

## LANDSCAPE INDICATORS TO EVALUATE THE AGROECOSYSTEMS SUSTAINABILITY: A CASE STUDY IN GREECE

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### ABSTRACT

Indicators and indexes are useful tools for experts and decision makers who deal with environmental issues. This research seeks to identify and provide specific agro-environmental information, in the form of indicators (metrics), in order to assess the effects of human activities on the landscape and the degree of sustainability of the ecosystems. Two Hellenic regions were analyzed in order to provide an overview of sustainability at landscape hierarchical level: the first one in northern Greece (Imathia) and the second one in central-northern (Larissa). Results show that in Imathia the land cover is more diversified than in Larissa (i.e., in Larissa the 93% of the area is dedicated to herbaceous crop cultivation); therefore, in Larissa ecological structures such as woodlands are practically absent. Land use homologation represents a driving force working to increase the amount of agricultural outcomes but the environmental costs are frequently underestimated or not considered. In order to pursue the goal of sustainable development it is necessary to improve the landscape management in Greece and under this perspective, agriculture can play an important role, also in view of the arrival of the new European Common Agricultural Policy.

**Keywords:** indicators, environmental management, sustainable agriculture, landscape ecology, biodiversity, CAP Directive.

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## ASSESSMENT THE IMPACT OF USING THE ALLEY CROPPING IN THE EAST OF MOROCCO

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### ABSTRACT

The objective of this study is to assess impact of using alley cropping as an agroforestry's practice on productivity of fodder shrubs and barley crop. The study was carried out in Eastern Morocco (Tancherfi site). In order to diversify the productivity in the region and to meet nutritional requirement of livestock during feed gap periods, *Atriplex nummularia* were planted in association with barley in dry area. The vegetation parameters (shrub biomass and canopy cover) were measured during three periods (February, April and June), while the interviews with the livestock holders were conducted during June. The results show that shrub biomass and canopy cover of *Atriplex nummularia* were increased by 15% and 10% respectively due to the inclusion of barley. Farmers expressed their satisfaction with the use of this technique which has allowed an increase of 40% of barley grain yields. This result could be explained by microclimate created by fodder shrubs that benefited barley growth and development. As a conclusion, with active involvement of community alley cropping should be introduced in any policy related to development of pasture lands in eastern region of Morocco.

**Keywords:** Alley cropping, agroforestry, *Atriplex nummularia*, barley, Eastern Morocco.

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## STUDY OF THE CORRELATIONS AMONG THE MAIN FEATURES OF THE PLANT IN SOME MAIZE INBRED LINES AND THEIR HYBRID COMBINATIONS IN THE CONDITIONS OF ISTOG, KOSOVA

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### ABSTRACT

In this paper, it is presented the results of the study of the correlations among some important features of the plant in 10 maize inbred lines and their 20 hybrid combinations. The goal is to determine the emergence of the correlations among these features in three genotypic states: the lines in the role of the maternal and paternal parent and the hybrid combinations. From this study, it results to have strong positive correlations among the plant height and the height of the first corn cob. Also, it is observed to have positive correlations among the plant height with the number of the leaves and the height up to the first corn cob with the number of the leaves. Negative correlations are noticed among the length and the width of the leaf. Regarding the measure of the occurrence of the correlations among these features in the inbred lines (homozygote genetic state) and their hybrid combinations (homozygote state), there are observed changes in the size of the correlation coefficient, but not tending to bonding among them. The study of these links/correlations directs us in the process of selecting inbred lines and their hybrid combinations.

**Keywords:** correlation, hybrid of maize, variable correlation links, pleyotropia

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## SILVER NANOPARTICLES AND SILVER IONS BIOAVAILABILITY. BIOACCUMULATION IN *CAPITELLA TELETA* ORGANISM.

