3rd International TBCC 2016

Tropical Biodiversity Conservation Conference

BOOK *of* ABSTRACTS

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TABLE OF CONTENTS
FROM PRAGUE CONFERENCE

TABLE OF CONTENTS
FROM PRAGUE CONFERENCE

LAST LIVING WESTERN DERBY ELANDS NEED OUR ATTENTION!

Karolína Brandlová[1]
Tamara Fedorova[1,2], Pavla Jůnková Vymyslická[1],
Anna Kubátová[1,2], Magdalena Žáčková[1,2],
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Niokolo Koba National Park (NKNP) is the last refuge of the only confirmed wild population of Western Derby eland (Taurotragus derbianus derbianus), counting less than 200 individuals in 2006. The NKNP covers area of 913,000 ha and it is in the UNESCO List of World Heritage in Danger sites, particularly due to the sharp decline of large and medium sized fauna. The conservation programme for critically endangered Western Derby eland was established in 2000 in the Bandia reserve and later in the Fathala reserve, Senegal. Six founders (1 male and 5 females) caught in the NKNP became a basis of back-up population in semi-captive conditions of fenced nature reserves. Thanks to mutual cooperation of Directorate of National Parks of Senegal, Society for the Protection of the Environment and Fauna of Senegal, Czech University of Life Sciences Prague, and NGO Derbianus Conservation, the population counts 98 individuals (June 2016). Although the number of Western Derby elands in the reserves is increasing and precise population management is practised, the situation is still critical. There are only 28 females in reproductive age and genetic diversity is still decreasing. The population would benefit from additional founders form NKNP. On the other hand, demographic parameters of the wild population are missing and information about their ecology in the NKNP is scarce. For the last 16 years, the Senegalese-Czech team is running a conservation programme to protect the Western Derby eland together with their natural environment. For more information see Western Derby eland studbook or www.derbianus.cz.

Keywords: *conservation programme, Senegal, Taurotragus derbianus derbianus.*

Acknowledgement: We thank all those who supported the Western Derby eland conservation programme.

VETERINARY AND AGRICULTURAL DEVELOPMENT IN RURAL MALAWI THROUGH TRAINING OF COMMUNITY ANIMAL HEALTH WORKERS

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Agriculture is an important sector of the economy, as half a billion people in the world fully depend on the health of their livestock. These animals provide food, income and are used as working force. If the herd is not healthy, the whole community is affected. In addition, zoonotic diseases have a great impact on both human and animals. By providing training and transferring veterinary knowledge, communities can learn to keep their herds healthy and achieve a higher production, leading to a higher income and better standards of living.

DIO is a veterinary student organization run by volunteers, but also a Dutch foundation with the mission “Healthy animals, healthy people”. We try to achieve this by educating and motivating students and veterinarians in the Netherlands on the importance of animal health in developing countries.

Together with local partners such as Matunkha centre and the Small scale livestock and livelihoods program we aim to improve veterinary knowledge in Rumphi, a rural village in the norther part of Malawi. To achieve this we trained 15 farmers to become Community Animal Health Workers (CAHWs). In total they received seven weeks of training, in four different time periods. Furthermore they have follow up moments with a local trainer twice a year, in which they discuss problems and questions they encounter in the field and also recap the knowledge they already learned. Finally, the CAHW’s shared their knowledge on animal health with 150 farmers in their own communities.

The project is sustainable; the CAHWs all earn an income by selling their knowledge and medication. They also perform small veterinary procedures such as vaccinations and castrations. Most of them visit around 20 farms each week on their bike and do not need to exploit other activities to earn a living.

METHODOLOGY TO SURVEY AND ENGAGE LOCAL COMMUNITIES TO REDUCETHE ILLEGAL TRADE OF PANGOLINS

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Pangolins are the most heavily traded mammal that people have never heard of, with an estimated one million individuals having been victims of the illegal wildlife trade in the past decade. With the recently approved uplisting of all eight species to CITES Appendix 1 efforts are clearly focused on the ground, looking at developing suitable rehabilitation protocols, methodologies to survey for the species and how to engage local communities to reduce the illegal trade of pangolins. For an elusive species with such a high value many of this activities require a novel approach presenting an opportunity for interesting research an some creative conservation.

