotion of venture business development;
3) creating a system of economic incentives for economic development based on technological innovation;
4) transfer of scientific production, created at the expense of budgetary funds, for its introduction into production;
5) creation of conditions for the involvement of small and medium enterprises before concluding subcontract agreements in the field of innovation and industrial production;
6) stimulation of attraction of foreign investments and development of mutually beneficial international innovation cooperation;
7) creation of conditions for the spread of cooperation between small and medium enterprises and large enterprises.[4]

Government support of small and medium-sized enterprises engaged in export activities may be carried out by:

- assistance of promotion of foreign production products of domestic production (goods, works and services), intellectual property objects and creation of favorable conditions for Ukrainian participants of export activity;
- cooperation with international organizations and foreign states in the field of small and medium business development;
- Establishment of small and medium-sized enterprise support infrastructure that contributes to export activities, in particular by providing financial support (lending, guaranteeing, insurance of export operations, partial compensation of interest rates on loans for export activities, partial coverage of expenses of small and medium enterprises medium-sized businesses associated with the implementation of marketing activities in the foreign market, studying the situation of the external market, the search for partners, the promotion of that ariv new markets, participation in the exhibition and fair activities abroad, travel specialists to explore foreign markets, training, retraining and advanced training of personnel of small and medium enterprise for exports);
- assistance of promotion in participation of small and medium-sized enterprises in exhibitions and fairs abroad for the presentation of domestic production, including by providing financial support, lease exhibition space, partially covering the costs of small and medium-sized enterprises, related with participation in exhibitions and fairs abroad;
- assistance in spreading information on potential opportunities of domestic small and medium enterprises and providing access to foreign information networks for the search of business partners abroad.

Government support of small and medium-sized enterprises in the field of training, retraining and advanced training of managerial personnel and personnel can be carried out by:

- creation and development of a network of business incubators;
- the development and implementation of educational programs aimed at training, retraining and raising the level of skills of personnel for small and medium enterprises on the basis of state educational standards;
- creation of conditions for raising the level of professional knowledge and business qualities of specialists from among the socially unprotected sections of the population;
- the provision of teaching and methodological, scientific and methodical assistance to the subjects of small and medium entrepreneurship;

- facilitating participation in programs of exchange of international experience with the purpose of introducing advanced technologies and raising the level of qualification of personnel of small and medium enterprises.[7]

The key to efficiency of government support for Ukrainian farms and their effective development is to ensure an effective agricultural policy and its compliance with state authorities. The decisive factor for the further development of farming and small and medium-sized enterprises in the countryside is the state's decision on development and state support through cooperation and integration.

To begin, let's analyze the dynamics of changes in tax support for agribusiness in recent years. In fact, the vast majority of budget funds are attracted by numerous agricultural holdings. Instead of supporting small and medium-sized farmers, as in the EU, the government hope to growing up with big business. In 2017, the total amount of subsidies to agricultural producers amounted to 0.14% of GDP. It would seem a small figure in percentage terms. However, in money it reaches 4 billion UAH.

There is no surprise in allocating these funds between companies in the sector. The largest amount of budget money was received by holdings dealing with chicken meat - "Myronivsky Hliboproduct", almost UAH 1.4 billion, and "Ukrlandfarming", UAH 517 million.

In total, for 2017, 1706 legal entities were able to receive grants. There were among them a company that was lucky enough to receive support in the amount of 2 USD per year.[5]

Table 1. Analysis of GDP dynamics and tax support of Ukrainian agrarian enterprises during 2013-2016 [2]

Indicator	Year				
	2013	2014	2015	2016	2016 to 2013%
GDP of agriculture	132,2	160,5	236,0	277,2	209,7
Funds received from fiscal support	20,9	25,3	45,3	35,8	171,3
budget subsidies	7,2	5,5	2,1	2,2	30,6
accumulated value added tax	13,7	19,8	43,8	33,6	245,3

In 2017, UAH 6.3 billion was envisaged for government support to the agricultural sector. Of these, UAH 4 billion was spent on subsidies to producers of livestock products, UAH 550 million for a program of 20 per cent compensation of the value of Ukrainian agricultural machinery, UAH 300 million for compensation of credit rates, UAH 75 million for the development of hops, gardening, vineyards and berries. Let's look at the overall distribution of land between agricultural enterprises.

Table 2. Distribution of agricultural enterprises, according to agricultural lands (2017) [3]

Area, ha	Number of enterprises		Area of agricultural land	
	units	% to total enterprises	thsd, ha	% to total area of agricultural land
no more than 5,0	3138	6,9	10,1	0,1
5,1–10,0	2594	5,7	20,3	0,1
10,1–20,0	3937	8,6	61	0,3
20,1–50,0	11263	24,7	424,9	2,1
50,1–100,0	4903	10,8	354,3	1,8
100,1–500,0	7372	16,2	1797,1	9
500,1–1000,0	2651	5,8	1891,4	9,5
1000,1–2000,0	2481	5,4	3570,9	17,8
2000,1–3000,0	1084	2,4	2649,2	13,3
3000,1–4000,0	471	1	1635,4	8,2
4000,1–5000,0	276	0,6	1236,1	6,2
5000,1–7000,0	261	0,6	1526,3	7,6
7000,1–10000,0	138	0,3	1140,1	5,7
More than 10000,0	166	0,4	3643,1	18,3

Distribution of subsidies is quite legal. The procedure for the allocation of funds is prescribed in the Cabinet resolution № 83. According to this document, poultry farmers were allowed to receive 50% of 4 billion UAH.[10]

According to Mikhail Sokolov, deputy head of the All-Ukrainian Agrarian Council, the government made a gross mistake in the formula for calculating subsidies. As a result, enterprises engaged in both livestock and crop production, and all the small and medium farmers who participated in the program, did not receive subsidies. This led to a scandal due to the receipt of almost half of the subsidies by two agricultural holdings.

A grant - is a form of government support. Its amount was calculated as the proportion of realized subsidized products in the total volume of sales, multiplied by the declared amount of VAT, taking into account the proportionality factor according to the budget financing. Since most agricultural producers are engaged in plant growing and livestock production, they received small subsidies. The input and output VAT correlated in that way as the crop was "eaten" more than livestock generated.

To assess the effectiveness of grants, we must to understand the key performance indicators put forward by the government and the parliament before they are provided. The primary task was to support the livestock sector. According to the State Statistics Service, the number of cows in Ukraine in 2017 decreased by 2%, pigs - by 8%, and chickens - increased by 1.7%. After a year, subsidizing livestock farmers did not decrease and prices for their products. In 2017, chicken went up by 28%, beef - by 33%, eggs - by 24%, milk - by 21%.[7]

According to the budget-tax levers of agricultural development, government support is divided into direct and indirect. Usually, budget support involves direct financing, but in times of crisis in the context of acute deficit of the budget, the government refuses to implement actual budget expenditures in support and applies preferential taxation, which is also a loss of budget, but because of the non-receipt of potential tax revenues. On Figure 1 you can see the ratio of direct and indirect support to farms in 2013-2016.

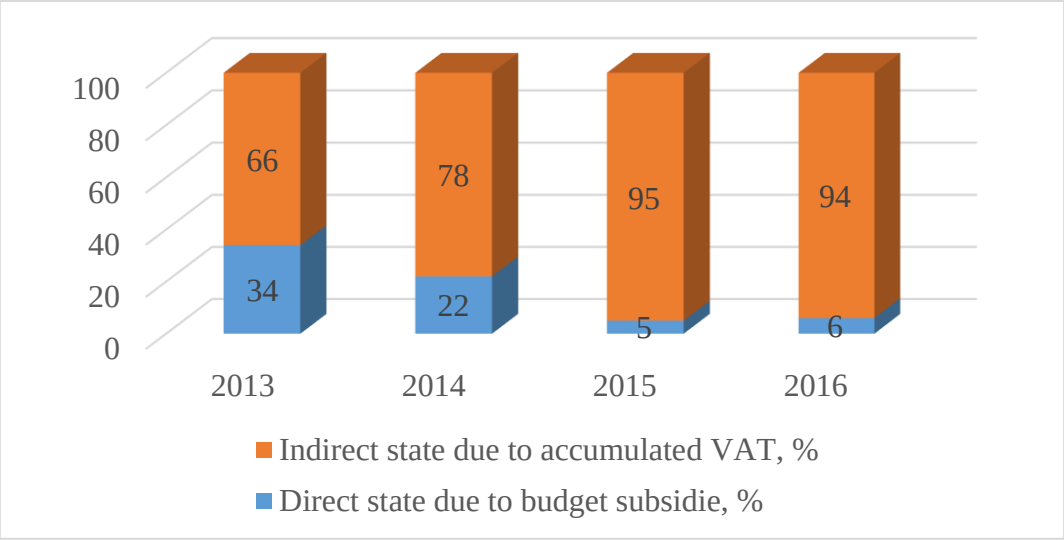


Figure 1. The dynamics of the structure of fiscal support of agrarians for 2013-2016 years.[6]

"Government support needs to be considered in three aspects: economic efficiency, corruption risks, impact on competition," said Deputy Director of the Center for Economic Strategy Dmitry Yablonovsky.

The idea of subsidies was obviously borrowed from the EU, where farmers receive significant government support. However, the difference between the agro-sector of Ukraine and the EU is on the scale of farms. In the EU, an economy of 1 thousand hectares in management is considered a landowner, whereas in Ukraine land banks of several companies reach 600 thousand hectares.

The EU has a clear vision of the reasons for subsidizing agriculture. Not so much for business development, but for maintaining the social component and for the sake of food security in the broadest sense of the word. In addition, the European Union has been reviewing its agricultural policy at least once every ten years - it critically assesses the goals and mechanisms for achieving them, and then carefully draws up the rules for providing assistance.[11]

In Ukraine, it is difficult to assess the goals of government support. The website of the Ministry of Agrarian Policy published the "Strategy for the development of the agrarian sector of the Ukrainian economy for the period up to 2020". It involves monitoring, controle and evaluating the implementation of its results. However, there is no data on the effectiveness of the allocated subsidies on the site.

"The Ukrainian system of government support is constructed at random and focused on the development of the business component," says Kachka. Under such conditions, the greatest amount of subsidies is received by those who are able to present their position during the budget process.

In the project of a new order of distribution public funds under the livestock program for 2018, which was at the disposal of the the Ministry of Agrarian Policy considered three lines of financing:

- The first is cheaper loans (livestock, poultry) - partial compensation of interest.
- The second is the compensation of loans involved in the construction and reconstruction of livestock farms and complexes, poultry breeding enterprises, milking rooms, processing and storage shops for agricultural products.
- The third is special subsidies for keeping cows, for young animals (raising young cattle).

- Fourth is a partial reimbursement of the cost of purchased for further reproduction of pedigree animals and the cost of construction.

The main manager of funds is the Ministry of Agrarian Policy, the lower level administrators - regional and district administrations. At the level of region administrations, competitive commissions were set up to select companies for government support. In fact, this means manually selecting companies at the level of the regions that will qualify for government support.

Loans are cheaper, but not for everyone. By paragraph 5 of the draft order provides that interest compensation is granted to economic entities for loans borrowed from banks, which have signed from the Ministry of Agrarian Policy, the "Memorandum on the general principles of cooperation". Thus, commodity producers find themselves in a situation where the receipt of compensation depends on whether, in which the bank was taken a loan.[5]

Such a limitation on the list of banks and the currency of a loan directly violates the "About Government Support to Agriculture in Ukraine", which states that cheapening of loans is carried out in a loan subsidy mode and consists in subsidizing part of the fee (interest) for the use of loans provided by banks in the national and foreign currency. The given norm of the Procedure contains the corruption factor, as it creates advantages for unknown to present banks which can conclude memoranda with the government.

You have debts - you do not have any support. By paragraph 11 of the Procedure provides that financial support is not provided to recipients of budget funds in respect of which a bankruptcy case has been instituted. The same applies to enterprises that are identified as bankrupt, who are at the stage of liquidation or who have overdue more than six months, arrears to the state budget, the Pension Fund and funds of compulsory state social insurance.

This also contradicts the Law "About Government Support to Agriculture in Ukraine", which does not link the right to receive state support in the presence or absence of a tax debt from any taxes and other mandatory payments.[5]

Three years for misuse. By paragraph 12 of the Procedure provides that in case of the establishment by the controlling bodies of the facts of the provision of inaccurate information or misuse of budget funds, the recipient of the budget funds shall return the funds used inappropriately in full. According to the document, he is deprived of the right to receive budgetary funds within three years from the date of detection of such violation, but not before the date of return of budgetary funds used for non-intended purpose.

However, the responsibility for the misuse of funds from the loan subsidy is established in the Law of Ukraine "About Government Support to Agriculture in Ukraine". It states, in particular, that if such facts are detected, the provision of any state support to the borrower during the current and next budget period shall cease.

Bureaucratic confusion with the documents. By paragraph 7 of the Order stipulates that, for the receipt of subsidies for the maintenance of cows, business entities shall submit an extract from the Unified State Register of Animals by July 5 and until December 5 for commissions in accordance with established procedure.

At the same time the holder of the register of animals is the Ministry of Agrarian Policy. Why they are force to get from agrarians unnecessary certificates?

Also, in paragraph 7 contains two alternative ways of including an entity in the register - the submission of a commission to a list of documents or the availability of a corresponding cow population, which is confirmed by the Agency for the identification and registration of animals (the administrator of the Unified State Register of Animals).[9]

The Cabinet of Ministers plans to approve for farmers the use of funds provided by the state budget to provide support to farms, which, in general, has similar conditions. According to this document, state support for farming and co-operation will be carried out in several areas:

- Firstly, partial compensation of the cost of seeds of domestic breeding.
- Secondly, the support of agricultural servicing cooperatives.
- Thirdly, partial compensation of the cost of machinery and equipment of Ukrainian production.
- Fourth, cheaper loans.

For farmers, the issue of providing funds will be commissions that are planned to be created at regional state administrations.

The farmers' association is a participant in decision making. By paragraph 6 of the Draft Order stipulates that the regional commissions for the provision of financial support include representatives of the regional representative offices of the NGO "Association of Farmers and Private Landowners of Ukraine". Of course, public involvement in controlling the costs of taxpayers' funds is positive.

Financial support by issuing a bill. By paragraph 10 of the project provides for the financial support of agricultural servicing cooperatives in the milk and fruit and berry fields for the purchase of equipment for the storage and processing of agricultural products by issuing a simple bill, which is lent by the Ministry of Agrarian Policy. But, neither the Budget Code nor the Law " About Government Budget of Ukraine for 2018" does not provide for the implementation of budget programs and the implementation of budget expenditures with the use of bills.[9]

Payment of equipment only through the state bank. By paragraph 11 of the draft Order provides that partial compensation of the cost of purchased agricultural machinery and equipment of domestic production is provided to farmers on a non-refundable basis at the rate of 40% of the cost of purchased equipment and equipment, excluding VAT. This should be specified in the act of acceptance and transfer of documents and other documents confirming payment through the state bank or bank, in the authorized capital of which 75% of shares and more belongs to the state.[9]

In order to receive compensation, the farmer will be forced to open an account in the appropriate bank, which is a compulsion to conclude an agreement. Such a restriction on the list of banks does not comply with the Law "On State Support to Agriculture in Ukraine". Moreover, in this way, state banks are placed in a privileged position in comparison with other banks. This point contradicts both the Civil and Commercial Code, since some business entities compels the prior concluding of contracts, while others provide unwarranted advantages in competition.

The government's declared path to simplification and transparency of business relations with the state is not reflected in its new acts on subsidies to farmers. And the idea of reducing the human factor in making decisions on allocating funds in support of farmers in general is offset. Will good agrarians without proper acquaintances be able to receive support – it is a big question. State support to the agrarian sector does not justify itself. More than 6 billion hryvnias of budget funds are spent inefficiently, and farmers themselves receive only a tiny fraction of help.

Over the past five years, the support system for farmers in Ukraine has often changed. In 2018, the government allocated a record 6.3 billion hryvnias to taxpayers for subsidies to farmers. However, the choice of support forms was not accompanied by professional discussions, there are no officially formulated objectives and substantiation of support programs. Under such conditions, it's almost impossible to evaluate their effectiveness. By 2017, more than 90% of all support was earmarked for tax breaks.[10]

This is primarily about the so-called single tax of the 4th group (or a fixed agricultural tax until 2015 - the FAT) and a special regime for the taxation of value added tax (VAT) for agricultural

enterprises. The FAT - is a fixed tax that replaces the tax on profit and land tax. The tax rate ranges from 0.09% to 1% of the normative value of agricultural land, depending on the type and location of the land. In 2010, the load from FAT to farmers averaged only about US $ 0.75 per 1 ha of arable land, which actually left the income of agricultural companies in Ukraine tax-free.

In 2015, due to a significant increase in the normative value of land, the tax burden on FPPs has increased to about $ 9 per 1 hectare, which in any case is much less than the burden that farmers would have on the overall taxation system. In 2016 and 2017, under the pressure of the IMF and other international donors, the special VAT regime for agricultural enterprises was gradually abolished. In 2015, the amount of support from the special regime of VAT was estimated at 28 billion USD.[1]

Instead, the FAT still exists and, apparently, will continue to exist. Both preferential regimes were harshly criticized and are now recognized as extremely ineffective tools for boosting productivity in agriculture and undermining productivity and productivity in agriculture.

How has the government support changed since 2017?

In 2017, the special VAT regime for agricultural enterprises was abolished. He was replaced by Mr., who in fact was no longer preferential to taxation. Under the new regime, agricultural enterprises, mainly livestock and horticultural producers, were eligible to receive subsidies, in proportion to the VAT paid.[5]

The total amount of grants for this program amounted to 4 billion UAH. However, the program was subjected to devastating criticism because of the fact that the funds were first obtained by large agribusinesses. In 2018, the volume of state subsidies to agricultural producers has increased to 6.3 billion UAH. At the same time, the criteria for access and distribution of subsidies also undergone significant changes.