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### ABSTRACT

The goal of the project is to investigate the bioavailability of silver ions ( $\text{Ag}^+$ ) released by silver nitrates and silver nanoparticles (Ag NPs), in three different medias: milliq water, seawater and sediment, and their bioaccumulation potential using the marine polychaete *Capitella teleta* as testing organism. The DGT performance tests were carried out to investigate the availability of silver ions in the three above mentioned medias, and concentration of silver ions in worms were used to calculate the bioaccumulation factor of silver ions in seawater and sediments. Growth rate of *C. teleta* was another endpoint monitored during our project. DGT measurements show that there is more labile  $\text{Ag}^+$  released from Ag NPs in milliq water than in seawater. The worms were exposed to silver ions, and silver nanoparticles in sediment and seawater for 16 days, and DGT performance lasted also 16 days. After exposure the concentrations of ions in organisms were measured by using an atomic absorption spectrometer (AAS). The observations showed that organisms in seawater were dead after one day of exposure, while the AAS measurements showed that the concentration of ions in organisms did not varied a lot with  $\text{Ag}^+$  and Ag NPs. BAF was smaller with AgNPs than with  $\text{Ag}^+$ . BAFs in both cases are less than 1, it means that for this specie silver is bioavailable but not bioaccumulated. Growth rate of *Capitella teleta* is not not affected by the presence of  $\text{Ag}^+$  and AgNPs.

**Key words:** Silver nanoparticles, bioaccumulation, bioavailability, risk assessment

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## STUDY OF GENETIC DIVERSITY OF SOME BEAN POPULATIONS IN ALBANIA

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### ABSTRACT

Common bean (*Phaseolus vulgaris* L.), represents a high genetic diversity with importance for agricultural Albanian production. In the Gene Bank of the Agricultural University of Tirana (AUT), a rich collection of bean germplasm is preserved. Exploration, collection and conservation, of genetic resources are some of the main purposes of plant genetic resources evaluation programs. For this reason, during 2008-2009 collection missions were undertaken on mountainous sites of the country. Collected common bean samples were -cultivated and in the same time evaluated and characterized. Field tests took place during 2010, at the Experimental Station of AUT. The morphological characterization was done according to the IPGRI- "Descriptors List for Bean" for characteristic as: plant data (growth type, colour of flower, days to flower, and duration of plant period); leaf data (shape, persistence, radiation); pod data (pods per plant, position, colour, pod length, width, cross-section). Seed characteristic evaluated were: main colour, width, height, colour of helium, etc. Results taken were analyzed for possible relation between characters in bean populations. Hierarchical Cluster Statistical Method was used to observe relation and distance among bean populations in this study. We observed differences between populations and sometimes within the same population of common bean, collected in different places. Pronounced differences were present between bean populations for flowering and days till flowering, which is represented with amplitude 17 – 43 days. Differences were observed for pod number and number of seeds per pod. The results of this study will serve as additional information for Gene Bank and for future plant improvement programs.

**Key words:** characterization, collection, IPGRI descriptor, genetic resources.

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**MANAGEMENT PLANS OF THE NATIONAL PARKS IN MACEDONIA****Zoran Sapuric<sup>1</sup>, Vulnet Zenki<sup>2</sup>**<sup>1</sup>*University American College, Skopje, Macedonia (former minister of environment)*<sup>2</sup>*South East European University, Tetovo, Macedonia*Email: [sapurik@uacs.edu.mk](mailto:sapurik@uacs.edu.mk); [v.zenki@seeu.edu.mk](mailto:v.zenki@seeu.edu.mk)

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**ABSTRACT**

National parks have a great importance for protection of the nature, ecosystems and overall environmental protection. In the Republic of Macedonia there are three national parks, (Pelister, Mavrovo and Galicica) that have a long history. Macedonian national parks are protected by special regime which is stipulated in the special legislation. The total protected area in Macedonia is 205.235 ha, or 8.07%, of the total area of the country. In future is possible to increase this area, because there have been taken certain activities aimed on declaring the fourth national park at the Shara Mountain. Development of the national parks is not possible without management plans. The well designed plans of national parks, can lead to the favorable environmental benefits, and at the same time will bring many economic and social benefits. The aim of this paper is to analyze the management capacities and potentials of the national parks in Macedonia and to research the possibilities for sustainable economic development of these parks, especially for greater development of eco tourism. Also the research gives some recommendations for the activities in the direction of higher economic development.