MICROFINANCE THAT HELPS TO COMBAT THE ECOLOGICAL DAMAGEAND ENVIRONMENTAL DEGRADATION

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Extreme poverty leads to deterioration of natural habitats because the modus vivendi of poor people and their daily activities leads to excessive deforestation and pollution. By using the Correlational and Ethnographic Methods of Research, we measure day by day poverty in areas where we perform Microfinance, and we observes on the field how poverty increases pollution of the ecosystems.

Our research generates two main conclusions:

- Poverty forces these families to rural areas in non productive lands, where the lack of resources impedes the efficient collection of the garbage generating the excessive accumulation of it, accelerating soil erosion and also triggering intestinal pathologies mostly diarrheal and parasitic that causes them malnutrition.

- There´s a direct correlation between the process which they build their homes, make their crafts, heat their homes and prepare their food with environmental degradation and the generation of micro-climatic changes that generates natural disasters in those areas. That´s why we´ll discuss how Social Businesses through Microcredit and Microleasing focused on improving human conditions, have significantly ameliorated the health oh the inhabitants and has completely reversed habitat degradation.

IN SITU CONSERVATION OF NATIVE LANDRACES AND THEIR WILD RELATIVES: CONCEPT AND GOOD PRACTICES FOR SUSTAINABLE LIVELIHOODS

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In situ approach involves the maintenance of genetic diversity at the original location, either in the wild or in traditional farming systems. A strong national programme of genetic resources conservation has existed in Vietnam since the 1990s. The programme began with ex situ conservation techniques.

The presentation will target conservation of native landraces and their wild relatives (NLWR) in three local eco-geographical areas: the northern mountains, the northern midlands, and the north-west mountains of Vietnam. These areas are rich in biodiversity of native landraces and their wild relatives. The important crop groups of NLWR will be protected by mitigating the threats to the agrobiodiversity of the target sites and preserving their genetic diversity, thus improving global food security.

In this presentation, the various methodologies of eco-geographical surveys and inventories; selection strategies of target species and Plant Genetic Resources Important Zones (PGRIZs); methodologies for NLWR conservation, management and monitoring plan for genetic diversity of target species in selected PGRIZs; lesions learnt on integrating livelihood strategies with gene conservation are discussed.

Keywords: *In situ conservation, genetic diversity, wild crop relatives, gene management zones, data management, target species, management plan, livelihood strategies.*

VETERINARY MISSION: SELECTED ENDANGERED ANIMAL SPECIES ON NEGROS ISLAND, PHILIPPINES

Ján Jamriška

Conservation of endangered species has many aspects, and veterinary care is one of them. It is not just treatment of basic diseases, which unfortunately can in third world countries lead to death. But it is mainly a different point of view on the same problem keepers, biologists or owners have. No mater if one has high end diagnostic methods for complex parasite infection, or works just with his knowledge to solve basic epidemiological problem. As a team of veterinarians, we came to Philippines to help with a breeding program of endangered Hornbills and some mammals. Their stud facilities are mainly localized in farms with other exotic bird species, bred mainly for economical profit. We have visited two farms, one near Kabankalan and the other one in Punta Ballo near Sipalay city, both localized on Negros Island in Philippines. Except basic treatment, we focused on epidemiological status and welfare of kept animals. We did coproscopic examination and took some blood samples for further analysis. Suggestions we did, should help prevent spreading diseases among specimens bred and should improve breeding conditions and welfare of kept animals.

HOW TO SAVE THE LAST COASTAL FORESTS AROUND MACHALILLA NATIONAL PARK IN ECUADOR? PERSPECTIVE OF POLITICAL ECOLOGY

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Ecuadorian coast has experienced one of the most drastic forest conversion in the last 50 years. Yet, the Machalilla national park was established in 1979 to protect coastal areas and one of the last stands of tropical dry and coastal cloud forests. The creation of the park itself was accompanied with obstacles and troubles with indigenous communities living for centuries inside the boundaries and in its buffer zone The lack of communication between park staff and communities led to misunderstanding of the purpose of the park and also led to several conflicts which continue until today. The expanding agricultural frontier as well as illegal logging activities are highly altering the last forest stands in the buffer zone. This situation led to implementation of several projects with the aim of diversifying the economy of the peasants and communities living there. Several farmers have subscribed their properties to the governmental incentive program SocioBosque which is paying them in return to conserving the forest. However, as this program require legal title to the land, many farmers can not achieve it as they own the land only informaly. Other farmers were involved in projects focusing on forest plantations of valuable timber species. Another communities are leading community ecotourism, while others are dedicated to sustainable collection of tagua nuts or cultivation of paja toquilla palm. Although all those activities in some way contribute to more effective use of resources and thus conserving remaining patches of forests, the region still remain under the huge pressure.