Of this amount, about 1 billion USD was directed to subsidies to small farms (which cultivate up to 500 hectares). Such farms can receive financial support both on irreversible and on a reversal basis. This funding is distributed among farms on a competitive basis and involves compensation for the cost of a wide range of different factors of production (partial compensation for the cost of loans, costs for the purchase of seeds, etc.).[10]

However, the largest share of budget subsidies - UAH 4 billion - is aimed at supporting livestock and is distributed as follows: 1.2 billion USD - partial compensation of expenses (30% of the total cost, but not more than 150 million) for the construction or reconstruction of livestock complexes, milking rooms or processing facilities.

If the construction is financed by credit funds, then the compensation is up to 25% and financing is carried out at the expense of another program (the total budget of this program is 1.1 billion UAH). Agricultural enterprises can not simultaneously participate in both of the above programs.

In detail:

- 700 million UAH - support for the preservation or increase of heifer herd of cattle (up to 13 months old) in volume up to 2 500 UAH per head. Prior to receiving funding for such a program involved exclusively households.
- 500 million UAH - for each cow on the balance sheet of the enterprise, UAH 1,500 is paid.
- 300 million UAH - partial reimbursement of expenses for the purchase of pedigree animals (up to 50% of the cost, the upper limit of payment depends on the category of livestock, but not more than 24 000 UAH per head).
- 200 million UAH - partial compensation of the cost of loans. In this case, the size of the loan should not exceed 100 million UAH. The actual cost of a loan for manufacturers can be up to 3%.[13]

The third largest program of support - UAH 945 million - compensates for a portion of the cost of purchasing agricultural machinery produced by domestic producers. This program reimburses 25% of the cost of purchased domestic equipment. Another UAH 300 million is for the maintenance of gardening, for example, for the laying of new gardens, vineyards, berry fields and their further processing. This program provides for the reimbursement of up to 80% of the cost of planting material, as well as state support for the installation of new gardens, construction of laboratories, the purchase of refrigeration and other equipment.[5]

All of the above-mentioned programs can be categorized as so-called subsidies for the purchase of factors of production, that is, such subsidies that reduce the cost of means of production (resources) for agricultural producers. However, the main problem is that updated support programs have been developed and implemented without open, research-based, public-purpose objectives, and tools for achieving these goals.

This is the worst thing that can happen with such programs, since it makes it impossible to assess the effectiveness of using taxpayers' funds. But even assuming that such programs are properly designed and implemented in a sustainable way, farmers still get the same subsidies in the last resort. That is, the support programs always benefit not only those to whom these programs are primarily directed. Agricultural enterprises are not the only beneficiaries of grants to purchase factors of production. Roughly speaking, subsidies for the acquisition of factors of production require farmers to get more profit. They supplement the "market" income of farmers through the state budget - that is, at the expense of taxpayers.[7]

However, it turns out that not "every hryvnia" from the pockets of taxpayers goes to finance subsidies, in the end, falls to those who are foreseen to them - the agrarians, the rural workers and the population as a whole. Most of this money stays in other pockets. Farmers in Ukraine are buying and not producing most of the factors of production, which leads to the fact that resource providers "intercept" a fairly large part of agricultural subsidies. In fact, the government honestly recognizes that, for example, the program of partial compensation of the cost of agricultural machinery is aimed primarily at supporting the domestic producers of such technology.

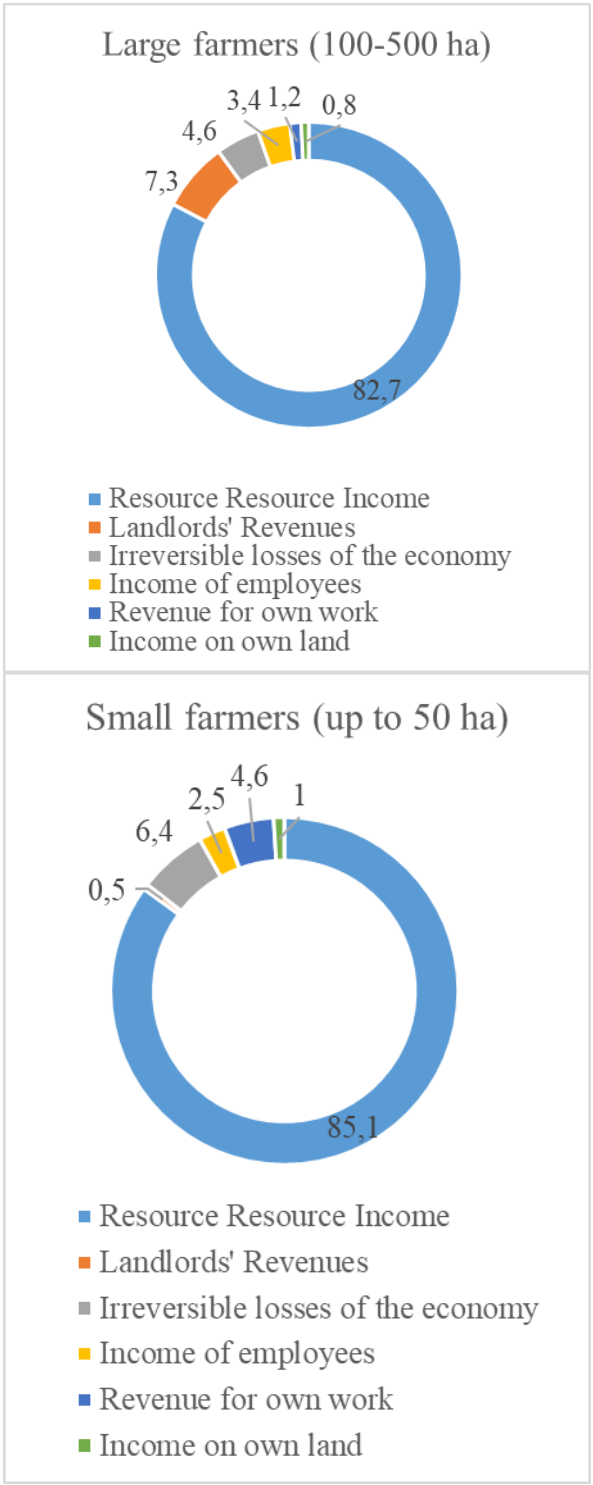
Part of the funds received from the grant goes to the owners of agricultural land, hired by workers and self-employed. This may be a higher rent or wage increase, for example.

In addition, a significant part of the taxpayer's funds, which is intended to support farmers, disappears in the form of irreversible losses due to the inappropriate distribution of factors of production caused by subsidies. For example, in the presence of a program to support the purchase of domestic agricultural machinery, it is likely that farmers, especially small ones, will increase the volume of purchase of agricultural machinery of Ukrainian production (for example, tractors, plows, etc.).

At the same time, native agricultural machinery is usually of worse quality and lower productivity, which leads to loss of productivity of individual farms and the sector as a whole. In the absence of a program of support, this would not happen, since there would be no such tendency by the government to distort the use of poorer quality agricultural equipment.

How grants are distributed among different beneficiaries.

Using the OECD methodology, we have explored how budget subsidies are distributed between different beneficiaries in Ukraine. But unlike the OECD approach, where the data were aggregated at the EU-wide level, we have made separate calculations of the distribution of subsidies between the beneficiaries for the four categories of producers: small farmers (up to 50 hectares), average farmers (50 to 100 hectares), large farmers (100-500 ha) and corporate agricultural enterprises (medium and large).[11]



Figures 2-5. Distribution of subsidies on the main factors of production for agricultural enterprises according to its sizes.

All four groups differ in intensity of use of different types of factors of production. However, the main difference is the share of own land in cultivation. Small farmers handle mostly their own land, while large farms treat mostly leased land.

All four charts show that suppliers of means of production are the main beneficiaries of agrarian support programs, in particular, more than 80% of state budget subsidies are eventually found in their pockets. In other words, from 6.3 billion UAH. of allocated funds, suppliers of production factors receive about 4.8 billion UAH.[3]

The second most important component is the irreversible economic losses that arise due to the sub-optimal allocation of resources caused by subsidies. In particular, 5-6% of the allocated 6.3 billion UAH. (about UAH 300 million) is simply a waste of lost resources of the economy. Landowners are the second group of beneficiaries of grants, especially if they lease land. In general, they receive more than 7% of the total amount of subsidies, that is, the income of this group has increased in total by more than 500 million UAH. Employees receive the least profit, since their increase in income, caused by subsidies on production factors, is from 4 to 7% (depending on the size of the enterprise) on the total amount of subsidies.

By building own system of government support, Ukraine is based on the experience of other countries, which is why I want to consider some of them.

1. USA: From direct subsidies to insurance payments.

Agriculture in the United States has played a key role since the country's founding. For migrants who migrated to new land, mostly from Europe, farming was largely a guarantee of successful development, since food was a guaranteed sale product, and the land owned future prospects. But later this advantage turned into a drawback - the problem of overproduction.

Sometimes, farmers' businesses also suffered from failure of crops, which hit farmers significantly. In order to support the industry that contributed to the emergence of jobs, without giving rise to exaggerated strategic returns to the budget budget, prompting the development of the transport system and other production and services, the American government introduced various types of assistance. Mostly, they were reduced to direct subsidization of farmers.

However, due to the tendencies of monopolization of agribusiness and technology development, the agricultural industry has become less lobby in Congress for years, since it has no longer relied on a large number of family farms. Thus, according to statistics, in 1940 there were 6 million farms in the USA with an average area of 67 hectares. At the end of 1990 there were only about 2.2 million of the area, on average, 190 hectares. In the first decade of the 2000s this tendency was preserved.

In 2014, the usual direct budgetary assistance was replaced at the legislative level by another instrument - risk insurance. It works simply. Farmers do not know what the cost of their crops planted and what the weather will be next season. Owners of livestock farms can not be sure of the prices of their products due to the risk of loss due to adverse weather conditions or livestock diseases. In the event of severe drought, flood and unpredictable market conditions for farmers, less costly partial insurance is provided, but if the risks are lower, the insurance may be higher.[13]

In order to implement such a tool, the American Congress has been looking for compromises for more than three years and subsequently adopted the Agriculture Act 2014. The document approved the allocation for $ 956.4 billion a billion (almost trillion!) For several years to launch a number of programs, including in the trade , Agricultural Research, Renewable Energy and Food Aid. Nevertheless, despite the huge amount of the budget, the Congress noted that the law "provides for the largest reduction in the cost of agriculture in history." The document maintains a trade promotion program, in the form of subsidies to farmers, when prices for basic crops fall below a certain level. However, direct payments have been replaced by insurance. That is, the insurance policy was the main target, and the concept of insurance was expanded to other areas, for example, milk production. In general, American farmers can choose a product support scheme between two major programs. The first is a price-dropping insurance (PLC), which provides for compensation if crop production prices fall below predetermined levels. The second is the Agricultural Risk Insurance (ARC). It provides farmers with payments in case of lower incomes below the national average. To calculate potential payments, farmers at the time of registration provide area and yield data on their farms.[13]

In addition, there are several options for insurance for crop or profits. At the same time, the federal government can subsidize insurance premiums at rates from 38% to 80%, depending on

the level of coverage and options chosen by the producers. Such a high level of subsidies is necessary in order to make products affordable. In general, the law is very complex and prescribes many other options for specific areas of production, such as livestock breeding, or cotton growing.

American financial analysts believe that farmers will increasingly be more interested in risk management, in particular due to the impact of global climate change. At the same time, the programs proposed by the new USA legislation may have a different effect, for example, the willingness of farmers to use more risky crop-specific regions. Nevertheless, developed economies, such as the USA, may well support a high level of agricultural subsidies, while in less developed countries such a scheme may seem too costly.

2. NETHERLANDS: Environmentally friendly and energy-saving is priority.

The Netherlands is the second-largest exporter of agricultural products in the world after the United States. The volume of agricultural exports last year amounted to over 80 billion euros. This is about 18% of the country's total exports. According to some estimates, agriculture accounts for 10% of the country's economy. Most of the Dutch agricultural products are shipped to Germany. Among the major agribusiness partners are Belgium, Great Britain, France and Italy. The main goods exported are flowers and plants, meat, dairy products, vegetables and fruits.

Having achieved a serious position in the world market, the main priorities in agriculture are now called not so much productivity growth as sustainable development, innovation, improved animal retention conditions, the use of renewable energy sources, etc. For example, among the subsidies that farmers can receive, there is a loan guarantee program that the state is ready to take. Small or medium entrepreneurs or, for example, young farmers under the age of 39 may apply for this program. The additional funds that a farmer receives under a guarantee must be spent on clearly defined goals, such as optimizing production, improving product quality or animal retention conditions.

Young farmers may qualify for additional assistance - up to 41 years. According to the Dutch Agency for Enterprise RVO statistics, only 5% of Dutch farmers are under 35 years of age. Therefore, the purpose of this program is to attract more young entrepreneurs to the agricultural sector. These funds can be invested in construction, land, machinery or mobile equipment.[13]

In addition, the state supports farms, which refused to use chemicals and pesticides. In order to ensure the competitiveness of these environmental products, the government, for example, has signed contracts with supermarkets and the Federation of Agro-Industry and Greenhouse Production on the expansion of the distribution of these products. Another objective in agriculture is to increase the use of biomass as a fuel in farms. So, by 2030 it is planned to replace 30% of oil products with "green energy". Therefore, scientific research in this area is supported.[13]

3. FRANCE: To protect farmers, tractors have reached Paris.

Agriculture is the most widespread state industry, although its foundation is private land tenure. The number of farmers and private agricultural enterprises in France is almost 1 million. In terms of output France occupies the 1st place in Western Europe and the third largest in the world. France annually exports more than 40 billion euros worth of agricultural products. The industry employs about 7% of the able-bodied population.[13]

A significant influence on the agrarian policy of the state is provided by a well-developed network of trade unions that take care of farmers' working conditions and lives, as well as the preservation of a "minimum income", even in the event of poor crop or natural disasters. The tax system is also of particular importance: the calculation of the amount of taxable income is based on the data of the land cadastre, average indicators of the cost of production, production costs, crop yields and livestock productivity.

In support of farmers it costs an average of up to 40 billion euros per year. Credit Agricole Bank plays the central role in the credit system of agriculture. The mechanism of action of preferential loans for agriculture is based on the principle of state repayment by the bank of the difference between the contractual interest rate and the rate of preferential loan granted to the farmer.
French farmers are also supported by the European Union through the Common Agricultural Policy (ECHP). France receives about 17% of the total budget. On average, one farm receives about 12 thousand euros of subsidies per year. In addition, the French farmers have benefits for credit. For the purchase of new agricultural machinery, they can raise funds under 3-4% per annum, for the purchase of land - about 7% per annum.[13]
Despite this, the level of dissatisfaction is increasing. During the last year, a wave of protests swept across the country. Farmers were marching on agricultural machinery to the capital, blocking roads, breaking into the center and demanding support from the state, in particular, raising milk and meat procurement prices.
Has acted: the government has promised to the herders additional financial aid in the amount of 290 million euros. In addition, French agriculture minister Stefan Le Hall stated that 500 million euros would be allocated for cash loans. Announced financial assistance will be complementary to the initial plan, which the French authorities introduced in September 2015. The plan is designed for 3 years and includes tax refunds and investment support, financed jointly by the European Union and the French regions. The total amount of support is 300 billion euros.
There is an indicator of agricultural producer support assessment (PSE) and it is used to determine the level of subsidization or tax on producers, that is, it characterizes the monetary value of the gross redistribution of resources from consumers and taxpayers to support agricultural producers as a result of the implementation of state policy. PSE is calculated by comparing the manufacturer's prices near the "farm gate" with the world prices translated into the national currency.
The positive value between prices shows the support of the manufacturer, the negative about his taxation. According to the OECD, state support of producers in Ukraine has been negative in recent years. In 2015, it slightly increased, but it still remains negative. One of the reasons for this is the taxation of the agricultural sector and the preferential treatment of import taxation. For comparison, in the countries of the European Union, the level of producer support in 2015 was 18.9%, and on average in the OECD countries - 17.1%, while there is a steady tendency to reduce such support.[11]

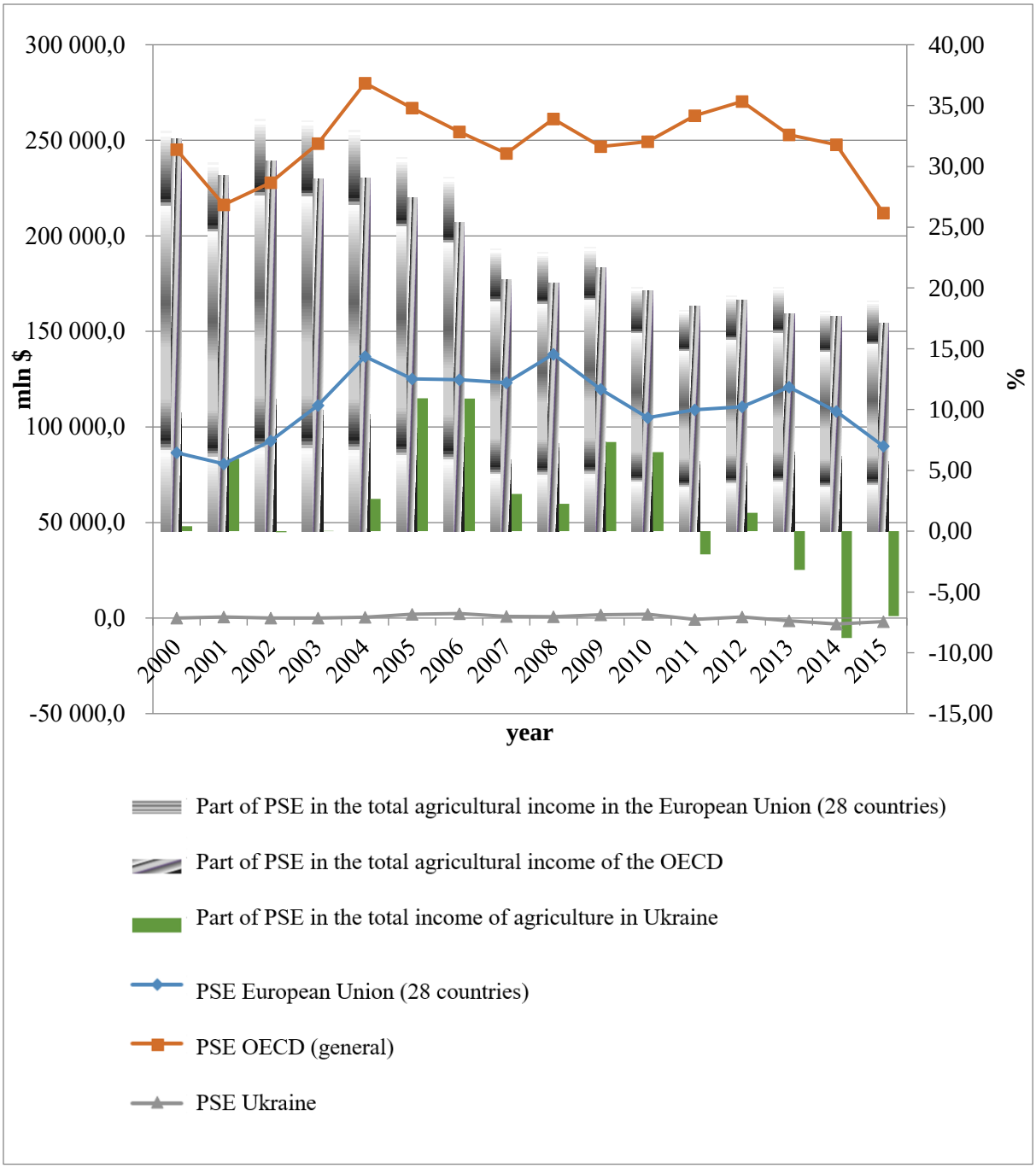


Figure 6. The dynamics of support for agricultural producers (PSE)

CONCLUSIONS

Today, the state of agriculture requires a more radical transition to the path of integration processes in the economy, and it is clear that the agro-industrial complex which is currently not in the best position can not bypass the party. Given the current trends that are practiced in European countries, we must clearly outline a position that we would prefer to take for a rapid exit from the crisis and gaining an industry of competitive status. From the above analysis, several conclusions can be drawn.