**Key words:** National parks, management plans, economic development, nature protection

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## NATURAL ECOSYSTEMS, SUSTAINABLE DEVELOPMENT OPPORTUNITIES, CASE STUDY: COMMUNE "Ishem"

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### ABSTRACT

Global warming and inappropriate utilization of the functioning of natural resources is endangering natural ecosystems. Human activity, such as agricultural activity, transport development, the development of tourism, the scale-up of the population and its uncontrolled dispersion, irrational utilization as well as interferences in the environment are some of the underlying causes that damage the ecosystems. In Albania it was the transition itself that showed its symptoms not only in the social-economical spheres of policy but it didn't spare the systems of administration of natural resources either. The purpose of our research is to spot the current state of renewable natural resources (woods, pasture land, flora, faunas, touristic areas) and to give the guidelines for a stable development. The territory of Ishem Commune lies in the central lowland climate zone characterized by a climatic element that favours prolonged droughts in the warm half of the year. The climate factor and the inappropriate utilization of natural resources of the area supports erosion. Erosion that comes as a consequence of this aridity, lack of vegetation is leading to the land degradation by markedly making inroads into the ecosystems of the area. Biodiversity of Ishem Commune is eminently rich in kinds and qualities, but as a consequence of the aforementioned phenomena we witness some rigidity habitat. Despite these problems it must be stressed that in the last years the natural resources of Ishem Commune have had a regeneration, a development and considerable growth as far as volume and the land area are concerned and as a consequence in an evolution of biodiversity in general. The impact of ecosystems in the environment is marked because of their multifunctional role. Environmental impacts are expected to be positive especially thanks to the amelioration of forest ecosystem of oak the largest in national scale. These impacts will be spotted in the improvement of the area microclimate, the increase of the capacity of the reservoirs, the scale-down of erosion level, the reduction in a satisfactory level of arid and frosty days as well as many other effects over the area environment. All in all we might say that with the current ways of utilization, the methods of land protection, natural forest, and water ecosystems of the areas that are under study by having low investments until these resources reach a rational utilization and by protecting them from contamination will have not only stability, but a continuing growth of this environmental stability and the functioning of these ecosystems.

**Key words** : Global warming, ecosystems, biodiversity, stability.

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## MONITORING OF VIABILITY OF SOME MAIZE ACCESSIONS STORED IN ALBANIAN GENE BANK

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### ABSTRACT

Seeds are the principal means of conservation, regeneration and distribution of most field plants. They serve as the delivery system for the transfer of genetic materials from one generation to the next. There are more than 650 accessions of maize (*Zea mays* L.) stored as base collection in Albanian Gene Bank. Using standard of germplasm monitoring, we realized the seed viability testing of some maize accessions stored in genebank before 12 years. Ten genotypes were taken randomly from a total of 643 maize accessions. The 400 seeds, replicated four times, were tested for energy and germination capacity. ANOVA analysis shows the presence of significant differences between maize genotypes for germination capacity ( $F_{\text{factic}} 23.2319^{**} > F_{\text{crit.}} 2.2501$ ). In all samples (excepted one) the germination capacity was maintained higher than 85 %. There were significant differences for the range of the germination capacity lost during 12 years. The lost values were less to 5% in 5 genotypes, less to 10% in 2 genotypes, and 11% in 2 other genotypes. In total germination capacity lost values range from – 1% to 24 %. The results of this study show that the maize genotypes in general were conserved in good conditions according to standard of the genebank. At the same time the presence of one sample with germination capacity (74%) show that round 9 percent of maize accessions can be under the 85% of germination level. Therefore, for the sure storage of the maize collection we recommends the next test viability.

**Key words:** viability, accession, collection, ex-situ conservation.



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## BRUCELLINA PPD PRODUCTION AND MONITORING OF VACCINATED CATTLE WITH VACCINE WITH STRAIN BRUCELLA ABORTUS RB51