SALIVA CRYSTALLIZATION OCCURS IN FEMALE BORNEAN ORANGUTANS *(PONGO PYGMAEUS)*: COULD IT BE A NEW OPTION FOR MONITORING OF MENSTRUAL CYCLE IN CAPTIVE GREAT APES?

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The study aimed to confirm of the presence of saliva crystallization in female Bornean orangutans (Pongo pygmaeus) and to test preliminarily if it could be connected with menstrual cycle and could serve as a cheap, quick and simple method for the basic monitoring of their reproductive status. Sampling of saliva was done in three female orangutans from three zoological gardens (Dvur Kralove, Usti nad Labem, Bojnice) daily from September 2014 to January 2015, mostly by tongue prints on glass slides with ground edges or by sampling directly from the mouth using plastic spoons from which the saliva was transferred onto glass slides. Samples were evaluated by light microscopy with ×400 magnification. The quality of the sample and type of crystallization was assessed for two different approaches. In total, 246 samples were evaluated. We confirmed the presence of saliva crystallization in orangutans. The quality of samples was variable however acceptable. Unfortunately, it was impossible to detect exact fertile period in two females. However in one orangutan female, when the crystallization was evaluated by the approach typically used in humans, we discovered that saliva crystallization during the fertile period significantly differed from saliva crystallization in the non-fertile period. This points out the possibility of using saliva crystallization for detection of the fertile period in orangutans. However, further research was recommended. If you are interested in participation in this research or if you know about a breeding group suitable for this research purpose please let us know by writing an email on kubani@seznam.cz.

Keywords: *arborization; ferning; non-invasive; estrus monitoring.*

NOBLE SAVAGES OR PREDATORS? HUNTING PRIMATES BY INDIGENOUS COMMUNITIES

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The romantic idea of the indigenous tribal hunters as “noble savages”, which describes the traditional hunters as living in harmony with nature, is still prevalent among many anthropologists, ecologists, and conservationists. In this paradigm, the indigenous people behave as good managers of their natural resources, albeit they do that unconsciously, out of their pure nature. We argue that the hunting behavior of these people can be better described by the optimal foraging model, same as the one that explain hunting behavior of carnivores and other predators. However in case of human hunters there is no the negative feedback imposed by the population density of the prey on the population density of the predator. Under such circumstances, hunting of primates by the indigenous communities may not be sustainable. It may have caused local extinctions of several primate species, including orangutans, proboscis monkeys or langurs, and it was probably the leading cause of the extinction of several primate species in past centuries. It seems that in order to assure the survival of primates in tropical rainforests, strict elimination on hunting may be a better strategy compared to the attempts to develop a sustainable harvest system.

Keywords: *arborization; ferning; non-invasive; estrus monitoring.*

CHEWING LICE (PHTHIRAPTERA: AMBLYCERA, ISCHNOCERA) FROM WILD BIRDS IN VIETNAM

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Our research of chewing lice of wild birds took place in 2008, 2010 and 2016 in territories of three national parks (Ba Be, Cuc Phuong and Tam Dao NP) in northern Vietnam, in 2015 in two locations within Pu Mat NP in central Vietnam and in 2011 and 2012 in four locations within three NP in southern Vietnam (Cat Tien, Binh Chau – Phuoc Buu and Bi Doup – Nui Ba NP). In generally, 959 birds of 133 species were examined, 299 ex. of 50 spp. in northern Vietnam, 227 ex. of 39 spp. in central Vietnam and 239 ex. of 50 spp. in southern Vietnam. A total of 282 birds of 61 spp. (prevalence 29%) were parasitized by chewing lice belonging to 10 genera from two suborders, Ischnocera and Amblycera.

The birds examined were mostly passerines (Passeriformes; 95%, 916 ex., 120 spp.) from 27 families, the other 43 birds belonged to orders Coraciiformes, Cuculiformes, Piciformes and Strigiformes. The highest prevalences of infestation were found on bulbuls (Pycnonotidae; 69%, 135 ex. of 11 spp. examined), babblers (Timaliidae sensu lato; 29%, 305 ex. of 25 spp. examined, chewing lice recorded from all examined species) and Old World flycatchers (Muscicapidae; 17%, 153 ex. of 20 spp. examined). New host-louse associations, new chewing lice species described within this study, as well as other parasitological parameters as abundance, dominance or intensity of infestation, are discussed in the presentation.