Recently, attention has been insufficiently given to supporting the development of farms, and given the fact that this is one of the most vulnerable actors in the agrarian sector, obligatory immediate assistance from the government is required for the weakest market participants

From the above analysis, several conclusions can be drawn.
First, rather chaotic agricultural support programs are in any case unlikely to be useful to farmers, with the exception, perhaps, of a small group of individual wealthy and well-connected agricultural enterprises. To be an effective tool, support programs must be stable and operate for a long time (3-5 years) so that farmers can plan their activities with state support.
Secondly, the biggest problem with the current policy of government support lies in the fact that it lacks an open, professional discussion based on facts and research.
There are no well-defined and well-founded goals, and therefore it is impossible to evaluate the effectiveness of the programs. Usually increasing productivity and competitiveness of the industry should be the ultimate goal of the policy of state support - these are the goals that stimulate the growth of agriculture.
In this case, subsidies on means of production are not a good tool.WTO (World Trade Organization) and applied research show that measures to support production and trade that do not distort the market (for example, research, education, roads and other types of infrastructure, sanitary and phytosanitary measures, etc.) bring much more benefits to the industry and to the economy as a whole.
Thirdly, it follows from the first and second conclusions that at present the money of taxpayers who are going to finance subsidies to farmers is wasted. Assuming that proper development and sustainable implementation of such programs will be available, farmers will remain the smallest beneficiaries.
Fourthly, all current agribusiness support programs reduce the cost of production factors. That is, the final beneficiaries of these programs are mainly suppliers of means of production, which receive more than 80% of the total state support (or UAH 4.8 billion). From 5% to 6% of the resource, the programs are spent "nowhere" and irrevocably, and farmers and peasants get the least benefit.
Understanding of the problems and prospects of the agrarian industry development in the majority of politicians and citizens is superficial, clogged with stamps, imposed by people who have never treated agricultural production as their own vital affairs. On the 25th anniversary of independence, we must state: the vision of the development of the agrarian sector has not been formed in our elites. It seems all agrarian discourse is reduced to the issue of lifting the moratorium on land sales. At the same time, we have no answers to many questions.

REFERENCES

1. Demyanenko, S. and V. Galushko (2004). Shifting Agricultural Policy Towards Measures Envisaged by the Green Box. In S. von Cramon-Taubadel, S. Demyanenko, and A. Kuhn (eds). Ukrainian Agriculture. Crisis and Recovery. Shaker Verlag.Aechen.
2. Economic assessment of the budget and tax component of the financial and economic mechanism (PhD in Economics I. Dolzhenko)
3. Efficiency estimation of budget and tax support for agricultural production in ukraine Inna Dolzhenko, Associate Professor of the Department of Finance, PhD in Economics.
4. Fiscal support of agriculture in ukraine Inna Dolzhenko, PhD, Assosiate Professor.
5. Grants to farmers - pay those who can not afford to pay ?! Tetyana Ostrykova, deputy Faction "Self-help"
6. Improvement of the mechanism of fiscal and tax regulation of the agrarian sector development (PhD in Economics I. Dolzhenko)
7. Influence of Tax Benefits to Agricultural Enterprises on Sector Productivity, Nivievsky, O. (2016). an article on VoxUkraine.

8. Koretsky M.H. Strategic management / M.X. Koretsky, A.O. Degtyar OI Dations - K.: ZUL, 2007. - 240 p.
9. Law of ukraine About development and goverbment support of small and medium enterprises in Ukraine http://zakon.rada.gov.ua/laws/show/4618-17
10. Ministry of Agrarian Policy http://minagro.gov.ua/support_apk?nid=25548
11. OECD (2002), “The Incidence and Income Transfer Efficiency of Farm Support Measures”, AGR/CA/APM(2001)24/FINAL, OECD Publishing, Paris.
12. Pavlyk V. P. (2007), “Otsinka sil's'kohospodars'koho vyrobnytstva za sobivartistiu i zatratamy pratsi”, Ekonomika APK, -vol. pp. 67 -- 72.
13. World models of agricultural support. Oleg Nivievsky, lecturer at the Kyiv School of Economics Roman Noether, Coordinator of the Monitoring of Parliamentary Committees.

IMPACT OF PERCEIVED DIFFERENCE AND PERCEIVED QUALITY ON CONSUMER LOYALTY TO THE BRAND

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ABSTRACT

The study aimed to measure the impact of both perceived quality and perceived difference in the level of consumer loyalty for the brand.
It also aimed to study Syrian consumer behavior towards sportswear brands, and look for the situations where they are willing to pay a higher price or wait and do more efforts to get it.
The impact of these variables was measured by the distribution of a statistical form to the students of the Al - Qalamoun University and analyze the data by using SPSS.
The study concluded that there is a significant impact of the perceived difference that the brand creates in the consumer's mind in its loyalty For this brand.
Consumer awareness of quality also increases its loyalty significantly, However, the role of these two variables is significantly increased as a result of their interaction with each other.
In particular the effect of the perceived difference that increases the perceived quality impact by up to 75% the results also showed that the consumer is willing to pay a higher price in many cases, especially against the characteristics that characterize the brand.
Whether through distinctive and famous selling places or the unique style of the product or quality Or convenience, while he will not be willing to pay a higher price only if this brand is not available. He will be ready to switch to other brands without waiting.

Keywords: *brand, perceived difference, uniqueness, brand personality, quality perceived, brand loyalty*

THE PROBLEM

The openness of the markets and the ease of entry of competitors is the biggest challenge facing any company in Syria. Which puts the consumer in front of a large number of options that create a real difficulty when making a purchase decision.
But the biggest problem and challenge facing companies is keeping these consumers and create loyalty to them and this represents the main problem dealt with in the study.
The problem of research is thus summarized in the following questions:

1. How can we create loyalty to the consumer?
2. Does the difference the consumer perceives for different brands affect the level of loyalty to each one?
3. Does the perceived quality affect the level of loyalty to the brand.

RESEARCH METHODOLOGY

Use the descriptive, analytical approach by going back to several previous studies in order to construct theoretical side and devise the proposed model for the study, and then uses a statistical form to measure Variables using quantitative and descriptive statistical methods such as correlation analysis and path analysis.

VARIABLES AND ASSUMPTIONS

As can be seen from the importance of research, the study distanced itself from traditional variables and methods such as discounts price and loyalty program. Focused on the brand through two dimensions is the perceived quality of these the difference and the difference, and the following figure illustrates these variables and their effect on loyalty.

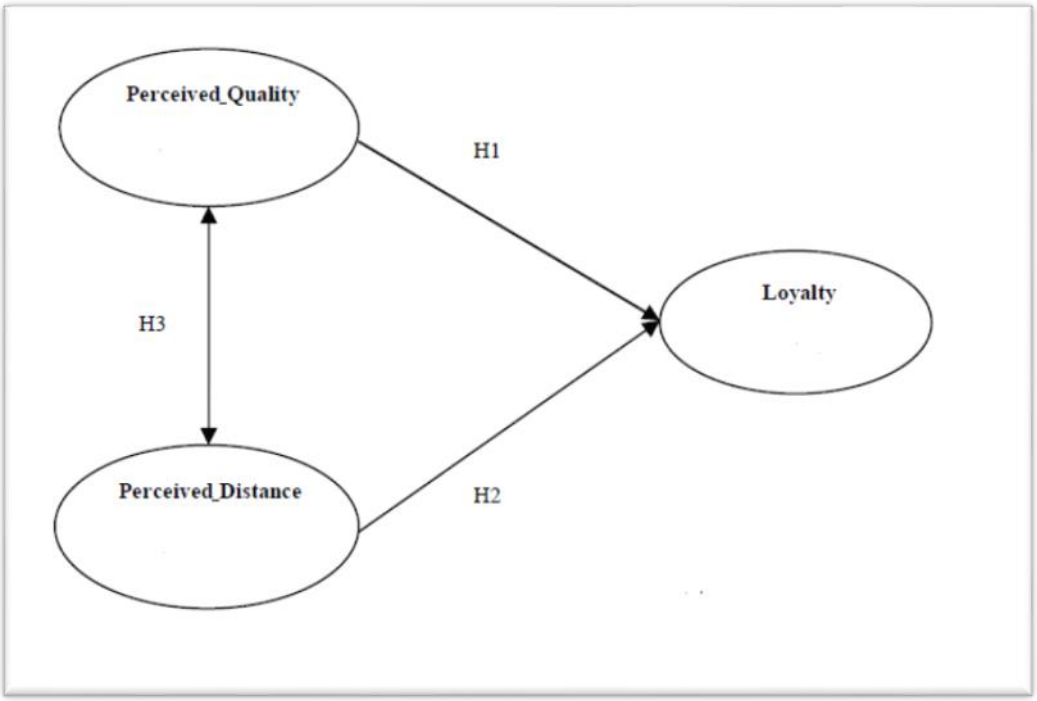

Figure 1. Proposed model

STUDY HYPOTHESES

H1: There is a significant effect on the perceived quality of the brand on the level of loyalty to this brand
H2: There is a significant effect of the difference the consumer perceives to the brand in the level of loyalty to the mark.
H3: There is a reciprocal effect of each of the previous variables that increases their level of loyalty
If the tag.

THEORETICAL FRAMEWORK

An introduction

The brand is a guide to the consumer's buying decision, and a tool used by many companies to build strong, distinctive and long relationships with customers, but this relationship will not acquire those qualities unless they provide unique characteristics and a high degree of quality that the consumer perceives differently from the brands. Competition and make it not think of turning to any alternative sign.

FIRST: DISTANCE PERCEIVED

The consumer will purchase the mark that is distinguished from his / her point of view from the other marks to continue to purchase products bearing this brand as long as they maintain the difference and comparative advantage with competitive marks.
People who are responsible for creating the image of the mark in the consumer mind are interested in finding points of difference represents the set of benefits that differentiate the mark from the competing marks. Maytag Tool Manufacturing household with reliability, Tide powder with bleaching ability, BMW with concentric control 1 these differences are what the consumer remembers about the mark[1].
The formation of a brand includes the establishment of key brand linkages in the consumer mind, and a number of constituents tasks in order to distinguish them and give them a competitive advantage[2].
Brand recognition has become one of the most important techniques in this harsh competitive environment, and it is personal one of the solutions available to provide differentiation to the mark is to associate the mark with a unique personality that contributes to differentiation mark and give it an identity of its own make it desirable by the consumer[3].

Personality Brand

"Brand is a passionate thing that has a personality, and captures the minds of its consumers and hearts[4]"

Uniqueness

Defining uniqueness is the degree to which the consumer feels that the mark is different from the competing mark, how much they are distinct compared to competitors. If the mark is not perceived as distinct from the competing markings, it will be difficult to put a higher price than competitors.Vedda tag is the primary engine its moral value from the point of view of the consumer. The uniqueness of the tag can be expressed through advertising or through the direct experience of the brand.
The perceived difference that drives the consumer to buy and maintain loyalty. Certainly not the success of new brands, which has nothing to distinguish them from, has nothing to do for consumers to buy, new labels must have what they distinguish to be preferred by customers. This can be achieved. Distinguished differentiation through the characteristics of the product or the construction of the image of the mark through advertisements.

Mechanism of recognizing the difference

Well-positioned brands occupy a space in the consumer's mind especially from his mind. It is similar to and different from competing brands. And most tags success is constantly seeking to maintain a number of similarities with the parity of points in the context of the points by which competitors seek to build differentiation through them, as well as building points of difference differentiation of paint to achieve a superior advantage over competitors[5.]

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[1] Keller L. Kevin, et al (2002). Three Questions You Need to Ask About Your Brand, Harvard Business Review, September, P. 3.

[2] 2 Keller K. L. & Lehmann D. R. (2006), OP.CIT, pp. 740-759

[3] 3 Bejoy J. T. & Sekar P. C. (2008), Measurement and Validity of Jennifer Aaker's Brand Personality Scale for Colgate Brand, VIKALPA (July – September), VOL 33, NO 3, p 49.

[4] Kotler. P. & Pfoertsch. W. (2006), B2B Brand Management, Springer Berlin . Heidelberg, P 4.

[5] 11 Boyle, Emily (2007) OP.CIT , pp. 122–131

Consumption and its relationship to the perceived difference

One of the basic concepts in consumer behavior is that the consumer does not purchase the building products what this product does, but based on what this product means to the consumer[6].

SECOND: QUALITY PERCEIVED

The perceived quality is one of the intangible dimensions of the brand, and it creates a brand image high quality targets each manager. Because the company needs to satisfy the needs of its consumers and meet the promises that made through its brand. It is a challenge that companies must.
cooperate and work effectively with other departments and business partners. Several studies have.
indicated the impact of perceived quality in returns the company, so the development of quality awareness through marketing activities is another challenge for the managers of the brand business[7].
The concept of perceived quality has attracted the attention of many researchers because they believe it has an important impact on performance catalog. The belief that high quality recognition leads to repeat procurement is the pillar basic to any business. It is therefore necessary to understand the relationship between the perceived quality and level of satisfaction. Finally, you decide to buy and repeat this purchase, as this may help develop a new model for decision-making, and provides practitioners with marketing activities with indicators that help deepen their concerns marketing and management of scarce resources.

Quality dimensions

If quality is a multi-dimensional concept, it is not easy to find one or measure it. So it is the distinction is usually between Quality, Quality, Quality Perceived, Quality the actual refers to the technological differentiation in the product that can be defined and measured, while the perceived quality refers to the consumer's judgment on the overall differentiation of the product, and therefore differs from actual quality it is believed that the high perceived quality that leads the consumer to repurchase is the cornerstone[8] the perceived quality adds value to the brand in several ways: it is the cause of any company, to purchase, excellence, access to price premiums, increase the attention of distribution channels, the expansion of the mark. The mark must maintain its consistency and quality, and focus on consistency as a component[9].
A basic component of quality, when talking about the intention of repurchase and loyalty, the mark should mean the consumer has consistently in specifications and quality. But how companies achieve continued excellence and consistency at same time?
The Company shall maintain the intrinsic characteristics of the mark and strive to achieve excellence through other characteristics. For example, the German star-G, when manufacturing jeans, mixes yarns from a variety of cotton types to maintain color, since there is a large number of gradients colors, they blend to maintain quality, stability over time. At the same time you do The company achieves excellence through modern designs and new ideas.

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6 Solomon M. R (2007), Consumer Behavior: Buying, Having and Being 7th ED, Prentice Hall, International, Inc., p 14.

7 13 Annie Peng Cui (2008), OP.CIT, p9

8 Netemeyer Richard G. (2004), Developing and validating measures of facets of customer-based brand equity, Journal of Business Research, Vol. 57, pp. 209– 224,

9 Rodoula Tsiotsou, (2005), IBID, pp 1-10.

THIRD: LOYALTY BRAND

Brand loyalty concept

Long term loyalty is an old term and is defined as a deep commitment by the consumer to do or purchase the product favorite service frequently in the future. And first appeared in marketing through the term loyalty for the brand. But is it really possible for people to have loyalty to the brand? Will you the housewife goes to another store to buy a product if she does not
find it in the store where a mother is going will they buy another product?[10].
The brand can build an amazing level of loyalty, and then companies should not neglect this is the value of the mark; on the contrary, many of them do not have a strong mark working on to dispose of their traditional methods and adopt new methods of obtaining such loyalty[11].
One of the activities that ensures benefit from loyalty to the organization is ensuring long-term performance to the organization, product development and focus on the consumer, as well as confirm the repeat purchase process, increase the rate maintaining the customer, as well as shortening the purchasing cycle of the consumer, and reinforcing their experiences. All that will make the organization is able to respond to customer needs, distinguish its products and services from competitors and build loyalty long-lasting and maintain[12].
True loyalty results from the quality of the relationship between the company and the consumer. And if people are involved direct in this relationship there is a fundamental role in the behavior of these individuals in building loyalty, but in case absence of individuals the brand is the principal and effective representative of this relationship that leads to loyalty.