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### ABSTRACT

Brucella infection is present in Albania, as in small ruminants, also in cattle. Prevalence of Brucella infection in small ruminants is at 0.9 to 1.2%, whereas this infection in cattle has endemic character and is identified in some areas of the country, as in Korce, Durres, Diber, Lushnja and Gjirokastra. The strategy of control / eradication of brucellosis in cattle in some complexes, along with elements of serological control and the elimination of positive heads of cattle, was applied the immunization of cattle with the vaccine produced by vaccine strains Brucella abortus RB51. To identify cattle vaccinated and those infected with Brucella spp, was produced Brucellina PPD allergen. For the production of Brucellina PPD allergen was used strains Brucella abortus RB 51. Bacterial emulsion produced, underwent several rigorous methodological procedures, like: emulsion deactivation in biofermentator in temperature 70<sup>0</sup> C, centrifugation at 10.000 and 15.000 g/min, separation of the supernatant, the benefit of cytoplasmic protein by processing it with ATC and purification through the use of tampons solutions with pH 11, pH 9.6, pH 2.6 and pH 7.0 - 7.2. After these procedures through Kjeldhal method was enabled determine the concentration of the purified cytoplasm protein. The product received was finalized at that level, at which 1 ml product contained 1µg protein. The study has been extended in 1250 head of cattle from complexes of Tirana, Durres and Lushnja, conducted during the years 2009 to 2012. With the applied strategy, it was achieved that after 18 months, the complex of cattle in Durres was considered practically healthy, while the cattle complex in Lushnja is on the eve of health. Sensitivity of allergy test in vaccinated cattle resulted 94%, while the sensitivity of this test in a limited number of heads of cattle, considered positive with serological tests, resulted 81.25%, versus specificity which is 100%. This study shows that Brucellina PPD allergen produced with strains Brucella abortus RB 51 can be used to identify vaccinated cattle from the infected cattle by using Brucella spp. ATC-Acid trichoracetik.

**Key words:** strain Brucella abortus RB51, Brucellina PPD, cows.

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## PRELIMINARY DATA REGARDING ANTHROPOGENIC IMPACT ON THE MURAT RIVER (AĞRI REGION)

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### ABSTRACT

The Murat River (in Turkish Murat Nehri, Murat Suyu or Murat Irmağı) is the eastern branch of the Euphrates and it springs near the small town Doğubeyazıt. Agri city is the capital of the region with same name and is located in eastern Anatolia; in year 2008 the population of this city was officially estimated to 91,817 inhabitants. There are not so much scientific papers regarding the Murat River, despite the great anthropogenic impact, especially in the urban area. The present papers renders the first results regarding the estimation of the the saprobity degree of the river based on ciliates communities; 19 ciliates species have been identified so far; most of them belong to the community that characterizes polisaprobic areas. This paper also presents the results of a questionnaire about environmental protection; the target group was composed of 200 students of Ağrı Faculty of Education, aged 19 -23. I thought that they have formed opinions on environmental issues. We used this target group starting from the assumption that the subjects were mature enough to have clear opinions about environmental issues.

**Key words:** the Murat River, pollution, ciliates, environmental education.

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## DETERMINATION OF Pb-210 AND Po-210 RADIOISOTOPES IN SOIL USING EXTRACTION CHROMATOGRAPHIC TECHNIQUE

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### ABSTRACT

Polonium (Po-210) and Lead (Pb-210) are relatively long-lived members of the natural U-238 decay series. They contribute significantly to the radiation dose of the population. For this reason we have analyzed soil samples from different parts of Albania to determine the respective level of Po-210 and Pb-210. A radiochemical procedure is applied to separate lead and polonium simultaneously from different soil samples in the presence of the standard solution of Po. After adding Po-209 tracer and lead carrier samples are decomposed using mineral acids. Lead and polonium are selectively retained from 2M HCl solution by crown ether resin. Polonium is stripped with 6M HNO<sub>3</sub> while lead with 6M HCl solution. The sources of polonium are prepared by spontaneous deposition onto silver disk. The activity concentration of Po-210 is determined by isotope dilution alpha spectrometry. Lead is precipitated as oxalate and the activity concentration of Pb-210 is calculated from the liquid scintillation spectrum. The chemical recoveries for Po and Pb are good and the values range in 60-80 %. Replicates, reagent blank and certified reference materials are used for the quality control purposes. In general Po-210 and Pb-210 activity concentrations in certified reference samples agreed well within the statistical uncertainty with the reference values and confidence intervals reported for these materials.