Keywords: *Brueelia, Myrsidea, Philopteroides, Eurylaimidae, Turdidae, host-switching.*

Acknowledgement: The study was granted by the Internal Grant Agency of University of Veterinary and Pharmaceutical Sciences Brno (IGA UVPS Brno, No. 74/2011/FVHE and 2012), the Internal Mobility Agency of University of Veterinary and Pharmaceutical Sciences Brno(IMA UVPS Brno, No. 2015-FHVE-13 and 2016-FVHE-12).

THE SEMI LONG-TERM CUTTING, BURNING AND MULCHING EFFECTS ON SOIL, PLANT AND SPECIES ABUNDANCE IN THE NORTHERN GUINEA TROPICAL GRASSLAND

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The study was designed to investigate the effects of the near long-term defoliation and mulching on soil, plants and species abundance. We hypothesized that (i) the tropical savanna grassland management exerts substantial impacts on the chemical composition of the soil properties which afterward influence the biomass yield of the plants (ii) cut-with-litter abandonment and cut-with-burn have different impacts on the species composition, abundance and biomass production. The sampled and analyzed data were under cutting, burning and mulching treatments. After a 7-year of research, it was found that the introduced management practices significantly stimulated the species richness and biomass production. The general conclusion from the findings was that cut-with-litter abandonment was a better alternative to burning. Besides, burning might accelerate species richness yet, cut-with-litter abandonment produced higher soil and herbage nutrients and biomass production making it more ecological and economical values compared to burning. However, a longer-term study is required to consolidate our results about the management effects on the soil and plants in this Northern Guinea Tropical Savanna region of Nigeria.

Keywords: *soil-plant relationship, species diversity and abundance, Northern Guinea Grasslands.*

DOES SCIENCE HELP OR COMPLICATE THE CONSERVATION OF INDIAN RHINOCEROS?

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Captive populations might be very helpful in conservation of large mammals. Whereas other rhinoceros species suffer highly by current poaching crisis, the Indian rhinoceros (Rhinoceros unicornis) wild and captive populations are slightly increasing. The latter one exceeded 200 individuals in 2014. Recently, several scientific studies on captive population were published with conclusions which would affect highly the management if applied. These studies identified infant mortality and interbirth intervals among the main parameters affecting the viability and survival of rhinoceros populations. Therefore, we tested the recently suggested prediction that in captive Indian rhinoceros, longer interbirth intervals may result in higher infant mortality. We also examined which factors are the main predictors of infant mortality and interbith intervals using the studbook data on Indian rhinoceros born in zoos worldwide as well as data from Dudhwa National Park, India, where rhinoceroses were successfully reintroduced. We found no association between interbirth intervals and infant mortality. In both populations, the main predictor of infant mortality was mother's parity, with higher mortality in calves born to primiparous mothers. In addition, we found that the interbirth intervals were shorter in zoos than in Dudhwa and that they increased with increasing age of the mother, which was the only factor affecting interbirth interval in both populations. Our results show that the same factors affect both parameters in both populations and thus illustrate that the reproduction and infant survival of Indian rhinoceros in zoos reflect the natural pattern. Thus, no change of the management of captive populations is needed.

Keywords: *Calf mortality, Dudhwa NP, interbirth interval, parity, Rhinoceros unicornis, zoo.*

Acknowledgement: Our thanks are due to the Wildlife Institute of India, Uttar Pradesh Forest Department and U.S. Fish and Wildlife Service that funded the Rhino Reintroduction Programme in Dudhwa NP. This work was supported by the Ministry of Agriculture of the Czech Republic (MZERO0714).

SEA TURTLE CONSERVATION IN INDONESIA

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The Indonesian region of Berau has the greatest biodiversity in the world. The region is above all a home to sea turtles, and these islands are the eighth most important breeding grounds of green sea turtles in the world. Another critically endangered species, the Hawksbill sea turtle, also searches for food in this area. However, this incredible treasure of East Borneo is quickly disappearing.

The population of green sea turtles in this region has fallen by over 90 % in the past 70 years. This is primarily due to the fact that the locals still hunt for freshly laid turtle eggs and sell them. Bracelets from the turtle shells are also offered. Unfortunately, the sale of turtle shells and eggs is a global problem, not only limited to Indonesia.