Brand loyalty dimensions

Strongness arises between the consumer and the company. The concept of brand loyalty may be seen as a concept asimple measure is measured by the consumer's repurchase process, but researchers look at it when they see it from the perspective of consumer behavior. In Cognitive Learning Theory Theorists A distinction was made between consumer loyalty that reflects his confidence and intention to buy back as a result of his belief in the product, and the fake loyalty of the trademark resulting from repeated purchases because of the unavailability of an alternative in the stores. Called this theory to measure loyalty to the brand through attitude trends is not just through intensity of the purchase process. In other words, this theory divides loyalty into two main dimensions: behavioral loyalty loyalty behavioral, which includes the behavioral dimensions of the purchase, including frequent buying behavior and the continuation of this behavior, the other section is based on trends Loyalty Attitudinal and includes the commitment
towards a specific mark and intention to repurchase[13].
The process of repurchasing a brand is influenced by the strong perception of brand variants named loyalty to the mark. The perceived difference of the mark was expressed by the sensitivity of the mark, which is marked between false loyalty and true allegiance.

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[10] Kotler Philip (2003), OP.CIT, p. 97

[11] Cheverton Peter (2002), How Come Your Brand isn't Working Hard Enough? The Essential Guide to Brand Managment, Kogan Page, pp. 35-37.

[12] Erdener Kaynak, et al (2008), An Integrative Framework Linking Brand Association and Brand Loyalty in Professional Sport, Brand Management (May), VOL 15, NO. 5, pp. 336-357.

[13] Russell-Bennett Rebekah, et al (2007), Involvement, satisfaction, and brand loyalty in a small business services setting, Journal of Business Research, Vol. 60, pp. 1253–1260.

Building on the above, four types of consumers can be identified by degree of loyalty as illustrated by the figure the following:

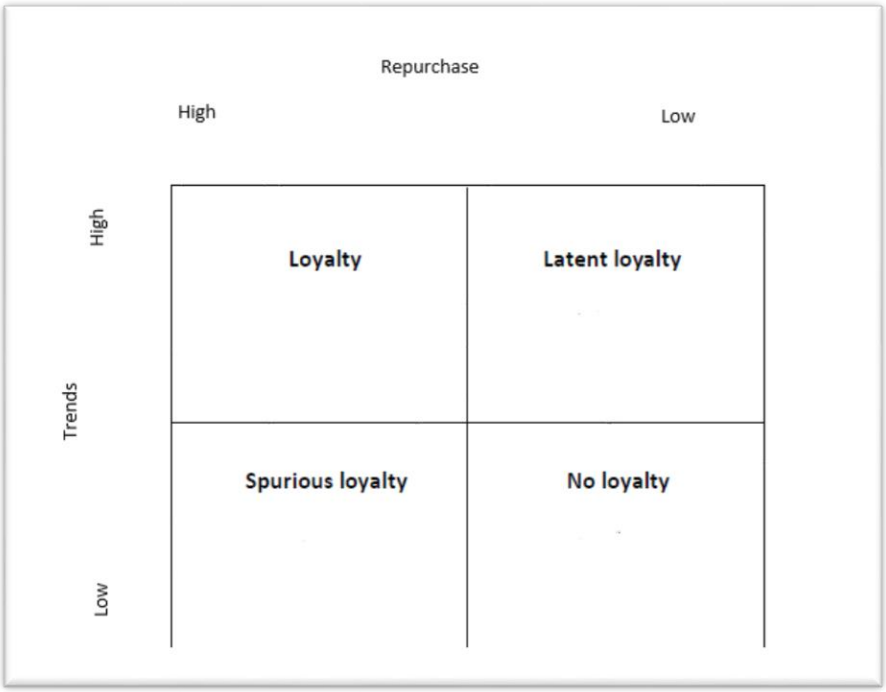

Figure (2) Proposed model

- Loyal loyalty: The consumer has high trends, but does not repeat purchases, and may be the reason the lack of availability of the product, the weakness of purchasing power of the consumer, or the fact that the product is not is a basic need for the consumer.
- True loyalty: the consumer has strong attitudes towards the mark translated by doing frequent purchases.
- Fails Loyalty: The consumer has little inclination toward the mark, but nevertheless purchases the product this process is repeated, and this may be due to the limited number of alternatives available to the consumer that are once there so that the consumer turns to the use of the mark.
- Non-loyalty: when the consumer is not inclined to the mark, and as a result does not offer to buy them, and the reasons are exaggerated behind this negative bias towards the mark is its perceived low or weak communication marketing.

Evidence suggests that loyal consumers have a strong commitment to the brand, or services, or retail stores, and show strong resistance to the attempts of persuasive competitors.

Loyalty levels

Researchers rated four levels or stages of loyalty to the company or product:

a. Cognitive loyalty: It refers to loyalty based on beliefs, loyalty in these: The stage goes towards the mark because of the level of performance and characteristics. This stage expresses beliefs consumer related to brand quality.

b. Affective Loyalty: It indicates the consumer's level of preference for the mark. The level of pleasure and love of the experience of the sign. The more love and the recognition that the mark and provide the required experience increased the loyalty of the customer.

c. Voluntary loyalty: refers to a deeper level of commitment, expressed with the level of commitment shown by the consumer to continue using the mark in the future. It is also linked to the desire to overcome obstacles even if competitors offer better prices or value.
d. Practical or behavioral loyalty: The level at which the consumer turns from intention to actual use, expressed through the level of the consumer using the brand, and how much money and time is spent on this mark compared to other brands.

Building loyalty to the brand

Building customer loyalty is not easy, because loyalty can not be strong as long as the consumer does not it can resist the offers of competitors that show higher value and provide all that the consumer needs, but exceed needs. Therefore, the power of the mark comes from the impact it leaves in the mind of the consumer, if the consumer recognizes the brand is well aware, and has positive links with it, it will add value to the experiences of the consumer and experiments with this tag. A strong brand is likely to give value to the company is a reduction the possibility of the consumer to replace them and continue to purchase them.[14]

PRACTICAL SIDE

The study was conducted through the use of a questionnaire distributed to 310 students from the University of Kalamoun two stages. The first 30 randomized forms were distributed to test the questionnaire, and were retrieved all questionnaires were dealt with and some concepts that were difficult to understand by the views and benefit were addressed of their suggestions. Thus, 280 questionnaires were randomly distributed to students and 211 were recovered.
The study included sports apparel products for a range of brands (Reebok, Nike, Adidas, Jordan, Converse, Sketchers, Tommy, Diadora Puma) the questionnaire contained several parts. The first contained a number of questions about the research sample such as age and sex income and the province to which he belongs. The average age of the sample ranged from 20 to 22 years the questionnaire contained several parts. The first contained a number of questions about the research sample such as age and sex income and the province to which he belongs. The average age of the sample ranged from 20 to 22 years the percentage of males 68% versus 31% of females, and 1% did not answer the question. While it was average the monthly expenditure of the sample is about 13000 SP. The geographical distribution of the governors of the sample members was the largest number of people from Damascus is about 25%, while 20% of Homs. And 17% of Aleppo, the rest of the sample is distributed to the rest of the Syrian governors. The frequency of purchase was among sample members for sportswear is once every three months by 32% of respondents, while about 20% they buy every six months, and 14% make purchases every month. The second part of the questionnaire was to measure the variables of research and hypothesis testing. While the third part included some scenarios seeking to find out how willing the respondents are to pay a higher price for the mark wWaiting for them if they are not available.

STABILITY SCALE

Use the Kronbach alpha to test the stability of the measuring instrument, which is a questionnaire that used 12 questions to measure variables as shown in the following table:

[14] Robinson Camille, et al (2005), OP.CIT, p 594.

Case Processing Summary

%	N		
100.0	211	Valid	Cases
.0	0	Excluded[a]	
100.0	211	Total	

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics 1

N of Items	Cronbach's Alpha
12	.790

Reliability Statistics 2

Brand Loyalty		Perceived Quality		Perceived Distance	
N of Items	Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items	Cronbach's Alpha
3	0.745	3	0.715	6	.810

Note from the table that the values of the Cronbach alpha factor are greater than 7.0, which in turn is a good indicator of stability measuring tool.

TESTING HYPOTHESES

- The first hypothesis: Since the value of T = 419.2 is greater than 96.1 then the hypothesis is acceptable is significant because the value of Sig = 016.0 is smaller than 05.0, the change in perceived quality by unit one will increase the level of loyalty by 206.0.
- The second hypothesis: From the table, we note that the value of T = 13.4 and is greater than 9.1, as well as sign = 00.0 ore smaller than 05.0 if the hypothesis is acceptable at a 95% significance level and therefore the difference in the perceived difference by one unit will increase the level of consumer loyalty by 42.0 expressed by the value of β

Coefficients[a]

Sig.	t	Standardized Coefficients	Unstandardized Coefficients		Model
		Beta	Std. Error	B	
.068	1.834		.533	.977	(Constant) 1
.000	4.131	.292	.102	.420	Distnace
.016	2.419	.171	.085	.206	Quality

a. Dependent Variable: Loyalty

- The third hypothesis will be tested using the path analysis method. By comparing the direct effects and the indirect effects of the interaction of independent variables.

For the observed difference, its direct effect is β = 420.0 while the indirect effect is the result with the intermediate effect of perceived quality equal to (206) * (524 =). 107 Thus, the total

direct effect is the indirect is β (= 420.0) + (107.0 = 527.0) meaning that the ratio of the effect added by the perception the quality of the perceived teams is about 254.0, is the effect of the perceived difference in loyalty level consumer increased by 25% under the impact of perceived quality of the mark.

Coefficients[a]

Sig.	t	Standardized Coefficients	Unstandardized Coefficients		Model	
		Beta	Std. Error	B		
.000	7.734		.381	2.950	(Constant)	1
.000	7.060	.439	.074	.524	Distnace	

a. Dependent Variable: Quality

For the perceived quality, the direct effect on loyalty was β = 206.0 while the effect was an indirect result of the median effect of the perceived difference = (367.0) * (420.0 = 154.0).
The total direct and indirect impact of perceived quality is β (= 206.0) + (154.0 = 360.0) the effect of the perceived difference in perceived quality effect is about 747.0, IE the impact of perceived quality at the level of loyalty to the mark increased by about 75% under the influence of the perceived difference.

Coefficients[a]

Sig.	t	Standardized Coefficients	Unstandardized Coefficients		Model	
		Beta	Std. Error	B		
.000	10.046		.297	2.987	(Constant)	1
.000	7.060	.439	.052	.367	Quality	

a. Dependent Variable: Distnace

CONSUMER PREPARATIONS

Scenario 1: This variable measures the level of consumer loyalty to the brand and its commitment to purchase it whether or not they are available, by asking him whether he will buy another brand if the mark is looking for them is not available, or will he wait until he gets the brand?
The results were That a large proportion of consumers amounted to 50.24% will turn to buy a mark if not available, while 32.70% will wait until they get the brand, while 17% were unsure of their position and declined to answer.
Scenario 2: aimed to find out how much the consumer has been asked to pay for the price from another place if not available to measure the value of this brand and the extent of consumer loyalty to it. The results in this scenario showed a decrease in the moral value of the brand and in consumer loyalty.
About 56% of consumers will switch to buying other brands if they are not available, only 31% of consumers were willing to pay a premium for the brand if they were not available.
(The rest of the consumers were not sure of their position and did not answer the question explains the answers to this question.
Scenario 3: Shows how far the consumer compares the suitability of the brand to the price he wants and the degree of importance of the characteristics of this brand to him, and then measure the moral value For this tag compared to other brands.

The results shown in the previous figure showed that nearly 60% of consumers are willing to pay a price top of the brand that suits them even more. While 27% will buy another less appropriate and relevant brand lower Price. The rest of the sample did not answer this question.
Scenario 4: The extent to which the perceived quality of the brand affects the creation of a significant value in the consumer, is he willing to pay a higher price for it or not?
About 64% of consumers were willing to pay a higher price for the quality brand, compared to 25% who preferred to buy other brands of acceptable quality at a lower price. While 10% abstained the answer.
Scenario 5: Is branding and uniqueness a major reason for buying and paying a higher price?
Increases the value of the mark. This is illustrated by the figure below, where 60% of consumers will pay and 25% preferred to buy a standard brand for others to imitate them but at a lower price. While 14% refused to answer this question.
Scenario 6: The fame and reputation of the mark has had a significant impact on moral value when the consumer, it is the most factors that drive the consumer to buy the brand and pay a higher price. So 70% of consumers were willing to pay a higher price for the famous brand sold in most stores. While 16% of consumers preferred to buy a less famous brand at a lower price. About 14% did not answer this question.

Results:

1. The study showed a high impact of the perceived difference in consumer loyalty to the brand, that is the distinctive image created by the mark in the mind of the consumer has a significant and moral influence in the composition consumer trends and loyalty creation.
2. The consumer's perception of the quality of the mark also affects the consumer's loyalty to the mark.
3. There is a mutual and indirect impact of both perceived quality and perceived difference in consumer loyalty to the brand:
    a. The perceived quality effect of consumer loyalty to the mark increased by approximately 75% under the influence of the difference is perceived as an intermediate variable.
    b. The impact of perceived difference in consumer loyalty to the brand increased by approximately 25% effect of perceived quality as an intermediate variable.
4. 50% of consumers are not ready to wait if the mark is not available and they will by purchasing another available mark. While 32% will wait, while the rest will not.
5. 56% of consumers will not pay any fee to obtain the mark from another place if they do not provided. And that they would buy another mark. Only 31% will pay more to get about the mark from another place.
6. 60% of consumers will pay a higher price for the brand that suits them perfectly. And that 64% they will pay a higher price for the excellent quality mark. While nearly 60% will pay a higher price for a distinctive and unique mark. And about 70% will pay a higher price to get famous brand sold in most business centers.
7. About 80% of consumers will tell others about positive things associated with the mark about 73% will advise friends regarding the mark.

Recommendations:

1. Focusing on creating a distinctive image in the consumer mind about the mark increases its awareness of the difference between mark and competition levels.
2. Focus on delivering unique and distinctive quality that increases consumer awareness and loyalty to the brand.

3. Provide products well because non-availability reduces consumer loyalty to the mark and drives them to search for alternative signs.
4. In addition to providing the mark, companies must select their shops in a distinctive manner.

REFERENCES

1. Annie Peng Cui (2008), Understanding Brand Managers' Intangible Capital and Capability, a dissertation submitted to the Kent State University Graduate School of Management In partial fulfillment of the requirements for the degree of Doctor of Philosophy Summer.
2. Anselmsson Johan, et al (2006), A conceptual framework for understanding Customer-based brand equity and price premium in grocery categories, Lund Institute of Economic Research, VOL. 4, pp. 4-5.
3. Bejoy J. T. & Sekar P. C. (2008), Measurement and Validity of Jennifer Aaker's Brand Personality Scale for Colgate Brand, VIKALPA (July – September), VOL 33, NO 3, p 49.
4. Kotler Philip (2003), Marketing Insight form A to Z, 80 concept every manager need to know, John Wiley & Sons, Inc., Hoboken, New Jersey.
5. Roy S. K. et al (2009), Examining the Effects of the Customer Loyalty States on the Word of Mouth, Pacific Asia Conference on Information Systems.
6. Russell-Bennett Rebekah, et al (2007), Involvement, satisfaction, and brand loyalty in a small business services setting, Journal of Business Research, Vol. 60, pp. 1253–1260.
7. Schiffman L. G. (1997), Leslie Lazar Kanuk, Consumer Behavior, 6th Ed, Prentice Hall, International, Inc.
8. Solomon M. R (2007), Consumer Behavior: Buying, Having and Being 7th ED, Prentice Hall, International, Inc., p 14.
9. Tang Xiao-fei, et al (2006), An Empirical Study on the Effects of Win-back Strategy on Company Performances in China Market, International Journal of Business and Management (October), Vol. 1, No.5, pp. 68 -73.
10. Tong Xiao (2006), Creation of Brand Equity in the Chinese Clothing Market, A Dissertation Presented to the Faculty of the Graduate School University of Missouri-Columbia In Partial Fulfillment of the Requirement for the Degree Doctor of Philosophy, p 28.
11. Cheverton Peter (2002), OP.CIT, pp 35-37.
12. Russell-Bennett Rebekah, et al (2007), Involvement, satisfaction, and brand loyalty in a small business services setting, Journal of Business Research, Vol. 60, pp. 1253–1260.
13. Jooyoung Kim , et al (2008), Antecedents of True Brand Loyalty, Journal of Advertising, VOL. 37, NO. 2, Pp. 99-117.
14. Schiffman L. G. (1997), Leslie Lazar Kanuk, Consumer Behavior, 6th Ed, Prentice Hall, International, Inc, P.222.
15. Robinson Camille, et al (2005), OP.CIT, p 594.

AGRONOMIC CHARACTERIZATION AND EVALUATION OF TWENTY GROUNDNUT LINES INTRODUCED FROM TEXAS A & M (USA) AT THE SAME'S AGRONOMIC RESEARCH STATION IN KAYES/MALI

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ABSTRACT

The economy of West Africa is dominated by the agricultural sector. In 2003, this sector contributed 16.9% to Senegal, 36.3% to Mali and 37.4% to Nigeria (FAO, 2006).
Groundnut remains one of the main legumes in West Africa and particularly in Mali. The global scale corresponds to a total production of 37.1 million metric tons and an average of 1.4 tons per hectare (FAO, 2003 by NTARE et al., 2008). The groundnut varieties grown are pure lines. Any variety has characteristics that distinguish it from others. Knowledge of a variety requires the prior establishment of his identity card. This identity card describes in detail the morphological, agro-physiological characters and the genetic profile before its registration in the national catalog of varieties. This study, entitled Agronomic Characterization and Evaluation of Twenty Groundnut Lines Introduced from Texas A&M (USA) at the Same's Agronomic Research Station in Kayes/Mali, fits perfectly into this framework.
The experimental device used was that of the incomplete square lattice (alpha design). The test consisted of two repetitions. Each elementary plot consisted of 4 lines of 3 m with 0.5 m between the lines, inter hole was 0.15 m. Two groups of observation parameters (pre and post-harvest) were measured to identify the characteristics of the different lines in competition and to evaluate the best performing lines for future improvement work. The results obtained show that the lines had an average germination rate of 96.10%. In view of the results obtained, we plan to renew the lines of the American collection in order to improve and select the most adapted lines in the agro-ecological conditions of Mali.