**Keywords:** Polonium, lead, soil sample, crown ether resin.

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## ENERGY EFFICIENCY AND RENEWABLE ENERGY SOURCES – BENEFIT FOR THE AGRICULTURAL SECTOR IN THE REPUBLIC OF MACEDONIA

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### ABSTRACT

The agricultural sector is of great importance for the Republic of Macedonia. It covers 10% of the total GDP and about 20% of the total employees in the country. Today, farmers face difficulties in achieving efficient production and selling their products on the international markets. The reasons are numerous, and the most important are climate changes (high temperatures, floods, and droughts), international agricultural policies and competitiveness between farmers. These challenges are the reason to ask “how to improve conditions in the agricultural production and thereby to increase the benefit of farmers”. Therefore, this paper aims to emphasize the necessity of using renewable energy sources and energy efficiency implementation in the agricultural sector in the Republic of Macedonia. The purpose is to increase the awareness of farmers that the properly utilisation of energy and environmental friendly practices can increase the efficiency of production and provide bigger benefits. The research gives an explanation in terms of energy efficiency and different types of renewable sources of energy, followed by the possibilities for their implementation. The survey is based on the analysis made on the existing farms and the use of efficient and environmental friendly energies in different agricultural sub-sectors in the country. At the end, the use of those technologies is explained and confirmed, not only with economic benefit for farmers, but also with benefit to the whole environment.

**Keywords:** Agricultural sector, economic benefit, energy efficiency, renewable energy sources, Republic of Macedonia.

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**DIMENSIONS OF ECOTOURISM IN RELATION TO ECOSYSTEM****M. Resulaj\*, E. Kadiu, D. Risilia, A. Jaupi***Faculty of "Economy & Agribusiness", Agriculture University of Tirana*\*Email: [marsiresulaj@yahoo.com](mailto:marsiresulaj@yahoo.com)

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**ABSTRACT**

Ecotourism is defined as "responsible travel to natural areas that conserves the environment and improves the well-being of local people. Ecotourism, when properly executed based on these principles, exemplifies the benefits of socially and environmentally sound tourism development. The object of this study is ecotourism and the relationship he has with the ecosystem and analysis of core criteria of ecotourism suggests two "ideal types" based on the level of sustainability outcomes. The comprehensive model adopts a holistic and global approach to attractions and interpretation that fosters environmental enhancement, deep understanding, and transformation of behavior. It is argued that the comprehensive model can best promote global sustainability by accommodating selected hard (or small-scale) and soft (or large-scale) characteristics, thereby taking advantage of the economies of scale offered by the latter. While this high level of attention has not yet resulted in a universally accepted definition, there is an emerging consensus that qualifying products must be primarily nature-based, focused on the provision of learning opportunities, and managed in such a way as to maximize the likelihood of environmentally and socioculturally sustainable outcomes, including positive benefits for local communities. In the end of this study it is argued here that size per se is not the problem, and that the success of the comprehensive model is dependent upon the extension of its principles into the soft arena, where economies of scale confer several critical potential advantages in the interests of environmental and economic sustainability that are absent in its hard manifestation.

**Key words:** comprehensive and minimalist ecotourism; hard and soft ecotourism; costs and benefits of ecotourism

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**ECO-TOURISM DEVELOPMENT IN THE AREA OF PRESPA, ALBANIA**Myftari, S<sup>1\*</sup>, Apostoli, S<sup>1</sup>, Kadiu, E<sup>1</sup>, Nesturi, E<sup>1</sup><sup>1</sup>*Agricultural University of Tirana*Email: [edmond\\_kadiu@yahoo.com](mailto:edmond_kadiu@yahoo.com)