The Indonesian conservation organisation Konservasi Biota Laut Berau protects 2 islands in the area against turtle egg thieves. Konservasi Biota Laut Berau organises workshops where people can learn to create souvenirs from sustainable resources such as coconuts instead of using turtle shells. In addition to direct protection of turtles on the islands, conservationists also focus on education and visit kindergartens and schools, where they teach children and students about the beauty of the sea, the unique organisms that live in it, but also how they can help them. It is difficult to change the mindset of adults, but the future belongs to children... And we hope that they will take care of the sea.

YPARD - YOUNG PROFESSIONALS FOR AGRICULTURAL DEVELOPMENT NETWORKING YOUTH IN AGRICULTURE

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YPARD is an international movement by Young Professionals FOR Young Professionals for Agricultural Development. YPARD operates as a network; it is not a formalized institution. At the heart of YPARD as a movement are its members, who are encouraged to become active in their area, spread the news about YPARD to other young professionals, encourage a stronger voice of youth in their own organizations and share their views and ideas with other young professionals in the network. This global on-line and off-line communication and discussion platform is meant to enable YPs all over the world to realize their full potential and contribute towards innovative agricultural development. YPARD´s mission is to serve as a global collective platform through which young professionals can realise their full potential and contribute proactively towards innovative agricultural development.

Our objectives are Facilitate exchange of information and knowledge among young professionals across disciplines, professions, age and regions; Broaden opportunities for YPs to contribute to strategic ARD policy debates; To promote agriculture among young people (activities still under discussion) and Facilitate access to resources and capacity building opportunities.

MANUAL LOW-PRESSURE BRIQUETTING PRESS AND ITS USE IN RURAL AREAS OF NORTH SUMATRA

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The existing burden on biomass resources, negative impacts on environment and problems of energy lowering resources could be alleviated by undertaking comprehensive alternative energy technologies for decentralized application. Utilization of biomass for combustion purposes ensures energy consumption requirements for heating and cooking in developing countries (DCs). However, using of raw biomass is characterized by low energetic efficiency and harmful air pollution, but densification technology (briquetting) can effectively reduce mentioned undesirable impacts. However, implementation of briquetting technology in DCs encountered limitations related to background facilities; heavy machinery as high-pressure briquetting press is used for briquette production, which means high initial expenditures and energy consumption. Therefore, manual low-pressure briquetting technology (operation pressure <5 MPa) represents alternative for biomass densification in DCs.

In present research a manual low-pressure briquetting press was constructed and tested in rural areas of North Sumatra. Partially disassembled construction was manufactured from wood components. System of piston and single lever powered by man power was used for biomass compaction; with square shaped briquettes. Feedstock materials originated from local production, i.e. plantation trees (coffee, cacao, coconut, oil palm), rice, sawdust, fruit skins, water plants or bamboo. Materials were crushed and mixed with water and binding agent (waste paper) in different ratios (biomass:paper – 1:1, 2:1, 5:1). After the feedstock compaction the briquettes were sundried. The results exhibited that amount and type of binding agents are major factors influencing briquettes quality, thus, low-pressure press efficiency. It was also proved that present design can be useful for small briquette manufacturers in rural areas.

Keywords: *Manual press; low-pressure briquetting; Indonesia; waste densification.*

Acknowledgement: Present research was supported by Internal Grant Agency of the Faculty of Engineering, Czech University of Life Sciences Prague, grant number 2016:31140/1312/3107 and by the Internal Grant Agency of the Czech University of Life Sciences Prague, grant number 20165003.

TROPICAL FORESTS DEVELOPMENT IN AFRICA

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Globally, tropical forests are important to the ecosystem and human survival, natural diversity, they are a natural pool of diversity that offers numerous medicinal plants, high quality food and wood, among other useful products. Tropical Africa is composed of Gabon, Cameroon, Congo, Ghana, Democratic Republic of Congo, Central African Republic, and Uganda, over the years, this region has taken a lead in production and Exportation of hard and quality wood. Their species include; African ash (Pterygota macrocarpa), African mahogany (Khaya grandifoliola), African Teak (Chlorophora excelsa), Afzelia (Afzelia bipindensis), Utile (Entandrophragma utile), Afrormosia (Pericopsis elata), African Cherry (Prunus africana) among others.

Time series analysis was run using data from FAOSTAT, Mongabay World Rainforests, and World Resource Institute (WRI) was studied. Results shows an increase in production and export of forestry products, and continuous decrease in the coverage of the natural rain forests. The study equally indicates a mixture of very good durability and low durability species across Tropical Africa, with most low durability associated with susceptibility to fungal and insect attacks. The investigation recommends that attention on acknowledgment of nature of emerging trends in climate, finance on conservation, technology and development, and legislation be taken seriously in the region.