Keywords: *Groundnut, lineages, characterization, agronomic assessment, Texas A&M (USA), Same's Station, Mali*

INTRODUCTION

The economy of West Africa is dominated by the agricultural sector. In 2003, this sector contributed 16.9% to Senegal, 36.3% to Mali and 37.4% to Nigeria (FAO, 2006).
Groundnut is grown in West Africa on more than 2,773,333 ha with an estimated total production of 2 690 000 tons and an average yield of 971 kg/ha (FAO, 2006).
It is grown in all agricultural areas of Mali. Groundnuts play an important role in the country's agricultural system. The **Kayes** region is the main production area for groundnuts (56,000 tons in 1996). For the same year, its production was 32,000 tons in **Sikasso** and **Koulikoro** and 17,000 tons in Mopti. Groundnuts are widely used in both food and feed (KODIO et *al*., 2006). Groundnut is the sixth most important oilseed crop in the world (NTARE et *al*., 2008). This oilseed is appreciated for its nutritional qualities and lends itself to many food uses. Its seed, both rich in oil (50%) and protein (25%), its stability and its good heat behavior, is widely used in different countries (SCHILLING, 2003). More than 100 countries around the world grow

groundnuts. Groundnut yields are very low in West Africa, below the world average of 1,386 kg/ha and yield in China of 2,922 kg/ha (NDJEUNGA et *al*. 2002).
The importance of crop yield losses due to biotic and abiotic stresses is not new in West Africa. Parasitic insects and diseases caused by mushrooms, bacteria, viruses, mycoplasmas, nematodes, and parasitic plants cause considerable economic losses to groundnut crops (SUBRAHMANYAM et *al*., 1992). Not only do they reduce yield but they adversely affect the quality of the crop (NIGAM et *al*., 2006). In Senegal, Mali and Guinea, cash crops were the main sources of income for farmers. In addition to these problems, the low productivity of groundnuts based agrarian systems, the regulation of aflatoxin levels and stricter quality standards have limited the competitiveness of groundnut in West Africa in domestic, regional and international markets.
In order to regain its competitiveness, groundnuts must become more productive, adopting new technologies and developing sustainable seed systems (FAO, 2006). The availability of high quality seeds and their adoption by farmers are fundamental to transforming traditional practices that govern agricultural production, and achieving greater stability of food production in West Africa.
New seeds with higher yield potential and resistance to strains than traditional varieties are a major asset for increasing agricultural production (NDJEUNGA et *al*., 2006). The use of high quality groundnut seeds is one of the most effective ways for the African producer to improve the productivity of his crop. The organization of quality seed production and its dissemination to all users is important for the realization of any development plan and is often a prerequisite for the introduction of other productivity factors. It is important that plants develop under adequate soil fertility and climatic conditions to ensure proper formation, good pod filling and good seed maturity. Farming techniques must be perfectly controlled so that the plant can express its full potential and ensure quality production (KODIO et *al*., 2006).
Thus research centers have been set up in the major producing countries, working on genetic improvement with the aim of creating highly productive groundnut varieties that are well adapted to the conditions of the environment. By identifying varieties that resist or tolerate disease conditions, it is possible to significantly reduce yield losses caused by parasite pressures. It would therefore be important to conduct a genotype study to identify cultivars that yield higher yields than currently observed. It is within this framework is the present study entitled: “Characterization and Evaluation of Twenty Groundnut Lines Introduced from Texas A & M (USA) at the **Same’s** Agronomic Research Station in **Kayes/Mali "**. To carry out this work, the objective was to identify the characteristics of these twenty American lines and to evaluate their performance in the agro-ecological conditions of the environment.

Research hypothesis
The use of the lines could contribute to the improvement of the productivity and production of groundnuts in Mali.
With as research questions:

- What are the unique characteristics of the groundnut lines to be tested?
- What are the performances of the lines in the agro-ecological conditions of the region?

Main objective
Contribute to the improvement of the productivity and production of groundnuts in Mali.

Specific objectives

- Identify and appreciate the characteristics of the different lines in competition;

Select and evaluate the best performing lines for future improvement work.

STUDY ENVIRONMENT AND HOST STRUCTURE

The present study took place at the Institute of Rural Economy (**IER**), specifically at the Groundnut program level at the **Same's** Agronomic Research Station in **Kayes**.
The **IER** was created by an ordinance of November 29, 1960 modified since by other texts. Currently, the legal text creating the IER is the Law No. 01-039 of June 6, 2001 ratifying the Ordinance No. 01-024 / P-RM of March 22, 2001 establishing the **IER**. From its creation to the present day, the **IER** has gone through several phases. In the seventies, an intense co-operation with the French institutes was established by the signing of a convention in 1962 which gave them wide responsibilities in terms of scientific orientation. Thus, the Research Institute in Tropical Agronomy (**IRAT**) contributed to the development of research on food crops in **Sotuba** (rainfed cereals), and **Kogoni** (rice) and the Institute of Fruits and Citrus fruits of Corsica (IFAC). The work began in fruit growing (station of **Bamako** in 1963, then **Farako-Sikasso** in 1965). During this period, priority was given to the recruitment and accountability of national staff for management and scientific guidance. The 1980s were marked by the split of the **IER** in July 1981 into two structures, one still called **IER** should conduct research on crops and the second called the National Institute of Forestry and Biological Biological Research (INRZFH), research officer in forestry and hydrobiology zootechnics. In 1987, the Center for Scientific and Technological Research (**CNRST**) was created to coordinate all research activities in Mali. From the 1990s to today, the highlights were the merger of the IER and the INRZFH, the restructuring of the **IER** and the beginning of the construction of a National System of Agronomic Research (**NARS**) system which draws on a better articulation of the activities carried out in the different agricultural research institutes. The advent of the National Program for Agricultural Research (**PNRA**) and the support of the Kingdom of the Netherlands have been the driving forces behind the restructuring, to which FAO, ISNAR (International Service for National Agricultural Research) and the World Bank have contributed. Also during the 1990s, the **IER** was established as a Scientific and Technological Establishment (**EPCST**) with legal personality and financial autonomy. Management and consultation bodies at the national level are: the Board of Directors, the Management Committee and the Program Committee.

LITERATURE REVIEW

General on groundnut

Groundnuts play an important role in traditional agrarian systems. It is an important source of protein, fat and feed (fodder and oilseed meal) as well as a significant monetary contribution to the economy of small-scale farmers who provide about 90% of world production, particularly in areas of tropical dry savannahs in Asia and Africa. It is consumed either in seeds (after husking the pods), or in the form of oil (after industrial or artisanal crushing of the seeds), or in more or less elaborate forms from the market of groundnut and confectionery ("butter", dough, flour, etc.). By-products give rise to various uses: forage for straws; fuel, composting, chipboard for empty hulls; food or feed for oilcakes. In cultivars and wild species, oil yields can range from 46 to 63% (SCHILLING, 2003). Groundnut helps to correct protein and vitamin B1 and B2 deficiencies in cereals, the staple food of Malians, because of its high protein and oil content (KODIO et al., 2006). Hulls from hulling in West Africa provide some of the energy for local oil mills. Large quantities of hulls are available on the farm when marketing is done in seeds; the product is then burned or spread as an amendment. In some countries, hulls are involved in the preparation of livestock feeds or in the manufacture of chipboards used in carpentry. Finally, properly harvested and dried hay has a very high forage value -0.4 UF/kg (SCHILLING, 2003). The oilseed crop market, to which groundnuts belong, is dominated by soybeans. Groundnut

(1999-2002 average data) accounts for 12% of world oilseed production and 1% of the international edible oil market (SCHILLING, 2003). Southern countries account for 90% of production, particularly China (12 million tons), India (7 million tons) and Africa (6 million tons). These producing countries absorb about 90% of the total production of which 50% is triturated at the family, artisanal or industrial level. The European Union is the main importer. The majority of international transactions are in seeds on the highly profitable groundnut market.

The main producers are in Asia 66% (China and India), Africa 25% (Nigeria, Senegal, Sudan), North and Central America 6% (USA), South America 4% (Argentina) (FAO, 2010). Nigeria is the largest producer, Senegal the second largest producer, where groundnuts are grown on more than 798 000 ha with an estimated total production of 606 712 tons and an average yield of 2 737 kg/ha. Niger and Mali are minor peanut producers, groundnuts occupying less than 4% of the total cultivated area and less than 3% of agricultural production in each of these countries. Yields are relatively low and estimated at 681 kg/ha in Mali and 685 kg/ha in Niger (FAO, 2006). In Mali, peanut cultivation occupies about 180 000 ha. Over the last decade, the area under cultivation has increased by 23% and yields have reached 800 kg/ha (COULIBALY et al., 2003).

Morphological characters

Groundnut is an annual legume 30-70 cm tall, erect or creeping. The aerial part is carried by a main stem, still erected, and two primary lateral branches coming from the collar of the plant. The leaves are composed of two pairs of opposite elliptic leaflets at the end of a petiole inserted on alternate or sequential branches.

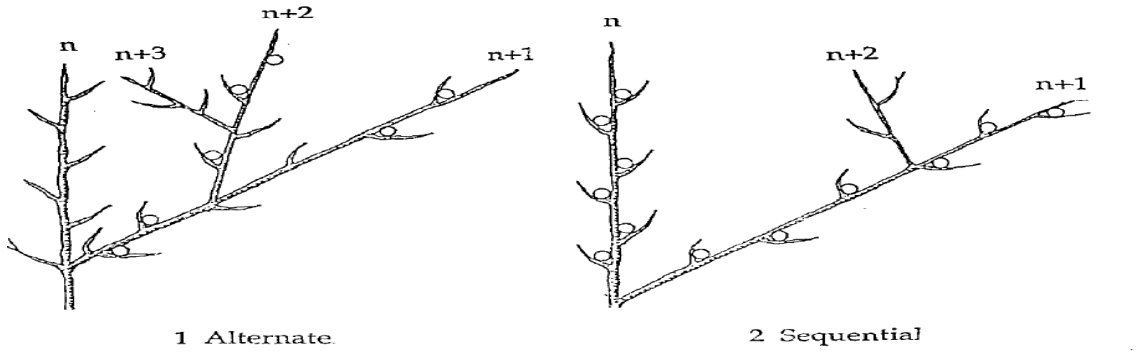

Figure 1: Forms of branches

Stage of development

Groundnut is an annual herb with a development cycle lasting from 80 to 125 days. The cycle of development according to Bouffil (1951) can be divided into four (4) phases: germination, flowering, fruiting and maturation.

Table 1: Decomposition of peanut vegetative cycle time by major phase and type of variety

Stages of development	Early varieties	Late varieties
Sowing - Lifting	4-5 days	4-5 days
Useful flowering	15 - 20 days	18 - 25 days
Appearance of the first flower	20 - 25 days	30 - 40 days
Maturation period	40 - 45 days	54 - 55 days

Source: GILLIER and SILVESTRE, 1969

MÉTHODOLOGIE DE RECHERCHE

Site

The trial was carried out in open fields at the Same's Agronomic Research Station in Kayes (geographical coordinates are: longitude 09 ° 23 'west, latitude 15 ° 02' north, altitude 281 m), on sandy loam soils.

Plant material

The trial was conducted with 25 entries: 20 lines (from the American collection) and 5 varieties selected from the known and popular varieties in Mali and in the West African sub-region. These varieties are: the variety Flower 11; the variety JL 24 (**Samékè**); the variety 55 437; the variety ICGV 86124 and the variety ICGV 86015.
The **ICGV** mention of varieties means ICRISAT Groundnut Variety. The first two digits after the ICGV mark represent the year of the hybridization and the last three digits are the numbers of the hybridization plots.

Methods

Studied factor

A single factor studied is the subject of the study: the line

Experimental apparatus

The device used is an incomplete square lattice with two repetitions separated by one meter with contiguous elementary plots of 4 lines of 3 m distant from 0.50 m between the sowing lines and 0.15 m between the drill holes. Either a plot area of: 3m x 2m = 6m2 and a useful area of 6m2 x 25 x 2 = 300m2 for a total area of 21m x 17m = 357m2.

Parameters observed

Observations focused on pre-harvest and post-harvest parameters.

Pre-harvest

Observations were made on seedling lines per elementary plot and focused on the following parameters:

- Date of emergence (duration of emergence): this is the number of days between sowing and emergence at more than 50% of plants (IBPGR and ICRISAT, 1992). It is determined after counting the seedlings emerged on the sowing lines after a regular passage.
- Number of plants at emergence: it is estimated by counting plants with at least two green leaves on the sowing lines;
- Flowering time: it is the number of days elapsed between sowing and the date at which a plant bears at least one flower;

- Number of days at 50% flowering: it represents the number of days between sowing and the day when 50% of the feet have at least one flower. It is obtained by visual counting on the sowing lines;
- Coloring of the leaflets: it consists in making an appreciation of the color of the leaflets at the complete stage of its development. For these appreciations we are based on the dark green or light green coloring;
- Botanical type and plant habit: it is recorded at the pod-forming stage for plants with a spacing of 10-15 cm;
- LAI (Leaf Area Index): the apical leaflet of the third leaf of the main stem is measured at the complete stage of its development. The average of the leaflets of the different plants was noted;
- Notation on leaf diseases: they consisted of an evaluation of the behavior of the plants with respect to certain parasite pressures. These observations concern: Early and Late Leaf Spot, Rust, Rosette ...

Lines with scores between 2 and 3 are considered resistant and those with a score of 4 to 5 are tolerant. On the other hand, those who score above 5 are said to be sensitive.

- Evaluation of the hairiness of the plants: notation made on the leaflets of the third node using both surfaces;
- Cycle: this is the number of days between sowing and the date of maturity.

Post harvest

The observations focused on the following parameters:

- Number of plants harvested: this is the count of the number of groundnut feet actually harvested per elementary plot;
- Weight of haulm: weight of haul from all peanut feet from an elementary parcel. It is obtained by weighing with a scale after drying in the open air (water content reduced to about 10%);
- Number of pods per plant: it is to take 5 random peanut plants, and the count is done in each elementary plot;
- Pod weights: weight of pods from an elementary plot. It is measured with a scale after air drying (seed moisture content about 10%);
- Weight of 100 pods: by weighing at the balance of 100 pods selected at random;
- Weight of 100 seeds: by weighing at the balance of 100 seeds selected at random;
- Color of seeds: noted in a period of one month after harvest and after complete drying on mature, shelled seeds;
- Number of seeds per pod: take 10 to 20 pods of peanuts randomly, and count;
- Percentage of dehulling (% DC)

% DC = **(**Weight of seed 200gr shelled **x** Weight of 200gr pod**) x** 100

- Harvest index or Harvest index (H.I)

H.I= Pod weight / (Pod weight + Weight of haulm)

The harvest index measures seed productivity relative to total biomass.

Conduct of the test

The execution of the test consisted in the execution of the following successive activities:

a. Shelling
It's an operation that separates the seeds from the hulls. It was done manually to avoid any injury of the seeds.
The dehulling is followed by a manual sorting of the seeds which makes it possible to eliminate the seeds skinned, immature, moldy and small.

b. Seed treatment
The husked seeds were treated with GRANOFORCE Red Insecticide-Fungicide with 25% Permethine + 125% Thiram at a dose of one 25g bag of the product per 10kg of seed or 2.5kg/ton of seed.

c. Soil preparation
The plot was plowed flat with a tractor-mounted disk plow.

d. Delimitation and Staking of the parcel
The material used for the delimitation consisted essentially of measuring tape, rope and stakes. The delineation began with the materialization of a right angle using method 3-4-5. The procedure first began with the delineation of the entire parcel and then within it the blocks and the elementary parcels were delineated. All these compartments are materialized by stakes.

e. Seedling
After sufficient rain, sowing was done 18 days after plowing. The seed packets of each of the 25 entries were arranged at the beginning (on the first line) of the elementary plot according to the experimental scheme resulting from a randomization. The sowing was done manually in holes. The seeds were placed in these holes at a rate of one seed and covered with soil and then slightly packed with hole. The entire trial was shown on the same day (July 14, 2012).

f. Farming techniques
The method consisted in reducing competition between crops and weeds in favor of crop development. The maintenance work was done on demand during the campaign, carried out using the hole:

- The first weeding took place on August 3, 2012, ie 20 days after sowing;
- A ridging was carried out on August 16, 2012 thus allowing the reinforcement of soil at the feet of the plants and also a good penetration of the gynophores in the ground and the second hilling after a large amount of rain (14 days of the first);
- Other maintenance work was also carried out and relied mainly on manual weeding (August 13, 2012 ie 10 days after first weeding) and on demand.

g. Fertilization
The fertilizer used is Diammonium phosphate (DAP) (18-46-0), which was brought on August 16, 2012 (33 days after sowing or 26 days after emergence) following weeding. According to the treatments, the contribution was made on the elementary plots at the rate of 30 kg ha-1 is 900 g for 300 m2, or 180 g per elementary parcel. The contribution of the DAP at the level of the elementary plots was carried out on the fly in a single day.

h. The harvest
It was done on October 12, 2012, ie 90 days after sowing and October 19, 2012, ie 97 days after sowing, using the hoe used to lift the soil and the pods. The count of the number of plants at harvest was made at the same time.

i. The Threshing
This operation was carried out on the various corresponding parcels manually and the pods were put in the cretonne bags on which we put labels bearing the names of the different treatments, the numbers of entry, the year and the name of the try for a good identification.

j. Drying of tops and pods
The tops were dried in the open air in the sun on the different parcels corresponding after we proceeded to different weighings.
The pods were also dried outdoors in the sun in a field area 15 days to obtain a moisture of about 10% of the seeds after have occurred, the various weighings using a precision balance.

k. Weighing of tops and pods
The weighing of the tops was carried out on the various corresponding plots using a maximum graduation scale of 100 kg. The pods were weighed in the laboratory using an electronic scale that was also used for weighing weights.

l. Observations
They were made in accordance with the experimental protocol throughout the conduct of the test.