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**ABSTRACT**

Prespa area is located in southeastern Albania, near the western part of the lake with the same name, and east of “Dry” Mountain. It consists of ten villages that are under the administration of the municipality of Liqenas, under the district of Korca. Its population is with Macedonian nationality, new age and dynamic, with good skills with culture and with education level, distinguished in particular for the hospitality, for wisdom, sincerity, and behavior that shows respect among themselves and with others who have occasion to go there. Distinguished for wealth and natural resources are complementary. Landscape in this particular area is an expression of a combination of different factors natural environmental lake with historic monuments or historic elements of worship, cultural traditions, etc. All these elements serve as promoter for a sustainable development of the area in line of rural tourism, eco-tourism which constitutes the basis of its development. The basis of life for residents of the area are agriculture, livestock and immigration, but perspective quality improvements expected to come from its tourism industry with the opportunity to develop things in the area, as hopes for a rebirth towards economic prosperity, social life in general. It maintains the status of National park promulgated Decree Nr.82, dated 18.02.1999. Heron where forests occupy 49% of the total land fund, meadows – pasture about 7% surface water, 17.6% agricultural land 7.6% and difference is not agricultural land (non-productive areas). Societies and traditional communities undergo important processes of transformation and disturbance derived from the trend towards “globalisation” which ecological characterizes world economy at the present. The definition of ecotourism says that: All nature-based forms of tourism in which the main motivation of the tourists is the observation and appreciation of nature as well as the traditional cultures prevailing in natural areas. It minimizes negative impacts on the natural and socio-cultural environment. It is especially important to distinguish between the terms Naturtourismus and Ekotourismus. “Naturtourismus” refers to a market segment whose distinguishing feature is that it engages in nature-related activities in attractive natural settings, preferably in protected areas. The spectrum ranges from science tourism, to wildlife watching and nature photography, to consumptive activities (fishing and hunting) as well as sports and adventure tourism. “Ekotourismus” refers to forms of Naturtourismus that attempt to responsibly minimize negative environmental impact and socio-cultural changes, help to finance protected areas, and create sources of income for the local population.

**Key words:** ecotourism, environment, natural assets, negative impacts, positive impacts.

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**CAPACITY BUILDINGS NEW OPPORTUNITY FOR DEVELOPMENT OF RURAL AREAS (CASE OF PREZA COMMUNE), ALBANIA****Etleva Muça (Dashi), Ana Kapaj, Ilir Kapaj, Irma Tabaku***Faculty of Economy and Agribusiness, Agriculture University of Tirana, Albania*E-mail: [evadashi@yahoo.fr](mailto:evadashi@yahoo.fr)

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**ABSTRACT**

Recent trends in Albania suggest that it has the potential for a modern and competitive agricultural sector, provided there is the right policy environment to engender sufficient private investment. The process of de collection in Albania created a big number of small farms and they have different characteristics according to the farm surface, agro-chemist characteristics and social economic factors. Rural population in Albania is seriously engaged in agricultural production. The latter is the main source of revenues for rural families in our country. Conventional approaches to technology transfer within small-scale farming systems have frequently failed. Household food security remains precarious for large numbers of people in the rural areas of Albania and food production levels show little or no increase.

In these conditions the role of the local stakeholders is the success key in their future actions with the intention to contribute to the sustainable development, by both conserving the tradition and enchainning local development. So, the main objective of this paper is to know the current situation of households in the Commune of Preza and to identify the potential actors and mechanisms which will facilitate and encourage the improvement of rural areas.

**Key words:** Preza Commune, SWOT analysis, Partnership, Capacity building.

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## ELECTROCHEMICAL INVESTIGATION OF HEAVY METALS IN HONEY IN SOME REGIONS OF KOSOVO

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### ABSTRACT

To investigate heavy metals (Cu, Pb, Cd, Zn) in honey as a method of investigation we have used Differential Pulse Polarography. Samples have been collected in some regions of Kosova, polluted considered areas but also some places from unpolluted zones as a reference of comparison with the first ones. Based on the literature data regarding the method we've used, wave polarographic potentials show presence of heavy metals in their own potentials whereof :  $E_{Cu^{2+}} = 86$  mv,  $E_{Pb^{2+}} = -313$  mv,  $E_{Cd^{2+}} = -503$ mv, and in our experimental conditions it was little hard to detect the presence of Zn, sometimes due to hydrogen wave interference. From obtained polarograms we have constructed calibration plot for each metal where from we conclude the quantity of metals in analyzed samples. Measurements were conducted in a pure electrolyte  $HNO_3$  at same conditions as in honey samples for metal concentrations from:  $1 \cdot 10^{-7} \text{ mol/dm}^3 - 1 \cdot 10^{-6} \text{ mol/dm}^3$  while we followed potential from 0,25 - 0,8 V. Values of the current intensity expressed in nA show no high values but the presence of heavy metals in analyzed samples is very clear.

**Key words:** heavy metals, honey, differential pulse polarography