Keywords: *Adaptation, Legislation, Regional Development, Economy.*

COMPARATIVE CHARACTERISTICS OF CHEMICAL COMPOSITION AND NUTRITIVE VALUE OF THE FEED TRADITIONALLY USED IN DAIRY FARMING IN THE REPUBLIC OF MOLDOVA

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This study was conducted to compare forage quality and nutritive value of some feed produced in Moldova. Chemical composition includes: crude protein, fat, cellulose and ash. The dry matter and nutritional value were calculated. The dry matter content in concentrates varied from 81.14% in the wheat waste for alcohol production to 88.16% in sunflower oil cake. The crude fat in the dried wheat waste for alcohol production totaled 8.16%, in the corn grain - 3.43-3.67%, in the barley grain - 2.16%, in wheat - 2.27%, in sunflower oil cake it varied from 7.97 to 13.22%, in the corn green mass - 0.73%, in the corn silage - 1.43%. The content of crude fiber was in dried wheat waste for alcohol production - 12.22%, in corn grain from 2.99 to 3.31%, in barley grain - 9.60%, in wheat - 2.34%, in the sunflower oil cake - 25.57% to 32.10%, in the green mass of corn from 6.57 to 7.26%, and in the corn silage 7.96%; in the hay of different types the content of fiber varied from 22.91 to 34.39%. A lowe protein content, in comparison with data given in specialty literature, was observed in the dried wheat waste for alcohol production, corn grain, barleys grain, wheat grain and in the sunflower oil cake.

The nutritional value of feed in Moldova differs in the level of their evaluation in oat nutrition units, energetic feed units and metabolizable energy in comparison with the information contained in normative reference books.

Keywords: *feed, chemical composition, nutritional value, dairy cattle breeding.*

Acknowledgement: The results presented in the paper are an output from study was supported by Internal Grant Agency of Czech University of Life Sciences (IGA CULS Prague) project no.: 50138621. The authors wish to thank for the opportunity to perform investigations.

LAND DEGRADATION IMPACT ON EARTHWORM POPULATION: UTILIZING ORGANIC FERTILIZER FOR SUSTAINABLE SOIL FERTILITY MANAGEMENT

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In this research, we would explain the connectivity between chemical fertilization and earthworm conservation in agricultural land and also provide the benefits and methods of producing and utilizing organic fertilizer. Land degradation, one of the major contributors to biodiversity loss is occurring worldwide at an alarming rate, resulting in huge loss of ecosystem services. This form of ecosystem degradation hampers sustainable development because of its adverse impacts on livelihoods activities. Agricultural intensification contributes the greatest damage to land degradation, leading to soil fertility losses which often results to farmers over reliance on chemical fertilizers. The impact of these chemicals especially ammonia and those of ammonia -base gradually erode the natural habitat of these earthworms thus lowering their population. The production and utilization of organic fertilizer form organic waste supports greatly in salvaging the problem of soil infertility as it enriches the soil and provides a medium for profitable organisms. The aim of the research was to establish the link between organic fertilizer production and sustainable soil fertility management. A physiochemical analysis of the fertilizer was carried out to ascertain its quality which was given in percentage (%): N-1.89, P- 029, K-1.12, C-0.5, Fe-2.01, Organic matter 5.13, Ash content 43.0 and Mineral content 2.02. The idea of producing organic fertilizer from waste was a very welcome development to farmers as they perceived would be of great benefit to food production and soil management.

Keywords: *Earthworms, Biodiversity, Soil, Land degradation, Organic fertilizer.*