RÉSULTATS DE RECHERCHE

The results of the observations were entered on Excel 2007 and were analyzed using the STATVIEW software, with the application of the Newman and Keuls test at the 5% significance level for the comparison of the average results of the treatments.

Rainfall situation of the station

Rainfall was variable from one month to the next, both for the quantities of water collected and for the number of rainy days. The second ten day interval of September recorded a record high of 168 mm followed by the second ten day interval of August with 158 mm. A total of 892.0 mm of rain was obtained in 45 days of rain from June to October. Physiological conditions have been generally favorable for good production and productivity of plants. This year the wettest month was September with 168.0 mm in 13 days of rain.
Comparing the average annual rainfall for the period from 2003 to 2012, the station recorded an average of 711.50 mm. The driest year was 2011 with a total of 444.0 mm and the most abundant year was 2012 with a total of 892.0 mm (Figure 2).
We find that this year's rainfall has been higher than the past nine years. In general, it has been satisfactory.

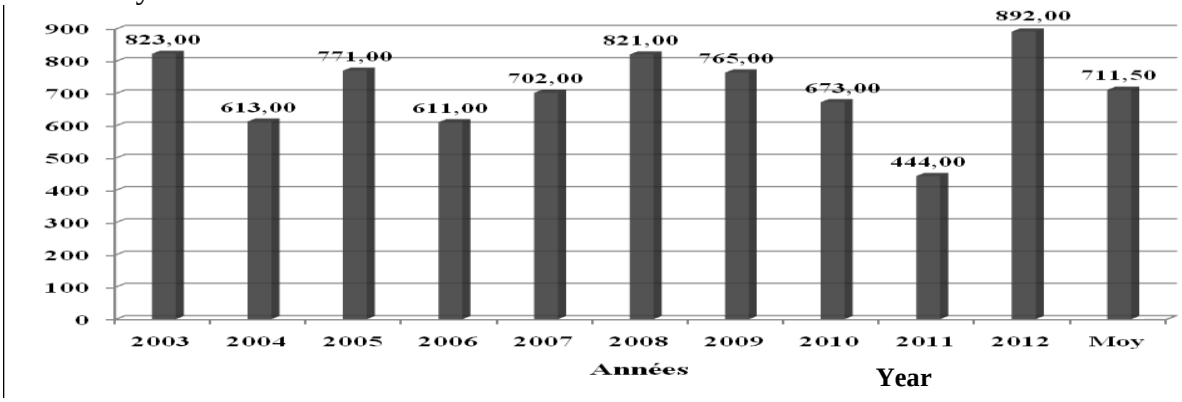

Figure 2: The average annual rainfall of the Same's station from the 2003-2012 period

Number of plants at emergence and germination rate

The number of plants raised allows knowing the quality of the seeds used. Analysis of variance shows a highly significant difference between treatments in the number of plants at emergence (Figure 3). The best were TX 045403, TX 048501, TX 048517, TX 048514, TX 045415, TX 048510, TX 048503, TX 045411, TX 048513 and the 2 controls (55 437 and Flower 11) with all 80 plants or 133 333 plants/ha after sowing. On the other hand, the lowest lifts were observed with the line TX 045405 (66 plants or 110833 plants/ha) and the control ICGV 86015 (69 plants, ie 114 167 plants/ha).

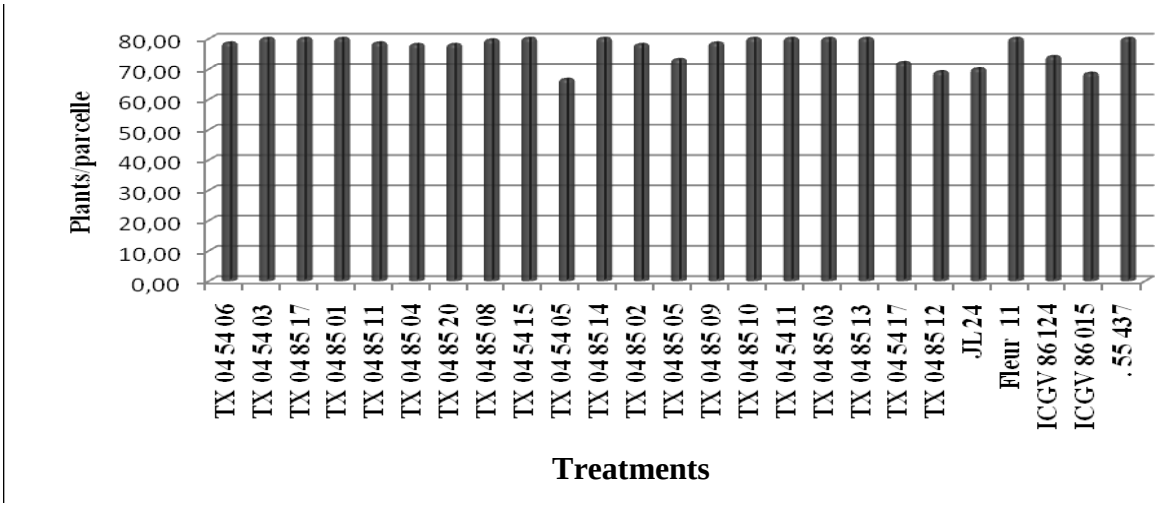

Figure 3: Number of plants at emergence

Date of appearance of the first flower

The analysis of variance of the results relative to the date of appearance of the 1st flower revealed a significant difference between the treatments. A comparison of the average treatments with the application of the Newman and Keuls test at the 5% significance level shows that line TX 045406 bloomed in 19 days after sowing (Figure 4) following lines TX 045411, TX 048503, TX 045417 and the three controls JL 24, Flower 11, ICGV 86124 which bloomed after 20 days. However, the late lines were [TX 0454 03, TX 048501, TX 048508, TX 045405, TX 048505, TX 048509, TX 048510, TX 048513 and TX 048512], 22 days after sowing. Controls 55 437 and ICGV 86015 were at 21 days after sowing (Fig. 4).

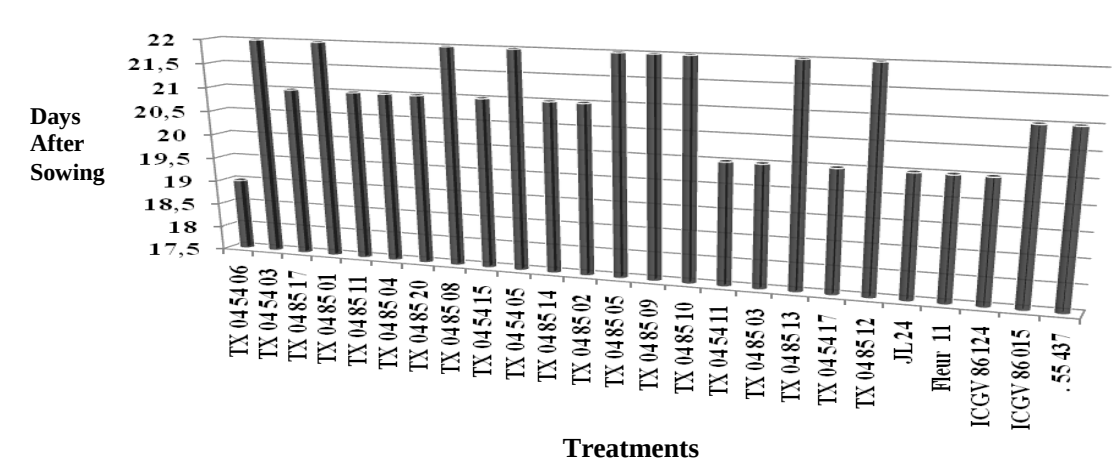

Figure 4: Dates of appearance of the first flower

Number of days 50% flowering

The analysis of variance shows a highly significant difference between treatments with respect to the number of days 50% flowering. The comparison of the averages of treatments with the application of the Newman and Keuls test at the 5% significance level shows that the lines TX 045406, TX 048502, TX 04 54 11, TX 048503 and TX 045417 reached 50% flowering in 23 days after sowing. In addition, the last to reach the 50% flowering was the line TX 045405 in 27 days after sowing.

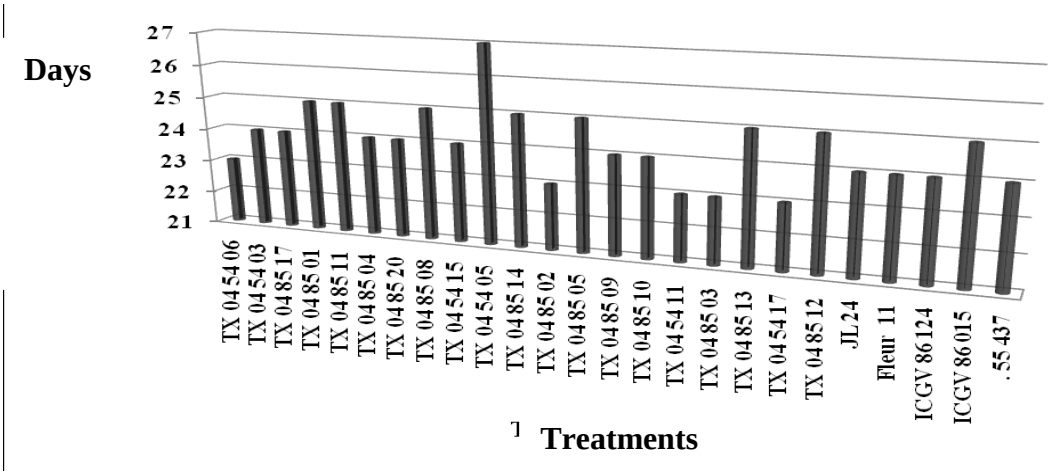

Figure 5: The number of days 50% flowering

The main foliar diseases observed are early and late leaf spot. The data for these two diseases are presented in Table 4. The evaluation of early and late leaf spot diseases allowed us to know the incidence of the disease on the different lines tested. Lines with a score of 2 to 3 are considered resistant and those with a score of 4 to 5 are tolerant. On the other hand, those who have scored above 5 are said to be sensitive.

All lines tested were resistant to both forms of leaf spot. The results showed that not all lines have the same level of manifestation of both forms of leaf spot. In both cases it was found that the number of treatments with a score of 2 dominated. The highest scores were observed by the treatments TX 045403, TX 048503, TX 048509, TX 048508, TX 048511 and the control ICGV 86015 with score 3. On the other hand, the lines [TX 045411, TX 048502, TX 045405 and TX 045405] and controls [JL 24, Fleur 11 and ICGV 86124] were the most resistant to late leaf spot with score 1 (Fig 6).

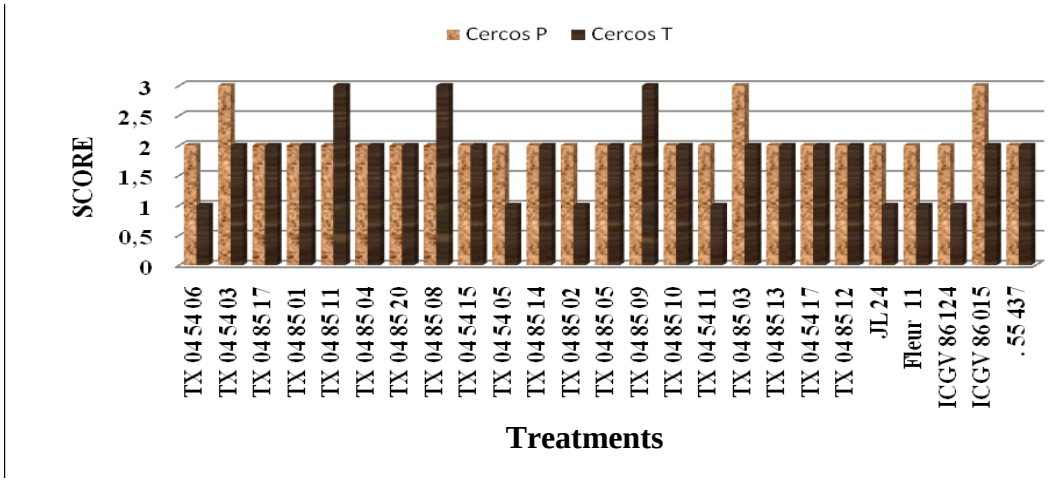

Figure 6: Incidence of both types (early and late) of leaf spot

Pod yield

The data on pod yields in Table and Figs. 7 showed that there is a highly significant difference between treatments with an average of 3.71T/ha. The line TX 048509 with a production of 4.46 T/ha was the best, it was followed by lines TX 048508, TX 048510 with a production of 4.32 and 4.38T/ha, respectively. In contrast, among the treatments in the trial the less productive lines in pod yield were: TX 045411, TX 045417, TX 045405 and TX 045406 with a yield of 2.33T/ha to 2.92T/ha.

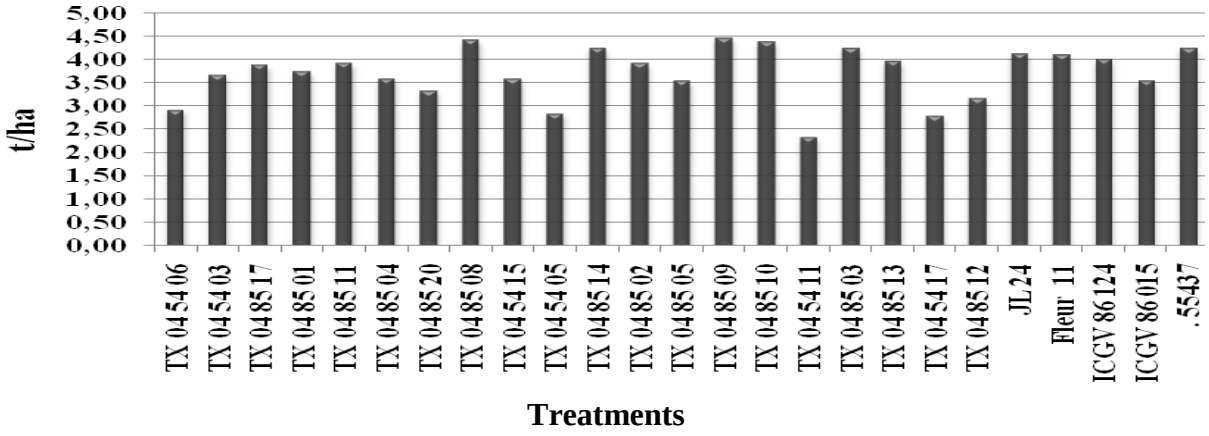

Figure 7: Pod yield

Fodder yield

The data concerning the yields of FIG. 8 showed that there is a highly significant difference between 5% significance. Yields varied between 4.17 and 9.17T/ha with an average of 7.02T/ha. Of the 25 treatments, the line TX 048517 had the highest fodder yield with 9.17T/ha and was followed by the control Flower 11 with 8.89T/ha and the lines TX 045417, TX 048511, TX 048513 with respectively 8.75T/ha and 8.33T/ha.
The lowest yields were with TX 045411 with 4.17 t / ha, TX 04 54 06 with 5 t / ha, TX 04 54 05 and TX 04 85 02 with each 5.42 t / ha (Fig 14).

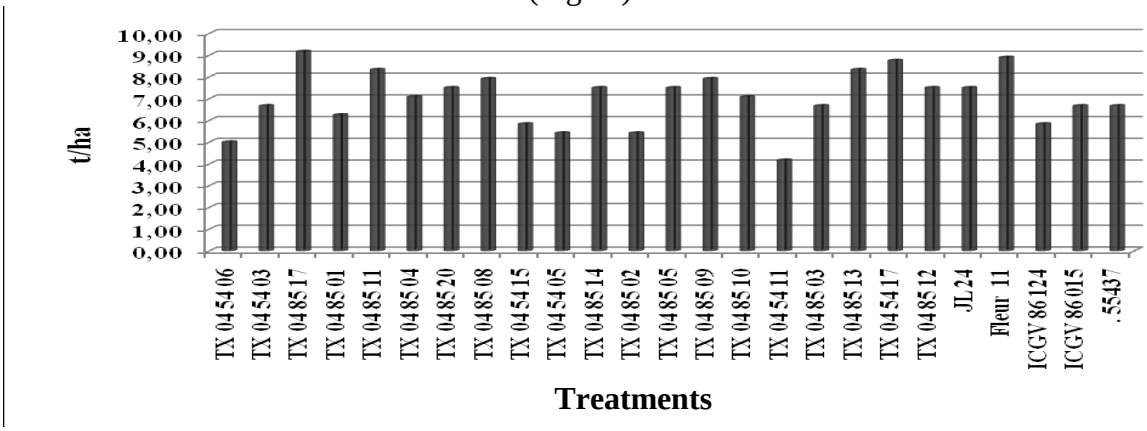

Figure 8: fodder yield

Harvest index or harvest index (HI)

The harvest index indicates the share of seed (or pod) production in total biomass. The analysis of variance shows a highly significant difference with an average of 34.83%. Harvest indices ranged from 24.19 to 41.96%. Comparing the averages of the treatments with the application

of the Newman and Keuls test at the 5% significance level shows that the best harvest indices were: TX 048502 and ICGV 86124 with indices 41.96% and 40, 68%.
The lowest were obtained by TX 045417 with 24.19%, TX 048512 and TX 048517 with 29.69% and 29.71% (FIG 9).