MARKET CHAIN ANALYSIS OF FISH PRODUCTS IN CAMBODIA

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Food security is one of the sustainable development goals. A key aspect of food security is an effective value chain for food commodities to ensure that food will come to consumers in a state adequate for consumption. Fish production in Cambodia supplies at least 82.1 % of the animal protein and 86 % of Cambodian land is in the catchment area of the Mekong River, the tenth biggest river in the world. Fish production in Cambodia has a long history and is the fastest growing segment in this country. The study analyzed the value chain of fish products in Cambodia, specifically focusing on the following species: Henicorhynchus/Cirrhinus siamensis, Henicorhynchus/Cirrhinus lobatus, Pangasius bocourti, Pangasius hypophthalmus, Oreochromis niloticus, Channa striata, Clarias batrachus and Anabas testudines. The research is focused on identification the value chains of all the segments, the supply chains, and analyzing their drawbacks and positives, comparing added value and price levels between provinces and rainy and dry seasons. The primary data collection was based on six different questionnaires for each actor in a value chain and interviews (n=117 respondents) from the following groups: fishermen, fish farmers, intermediaries, processors, retailers, and consumers. The research found significant statistical differences in price levels of the following species: Tilapia, Siamese Carp, and Common Carp and also for fish paste, depending on the province. We identified different added values from each value chain segment. The study also mapped the geographical channels of the supply chain for specified fish species and provided recommendations for improvements.

Keywords: *Value chain, fish products, fish storage, fish processing, added value, province comparison.*

Acknowledgement: Petra Chaloupkova, Royal University of Agriculture Phnom Penh.

LIFE CYCLE ASSESSMENT OF SMALL-SCALE BIOGAS TECHNOLOGY IN VIETNAM

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Biogas technology is currently a widespread decentralised source of energy in rural Vietnam.
In this study, Life Cycle Assessment was used to assess net positive and negative environmental impacts associated with small-scale biogas plants in central Vietnam. The main detriments are the intentional release of surplus biogas, the difficult handling of the digestate, and the biogas loss due to cracks. Yet, the benefits are the biogas, minimization of the air pollution, and reduced odour. We investigated if the production of biogas from household small-scale biogas plants is sustainable from the environmental point of view. The study involved 121 personal interviews selected in stratified sampling. Methods of data collection included combined closed and open-ended questionnaire survey with the heads of rural households. Although other important factors have yet to be identified, the preliminary results suggest that there is a total lack of training of the farmers in the use of biogas technology. Most of the farmers received just a very brief instructions manual. For this reason, the efficiency of biogas plants may be compromised. For instance, as a result of the lack of knowledge, the digestate produced is not used, rather wasted in most of the cases. In conclusion, small-scale biogas plants have the capacity to reduce environmental pollution as they are allowing to enhance the living conditions of the local community. However, the benefits of the technology may be compromised if the technology is not handled properly. A key priority then should be to plan long-term supervision of this technology.

Keywords: *Life Cycle Assessment, rural development, environmental impacts, sustainable development, renewable resources, manure management.*

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MICROCREDIT AND RURAL LIVELIHOOD IMPROVEMENT: THE CASE OF RURAL ENTREPRENEURS IN GHANA

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Microfinance industry in has been identified as a potential sector to harness the growth of Ghana. It is therefore worth analyzing the role the provision of microcredit play towards improving the livelihoods of rural entrepreneurs in rural Ghana and to understand the nature of the phenomenon of entrepreneurship, which is the fuel of informal market dynamics in rural Ghana.

Using Chi-Square and pair wise t-test statistical tool, the study found out that, there is a significant impact of microcredit on rural livelihood improvement and income of rural entrepreneurs. The increase in income levels contributed to reduction in poverty as well as expanding businesses of rural entrepreneurs in Ghana which lead to employment creation for the rural inhabitants. Based on the findings, microcredit provision is seen as an avenue for poverty reduction in rural Ghana which must be considered by policy makers in the country.

Keywords: *Microcredit, Rural, Livelihood, Microfinance, Entrepreneur, Economic, Development.*

Acknowledgement: This research was enabled due to financing provided by CULS IGA project reg. nr. 20155016.

LAND-USE CHANGE EFFECTS ON THE CONSERVATION OF THE TROPICAL RAINFOREST PLANT SPECIES: A GEOINFORMATICS ASSESSMENT OF CHROMOLAENA ODORATA AND PANICUM MAXIMUM IN OGUTA, NIGERIA

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The long-term study of the land-use in Oguta has been of crucial important in the field of nature conservation and ecology following the extinction of some plant species in the area. This study aimed at assessing the impacts of change in land-use on the key species (chromolaena odorata and panicum maximum) in Oguta, Nigeria. We hypothesized that the anthropogenic and natural processes brought substantial change in the land-use which consequently affected the plant community. Data on land-use and plants were collected and analyzed using geospatial and statistical tools. The result revealed that 1987 recorded the highest percentage coverage for both chromolaena odorata and panicum maximum species while, 2015 showed the lowest under all the investigated land-use types except wetland. Decrease in the areas of the forests (dense and light), open space with increase in wetlands had tangible role. The predictive analysis revealed that if the species are not well conserved, they will all become extinct in the next 4-5 decades.

Keywords: *Land-use change, tropical grass species, conservation, geoinformatics, Oguta-Nigeria.*

INTRODUCING BIOGAS RESEARCH TEAM - REVEALING CURRENT STATE, BOTTLENECKS AND PERSPECTIVES OF SMALL - AND MEDIUM-SCALE BIOGAS PLANTS IN SOUTHEAST ASIAN COUNTRIES

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Small-scale biogas plants are recommended technology for developing countries mainly due to benefits that the technology may offer such as: production of energy, organic waste management, reduction of deforestation, improvement of the economic situation in rural areas and increase of employment of rural population. Biogas plants are transforming organic waste into energy in the form of biogas and the by-product digestate, which can be used as an organic fertilizer. The main reason why the biogas plants are such a supported technology is the target for reducing greenhouse gas emissions set up by the governments of developing countries and by international organization. However, some of the benefits may be compromised. The main objective of present research is to reveal current state, bottlenecks and perspectives of smalland medium-scale biogas plants in Southeast Asian countries. The research is also addressing the sub-themes, such as: Impact analysis of small-scale biogas plants to rural households in SE Asia (economic, social and environmental), analysis of the quality of biogas in small-scale biogas plants, the quantification of the potential amount of biogas production and its climate value, the quantification of emission reduction potential through use of small-scale biogas plants, the quantification of methane and other potential contributors to the greenhouse effect due to the technology defects and excreta from livestock, and break-even point analysis of emissions from small-scale biogas plants compared to fossil and traditional used fuels. Already held case studies were in Vietnam, Indonesia, Cambodia and Sri Lanka and fellow Southeast Asian countries will follow.

Keywords: *Biogas Research Team, biogas, biogas technology, Southeast Asia.*

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PHYLOGENY AND POPULATION CHARACTERISTICS OF DERBY ELAND (TAUROTRAGUS DERBIANUS)

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Derby eland (Taurotragus derbianus) occurs in two lineages, usually recognized as subspecies, Eastern Giant eland (T. d. gigas) and Western Derby eland (T. d. derbianus). Eastern subspecies is currently listed as Least Concern (LC) and population seem to be stable. Nevertheless, the western subspecies is claimed as Critically Endangered. We assessed 11 new polymorphic microsatellite markers and presented their usage in particular population genetic analyses. Using this panel, it was possible to categorize each individual according to its origin into respective population. Despite low genetic variance, internal structure of Western Derby eland was detected, probably correlating with maternal lineages. It was confirmed that inbreeding coefficient is increasing with each generation in captive population of Western Derby eland. Comparison of last generation of Western Derby eland and populations from the Zoological gardens provided evidence of strong effect of genetic drift. Each of these populations is also highly influenced by founder effect. Our results confirmed the potential of genetic approach, which is essential for effective long term conservation and management.

Keywords: *Taurotragus derbianus, genetic parameters, inbreeding coefficient, microsatellites.*

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ANALYSIS OF CENTRAL IRRIGATION SYSTEMS IN THE REPUBLIC OF MOLDOVA

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The climate change is real threat for agricultural sector in the Republic of Moldova since there is an increased risk of droughts and water scarcity across the country. Temperature could increase by 4 – 5 °C by the end of the century and noticeably change precipitation patterns in the country. Amount of precipitation can decrease in summer and cause drought like in 2007, when 80 % of the country was hit by water scarcity and caused damage valued at USD$1 billion. Irrigation sector plays an important part in Moldovan agriculture but majority of central irrigation systems are disabled or in process of rehabilitation and only small part of an area is under active irrigation. This research assesses agricultural vulnerability to impacts of the climate change on water resources in Moldova. Estimates of irrigation water needs and analysis of structure of farming systems were carried out in order to find a potential improvement for water management. Using data from 26 central irrigation systems, it was found that the central irrigation systems in southern part of the central region are the most vulnerable central irrigation systems in Moldova. Two irrigation systems - Masivul Suvorov and Masivul Talmaza have favorable conditions for growing short period crops, but on the other hand, poor conditions for growing long period crops. By production change of some strategic crops and production shifts between central irrigation systems could be provided water savings and unburden water withdrawals. It has also been found that farmers who irrigate, are associated with land tenure. This could present constrains for mitigation of climate change's impacts.

Keywords: *Republic of Moldova, , Irrigation, Climate, Central Irrigation System. Water management.*

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