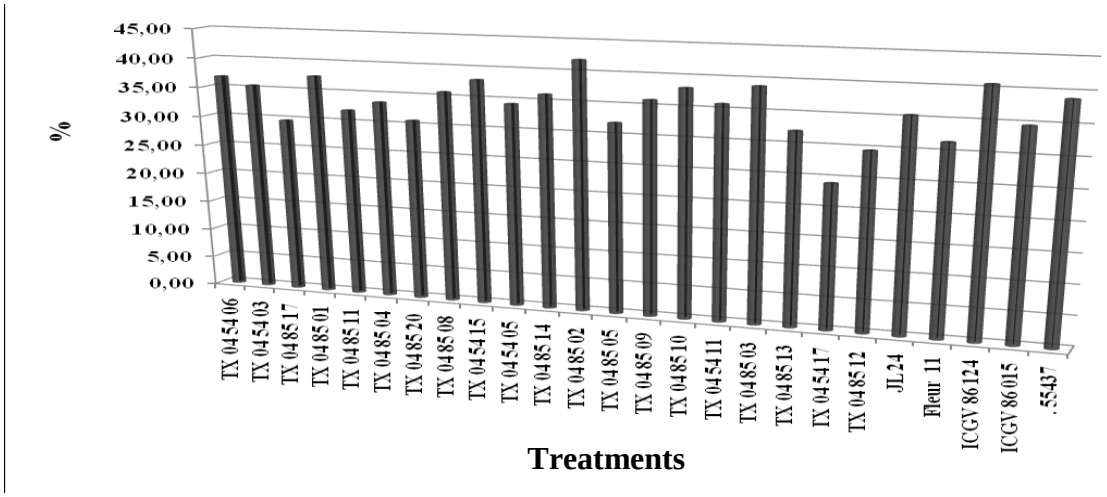

Figure 9: Harvest index

Weight of 100 seeds

The 100-seed weight associated with the percentage of husking of pods can provide evidence of pod filling of the lines. Analysis of variance shows a highly significant difference between treatments. The weight had varied between 34g and 51g with an average of 42,64g. The comparison of the averages of the treatments with the application of the Newman and Keuls test at the 5% significance level shows that the line TX 045406 has the highest 100-seed weight with a value of 48g among the twenty lines tested but their weight is lower than the three controls ICGV 86124, JL 24 and ICGV 86015 with 51g, 50.50g and 49g respectively (fig. 10). However, the lines with the lowest weights of 100 seeds are: TX 045415, TX 04 85 13 and TX 045403 have a weight of 100 seeds ranging from 34 to 36,50g.

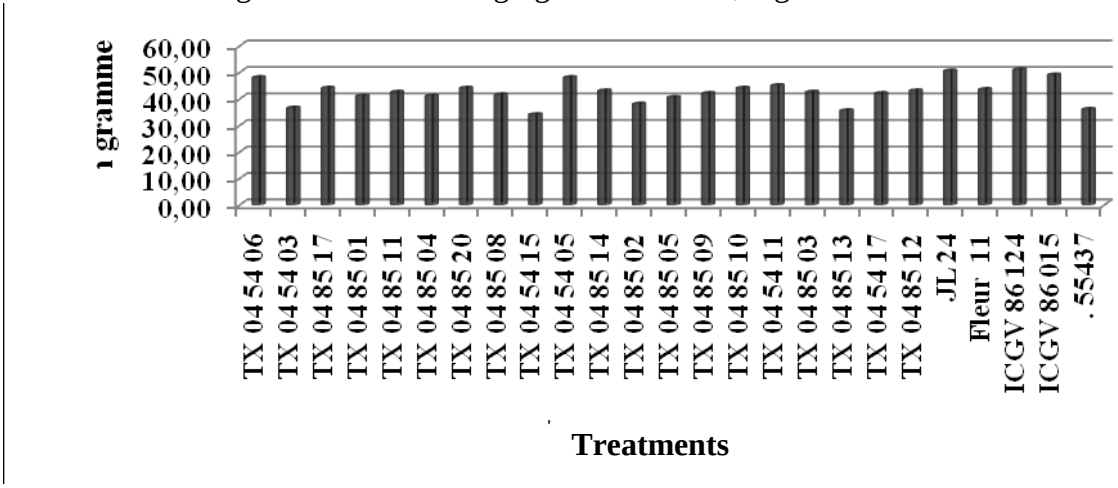

Figure 10: Weight of 100 seeds

Percentage dehulling

The hulling percentage gives the proportion of the seeds in relation to the hulls. It also provides information on the quality of filling the hulls. The data in Table showed that there is a highly

significant difference between treatments at 5% significance with an average of 65.84%. The hulling percentage varied between 56.50% and 72% (Figure 11). Comparison of the means of the data (Table 4), under the conditions of implantation of the test, showed that the best line was TX 048504 with a hulling percentage of 72%, it was followed by TX 048512 and TX 048513 with a hulling coefficient of 71 and 70%. On the other hand, the lines having a low percentage of peeling were: TX 045417 and TX 045405 with a hulling percentage respectively of 56.50 and 58%.

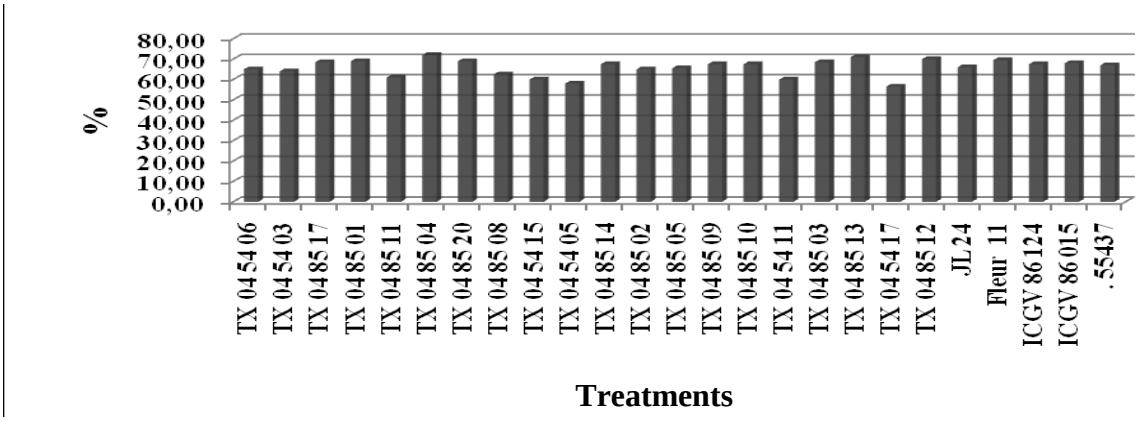

Figure 11: Percentage dehulling

DISCUSSION OF RESULTS

This wintering was characterized by a good seed germination. The line TX 048509 with a yield of 4.46T/ha was the best. Control varieties: 55,437, JL 24, Fleur 11, ICGV 86,124 and ICGV 86,015 yielded from 3.54 to 4.25T/ha. These results confirm Hemingway's findings, as three important studies of infestation in (1954, 1955, 1957) reveal that the density of leaf lesions has a profound effect on photosynthesis, resulting in a decrease in the yield of pod, a reduction in their weight and their oil content. Thus, in his trial, healthy feet carried an average of 26 pods while sick feet had only 19 pods under the same growing conditions (cited by CAMARA, 2009). In addition, they are partly in line with those obtained by TOGORA in 1997 and KODIO in 2010 (TOGORA 1997, KODIO 2010).

In general, all the lines tested had acceptable yields higher than 2 t / ha. This production greatly exceeded the average yield of groundnuts in the Sahel, which is 1.5 t / ha. The variations that have been observed can only be explained by the influences of the genomic differences of the lines in competition and the year-lineage interaction.

The different morphological variations which were observed on the size of the plants, the ramifications, the hairiness, the botanical type, the color of the leaves and seeds, the strangulations, the cross-links, the beak sufficiently proved that the lines have behaviors dissimilar genetically and ecologically.

As for parasite pressure, especially the two forms of leaf spot (early and late), they were less strong on all treatments. This could be explained by the weather condition not favorable to infestation with fungi responsible for leaf spot. The similar work of TOGORA in 1997 confirms these realities.

The results on production fane allowed us to say that the best feed line was TX 048517 with a very high production of 9.17T/ha on average and a pod production of 3.87T/ha, resistant to foliar diseases were more consistent with the different options of choice for future selection. Compared with the control susceptible to leaf diseases (Flower 11), it could be said that the low incidence of leaf spot disease weighed heavily in the determination of weight. This would be

significantly lower in the year of infestation, as leaf production and foliar diseases are negatively correlated.
The results concerning the maturation date showed that the material used was homogeneous with a 90-day cycle. Moreover, the most important characters in screening lines such as good vegetation, good production, resistant to foliar diseases and insects, a good agro-ecological adaptation are more consistent with the objectives.

CONCLUSION ET SUGGESTIONS

The study conducted during the 2012-2013 agricultural campaign at the at the Same's Agronomic Research Station aimed to identify the characteristics and evaluate the most successful lines. At the end of this evaluation, the results showed a great variability between the lines tested:

- The line TX 048509 with a production of 4.46T/ha of groundnut pods was the most successful. It should be noted that the line was significantly better to controls (55437, JL 24, Flower 11, ICGV 86,124 and ICGV 86,015) and had yields ranging from 3.54 to 4.25T/ha;
- The highest yield of fane was obtained with the line TX 048517 with 9.17T/ha, it was followed by the control Fleur 11 with 8.89T/ha;
- Both forms of leaf spot had no effect on pod and foliage performance;
- The lines tested were early with a cycle ranging from 85-90 days.

Thus we suggest following the work and results garnered the following projects:

- Continued testing of US collections to improve and select suitable lines in the agro-ecological conditions of the region;
- To extend the experimentation of these lineages in real environment because this American collection allowed us to obtain very convincing results.

REFERENCES

1. ALLAHRA T., 2010. Evaluation of the agronomic performance and response to leaf spot disease of 53 varieties of groundnuts (Arachishy pogaea) in Samanko (Mali). End of cycle memory. Rural Polytechnic Institute of Training and Applied Research. 60;
2. CAMARA Y., 2010. Evaluation of some Groundnut varieties for their tolerance to early Sigatoka disease. Thesis. CRESA. 70p ;
3. IBPGR and ICRISAT, 1992. Descriptors for groundnut. International Board for Plant Genetic Resources, Rome, Italy; International Corps Research Institute for the Semi-Arid Tropics, Patancheru, India, 125 p ;
4. FAO, 2006. (consulted on 3/10/2012). sur : http://www.fao.org/arachi21comt1.
5. SCHILLING R. 2003. -(consulted on 24 /09/ 2012) Groundnut e : History and perspectives; CIRAD
6. KODIO O. NTARE B. TRAORE A. WALIYAR F. and DIARRA B., 2006. Postharvest Groundnut technology. Institute of Rural Economy, 20 p ;
7. KODIO O. and NTARE B.R., 2010. Recommended Groundnut varieties in Mali. ICRISAT. 40p ;
8. KODIO O., 2009. Project Improving Productivity and Production of Tropical Legumes in West Africa. Institute of Rural Economy, 105 p ;
9. FAOSTAT, 2010. (consulted on 18/09/ 2012). Culture: the data of 2010. http://193.43.36.221/Desktop ;

10. GASSINTA P., 2009. Evaluation of 81 Groundnut varieties for their tolerance to end-of-cycle drought. End of cycle memory. Rural Polytechnic Institute of Training and Applied Research. 60p ;
11. GILLIER P. et SILVESTRE P., 1969. Agricultural Techniques and Tropical Productions, Groundnut, 289 p ;
12. NDJEUNGA J. NTARE B R. WALIYAR F. and RAMOUCH M., 2006. Groundnut seed systems in West Africa: Current practices, constraints and opportunities. ICRISAT. 67p ;
13. NIGAM SN. ARUNA R. GIRI DY. RANGA RIA GV. and REDDY AGS., 2006. Obtaining higher and sustainable yields of peanuts; Principles and cultural practices. Patancheru 502324, Andhira Paradesh, International Crops Research Institute for Semi Arid Tropics (ICRISAT), 41 p ;
14. NTARE B.R., DIALLO A.T., NDJEUNGA J. and WALIYAR F., 2008. Manual on Groundnut seed production techniques. International Crops Research Institute for Semi-Ard Tropics (ICRISAT), Patancheru, Andhra Pradesh502 324, India, 24p ;
15. NTARE B.R., DIALLO A.T., NDJEUNGA J. and WALIYAR F., 2008. Manual on Groundnut seed production techniques. International Crops Research Institute for Semi-Ard Tropics (ICRISAT), Patancheru, Andhra Pradesh502 324, India, 24p ;
16. SUBRAHMANYAM P., WONGKAEW S., REDDY D.V.R., DEMSKI J.W., MCDONALD D., SHARMA S.B. and SMITH D.H., 1992. Field diagnosis of Groundnut diseases. Newscast. N0 36, 79 pages.
17. TARJOT M., 1959. Work on the peanut leaf spot p13 ;
18. TRAORE M., 2011. Assessment of agronomic performance and tolerance to major leaf diseases (early and late leaf spot diseases) of forty-six advanced groundnut lines at Samanko / ICRISAT-Mali. Thesis. Training and Research Unit in Life and Earth Sciences (URF / SVT). 67p ;

ANNEX

Annex 1: Rainfall survey of the Samé / Kayes station (Year 2012)

Mois Per ten day	June	July	August	September	October
1	-	62	18	27	8
2	17	86	158	168	28
3	50	75	119	9	-
Monthly accumulation	67	223	295	271	94
The number of days	3	10	13	14	4
Annual cumulation : 892.0 mm of rain in 45 days					

Annex 2: Summary of completed statistical analyzes of pre- and post-harvest observation parameters

statistiques descriptives

	Nombre	Minimum	Maximum	Moyenne	Erreur Std	Dév. Std	Coef. Var.	Somme	Somme Carré	Variance
taux de g %	25	83.12	100.00	96.10	1.09	5.47	0.06	2402.47	231593.59	29.96
NPL (ha)	25	110833.00	133333.00	128133.16	1459.52	7297.59	0.06	3203329.00	411730783891.00	53254858.39
DF (1ére F)	25	19.00	22.00	21.04	0.18	0.89	0.04	526.00	11086.00	0.79
NJ 50%F	25	23.00	27.00	24.24	0.19	0.93	0.04	606.00	14710.00	0.86
Nbre de ram (n+1)	25	4.00	7.00	5.40	0.19	0.96	0.18	135.00	751.00	0.92
Haut TP (cm)	25	14.40	52.50	41.79	1.55	7.74	0.19	1044.70	45094.55	59.94
Ind F (cm)	25	2.12	2.54	2.34	0.02	0.11	0.05	58.60	137.65	0.01
Cercos P	25	2.00	3.00	2.12	0.07	0.33	0.16	53.00	115.00	0.11
Cercos T	25	1.00	3.00	1.84	0.12	0.62	0.34	46.00	94.00	0.39
DM	25	85.00	90.00	89.80	0.20	1.00	0.01	2245.00	201625.00	1.00
NPR (ha)	25	103333.00	133333.00	122199.72	1861.45	9307.24	0.08	3054993.00	375398283337.00	86624755.63
Nbre de Gou/plt	25	24.00	60.00	35.04	1.61	8.03	0.23	876.00	32242.00	64.46
Nbre de graine/gousse	25	1.00	2.00	1.04	0.04	0.20	0.19	26.00	28.00	0.04
Pgou (kg/ha)	25	2333.33	4458.33	3717.67	112.77	563.84	0.15	92941.67	353156205.11	317918.51
Pfane (kg/ha)	25	4166.67	9166.67	7022.33	253.62	1268.10	0.18	175558.35	1271423067.61	1608070.73
P100gr (g)	25	34.00	51.00	42.64	0.90	4.48	0.11	1066.00	45937.00	20.12
P100gou (g)	25	84.00	142.00	104.46	2.50	12.51	0.12	2611.50	276553.75	156.52

Annex 3: Probabilities of pre- and post-harvest observation parameters

	Moyenne	DDL	t	P	Signfication
taux de g %	96.1	24	87.78	<0.0001	HS
NPL (ha)	128133.16	24	87.79	<0.0001	HS
DF (1ére F)	21.04	24	118.36	<0.0001	HS
NJ 50%F	24.24	24	130.95	<0.0001	HS
Nbre de ram (n+1)	5.4	24	28.20	<0.0001	HS
Haut TP (cm)	41.79	24	26.99	<0.0001	HS
Ind F (cm)	2.34	24	102.54	<0.0001	HS
Cercos P	2.12	24	31.96	<0.0001	HS
Cercos T	1.84	24	14.73	<0.0001	HS
DM	89.8	24	449.00	<0.0001	HS
NPR (ha)	122199.72	24	65.65	<0.0001	HS
Nbre de Gou/plt	35.04	24	21.82	<0.0001	HS
Nbre de graine/gousse	1.04	24	26.00	<0.0001	HS
Pgou (kg/ha)	3717.67	24	32.97	<0.0001	HS
Pfane (kg/ha)	7022.33	24	27.69	<0.0001	HS
P100gr (g)	42.64	24	47.54	<0.0001	HS
P100gou (g)	104.46	24	41.75	<0.0001	HS

Legend:
DDL: number of degrees of freedom
t: average comparison test
HS: highly significant

Annex 4: Correlation matrix of pre- and post-harvest observation parameters

Variations	DF (1ére F)	Cercos P	Cercos T	NJ 50%F	Haut TP (cm)	Nbre de Gou/plt	P100gr (g)	Pfane (kg/ha)	Pgou (kg/ha)
DF (1ére F)	1.00								
Cercos P	-0.02	1.00							
Cercos T	0.54	0.10	1.00						
NJ 50%F	0.65	-0.10	0.21	1.00					
Haut TP (cm)	0.48	-0.06	0.46	0.29	1.00				
Nbre de Gou/plt	0.08	0.30	-0.15	-0.06	0.12	1.00			
P100gr (g)	-0.43	0.00	-0.41	0.09	-0.43	-0.25	1.00		
Pfane (kg/ha)	0.21	-0.11	0.53	0.15	0.64	-0.19	-0.14	1.00	
Pgou (kg/ha)	0.25	0.07	0.41	0.04	0.48	0.22	-0.20	0.43	1.00

Annex 5: Taking pictures during observations

Figure 18 : Arachide en floraison

Figure 19 : Mensuration des folioles

Figure 20 : Mensuration de la hauteur de la TP

Figure 21 : Plants récoltés

Figure 22 : Vue d'ensemble de la parcelle

Figure 23 : Séchage d'arachide

Figure 24 : Mensuration des gousses

Annex 6: Score of *diseases*

For these diseases the notation is made on the basis of a scale from 1 to 9 and relates to the main stem:

1 = no impact
2 = 1-5% damaged leaflets, no defoliation;
3 = 6-10% damaged leaflets and defoliation;
4 = 11-20% damaged leaflets and defoliation;
5 = 21-30% damaged leaflets and defoliation;
6 = 31-40% damaged leaflets and defoliation;
7 = 41-60% damaged leaflets and defoliation;
8 = 61-80% damaged leaflets and defoliation;
9 = more than 80% of leaflets damaged.

HEAVY METAL IN THE ENVIRONMENT AND EFFECT ON PLANT AND HUMAN

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ABSTRACT

The term heavy metal refers to any metallic chemical element that has a relatively high density and is toxic or poisonous at low concentrations. Examples of heavy metals include mercury (Hg), cadmium (Cd), arsenic (As), chromium (Cr), thallium (Tl), and lead (Pb)

Heavy metals are natural components of the Earth's crust. They cannot be degraded or destroyed. To a small extent they enter our bodies via food, drinking water and air. As trace elements, some heavy metals (e.g. copper, selenium, zinc) are essential to maintain the metabolism of the human body. However, at higher concentrations they can lead to poisoning. Heavy metal poisoning could result, for instance, from drinking-water contamination (e.g. lead pipes), high ambient air concentrations near emission sources, or intake via the food chain.

Heavy metals are dangerous because they tend to bioaccumulate. Bioaccumulation means an increase in the concentration of a chemical in a biological organism over time, compared to the chemical's concentration in the environment. Compounds accumulate in living things any time they are taken up and stored faster than they are broken down (metabolized) or excreted.

Heavy metals can enter a water supply by industrial and consumer waste, or even from acidic rain breaking down soils and releasing heavy metals into streams, lakes, rivers, and groundwater.

INTRODUCTION

Heavy Metals are defined as chemical elements with high specific gravity , about 5 times the specific gravity of water, with a negative effects on the environment when over-used and affect human, animal and plant health.

Examples : Mercury, lead, cadmium, arsenic, zinc, and copper are among the most toxic substances that pollute soil, water and air.

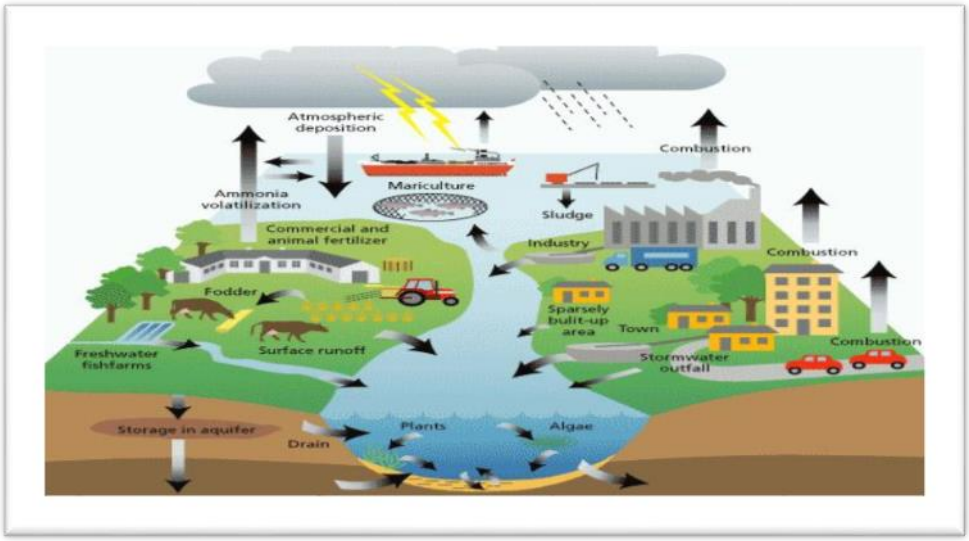
Agricultural soil is polluted by heavy elements, and those contaminants mixed with agricultural soil lose their fertility [1] , killing the bacteria responsible for analyzing soil organic matter and stabilizing the nitrogen element. In addition, plants absorb these elements if they are present in the soil or water and then reach the human through the food chain .

Effect of contamination of heavy elements on soil

Recent attention has been paid to the negative health effects of the accumulation of heavy elements in the soil and the possibility of their transfer to groundwater sources, especially in water-level areas close to the surface that rely on these sources for drinking water [2] .

How does heavy metals move into the environment:

- Enter the atmosphere as a group of industrial gases
- Move to soil and soil becomes contaminated
- Reach ground water and become contaminated
- Deposits at the bottom of the ocean and bays which with time drifted to the surface



[1]Figure (1)

http://biomesfourth09.wikispaces.com/, [2]

Toxicity of heavy metals :

Heavy metals concentrate on the membrane of the cell, altering its structural frame (body). This prevents the exchange of ions and organic substances essential for life, such as proteins and sugars, or prevents them altogether from transition [3].

The concentration of industry in the cities and the and commercial activities and the increase in transportation means that the environment in many cities , especially the industrial ones, has become an environment contaminated by gases and mineral elements that reaches the surface of the earth through **Acid rains** .

tropical Tropical Forest Research Institute P.O. RFRC, Mandla Road, Jabalpur (M.P.) – 482 021. India1.

Figure (2)

A virtual tree-graveyard of Norway spruce trees in Poland bears the scars of acid rain. Caused when rain droplets absorb air pollution like sulfur and nitrogen oxides, acid rain weakens trees by dissolving nutrients in the soil before plants can use them.

Accumulation and dynamic concentration of heavy metals:

Living organisms have different abilities to concentrate heavy elements
Like the aquatic organisms can accumulate heavy elements easily in their bodies
Fish, for example, have the ability to capture the trace effects of mercury metal from the water in which they live, concentrate it in their bodies and store it in the form of organic compounds such as diphenyl mercury, which are linked to cellular proteins within their tissues .

Figure (3)

http://al3loom.com/?p=20689, [3]

<u>Sources of heavy metals in soil :</u>

1. Natural sources: Heavy elements exist in nature, where they go through geochemical cycles to the environment[4,5]
2. Sources of human activity: include :
    a) Extraction of minerals from mines, and the resulting residues that become a source of pollution in the surrounding lands,

[3] GEORGE KAZANTZIS, in Handbook on the Toxicology of Metals (Third Edition), 2007

Figure(4)

www.ts3a.com

b) Sewage and industrial waste,

Figure (5), [4]

c) Disposal of solid and toxic waste. Residues of houses, factories and hospitals can lead to soil contamination by micro and heavy elements,

Figure (6)

d) Combustion of fuel (coal-oil),
e) Some materials and chemicals used in agriculture are exported to heavy elements in irrational agricultural practices.

Alloway, B. J., Zhang, P., Mott, C., Smith, S. R., Chambers, B. J., Nicholson, 4F. A., Calton-Smith, C., & Andrews A. J. (2000). The vulnerability of soils to pollution by heavy metals (Final Report for MAFF Project No. SP0127), London: MAFF4

Many fertilizers contain impurities of heavy elements and with large quantities added to the soil and with the addition of repeated accumulation of elements in the soil and absorbed by the plant to reach the human

Figure (7) Chemical Fertilizer Industry

Red Sludge:

The sludge : is a by-product from the early stage of aluminum production, which leaked from storage reservoirs .

Red sludge or alumina refinery residues (ARR), is a highly alkaline waste product composed mainly of iron oxide that is generated in the industrial production of alumina .
Annually, about 77 million tons of the red special waste are produced, causing serious disposal problem in the mining industry

In 2010 one of the Hungarian town flooded by red toxic sludge
There was a dam – six meter-high, a couple of miles away, that held back a reservoir of deadly "red mud", a caustic byproduct of aluminum extraction. But it had burst.

Figure (8)

Photograph: Tomas Benedikovic/isifa/Getty Images

Effects of heavy Metal on Plants:

- Some of these heavy metals i.e. As, Cd, Hg, Pb or Se are not essential for plants growth, since they do not perform any known physiological function in plants. Others i.e. Co, Cu, Fe, Mn, Mo, Ni and Zn are essential elements required for normal growth and metabolism of plants, but these elements can easily lead to poisoning when their concentration greater than optimal values19,20
- The use of compost to improve agricultural yield without caring with possible negative effects might be a problem since the waste composts are most applied to improve soils used to grow vegetables. Considering the edible part of the plant in most vegetable species, the risk of transference of heavy metals from soil to humans should be a matter of concern [6] .
- Uptake of heavy metals by plants and subsequent accumulation along the food chain is a potential threat to animal and human health[5]
- absorption by plant roots is one of the main routes of entrance of heavy metals in the food chain [6]

Some physiological effects of metal on plants:

Photosynthesis:

Leaf Chlorosis and stunting.
Reduced chlorophyll pigment and alter leaf architecture.

Some heavy metals and danger to humans:

Heavy metals become toxic when they are not metabolized by the body and accumulate in the soft tissues. Chronic level ingestion of toxic metals has undesirable impacts on humans and the associated harmful impacts become perceptible only after several years of exposure .

Lead:

It is a soft metal, and has a wide range of uses, was used in the manufacture of weapons and now used in cables and water pipes and in the paints of walls and pesticides.
Its spread and impact on humans.

Lead comes from the following sources:
- Of the mining industry
- Of solid fuels (coal) and liquids (oil)-
- Of lead pipes if any for water transport–

[5] ," International Research Journal of Environment Sciences, vol. 2, no. 10, pp. 22–27, 2013The

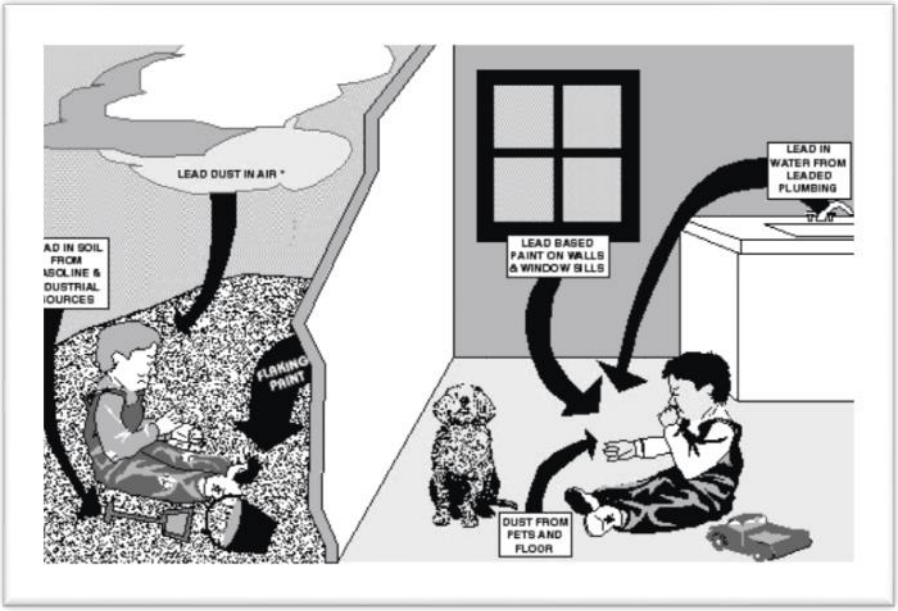


Figure (9) Multiple sources of lead contamination

Disadvantages of Lead to Human Health:

- Disruption of the biological structure of hemoglobin and human injury in anemia Hypertension
- Atrophy of kidney tissues
- Disorder and malaise of the nervous system
- Damage to brain cells
- Behavioral disorders in children such as aggression, impulse behavior, hyperactivity

Cadmium:

Its spread and impact on humans:
Cadmium spreads in nature through the manufacture of alloys and is found in garbage .
The roots of some plants, including tobacco, can absorb cadmium selectively from the soil, leading to accumulation in the tissue of the leaves [6][7] .

Figure (10) Symptoms of Cadmium Poisoning

[6]Harems,(1977).enTransport of zinc and cadmium in soils: Experimental evidence and modeling approaches

When a person takes cadmium in excess of the permissible limit, only 5% of it is used, and the remaining remains in the liver and kidneys, which are produced only very slowly.

Figure (11) Science direct Malacosteon

Increased cadmium concentrations in the human body causes:

- Osteoporosis
- psychiatric disturbances
- Cancer and infertility
- Increase blood pressure

Copper:

Copper is a highly used material, so there are many actual sources of copper waste. The standard limit for drinking water should not exceed 1 mg /L.

Figure (12) Poisoning with cooking utensils

- Long-term exposure to copper metal causes irritation of the nose, mouth and eye, also causes headaches.
- Industrial exposure to copper smoke leads to human infection with smoke fever with a change in the membranes of the nasal mucus, chronic poisoning it affects humans Wilson disease and symptoms in the cirrhosis, damage brain cells.

Mercury:

Mercury does not exist in foods, but spreads through microorganisms. Mercury also enters some cosmetics and reaches humans.

Figure (13)

Risks of exposure to mercury:

- Feeling tired
- Headache
- Genetic disorders

DISCUSSION

In recent years, although the direct discharges have been controlled and are declining, heavy metal discharge delivered by the rivers remain significant. It is clear that direct discharge is negligible when compared to the amount of heavy metal carried by the rivers to the sea, it is easier to control discharge pipes and big industrial enterprises & parks along the coastline than dispersed polluting SMEs along rivers across.

We need to start tackling pollution at source to control and reduce amounts carried by rivers to the sea to allay increasing fears over heavy metal pollution in seafood.
Maybe to do Application of pre-treatment processes of industrial and domestic wastewater before discharge into the marine environment.

REFERENCES

1. Tropical Forest Research Institute P.O. RFRC, Mandla Road, Jabalpur (M.P.) – 482 021. India
2. International Journal of Research in Chemistry and Environment, Vol. 1 Issue 2 Oct. 2011(15-21) ISSN 2248-9649
3. GEORGE KAZANTZIS, in Handbook on the Toxicology of Metals (Third Edition), 2007
4. Alloway, B. J., Zhang, P., Mott, C., Smith, S. R., Chambers, B. J., Nicholson, F. A., Calton-Smith, C., & Andrews A. J. (2000). The vulnerability of soils to pollution by heavy metals (Final Report for MAFF Project No. SP0127), London: MAFF.
5. Ayrault, S., Senhou, A., Moskura, M., & Gaudry, A. (2010). Atmospheric trace element concentrations in total suspended particles near Paris, France. Atmospheric Environment. doi: 10.1016/jatmosenv. 2010.060035..(RS Kookana et al.,1999).Degradation of bifenthrin, chlorpyrifos and imidacloprid in soil and bedding materials at termiticidal application rates. Pesticides science
6. M. S. Rakesh Sharma and N. S. Raju, “Correlation of heavy metal contamination with soil properties of industrial areas of Mysore, Karnataka, India by cluster analysis,”

International Research Journal of Environment Sciences, vol. 2, no. 10, pp. 22–27, 2013
7. Harems,(1977).enTransport of zinc and cadmium in soils: Experimental evidence and modeling approaches.US Patent 4,022-521.
8. https://www.theguardian.com/environment/2014/jan/08/devecser-hungary-eco-town
9. https://www.ecowatch.com/conservation-groups-take-action-against-epas-inability-to-combat-acid--1881621033.html
10. https://www.lenntech.com/processes/heavy/heavy-metals/heavy-metals.htm#ixzz5WMBnCVu6

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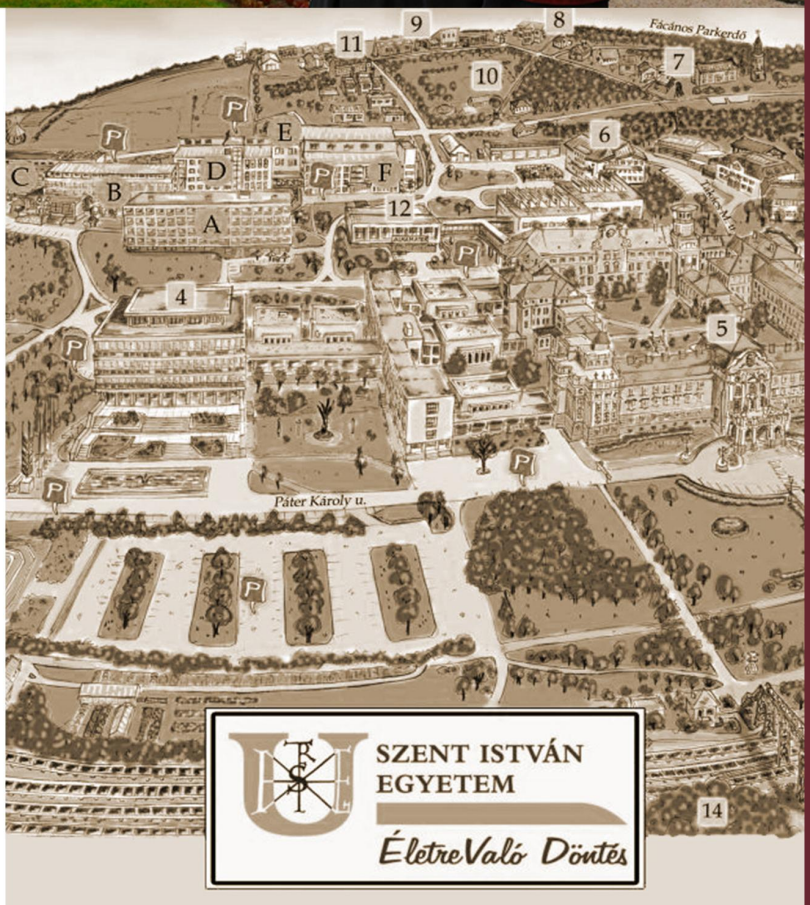

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