Topics of Ph.D. theses for study programme „Sustainable Rural Development“

2014/2015
1. Impakt nových posklizňových technologií na ekonomiku státu Amhara (Etiopie) / Impact of new postharvest technology to the Amhara National Regional Economy / Ethiopia/
2. Rehabilitační program pro posklizňové technologie v Etiopii – zaměřeno na technologie mlýnských strojů a technologie pro výrobu stolních olejů / Rehabilitation of postharvest technology in Ethiopia – focused towards Grain milling and Edible oil processing
5. Termochemické zplyňování biomasy a kogenerace (pyrolyza) za účelem ekologického zpracování odpadů ze stromů palem. / Thermochemical gasification of biomass and cogeneration (pyrolysis) for the treatment of organic waste from palm trees.
6. Design of Water purification technology for potable and irrigative water in Syria (Latakia region).
7. Detekce a kvantifikace mechanického poškození semen vybraných obilovin/ Detection and quantification of mechanical damage to the selected cereal seeds
8. Detekce a analýza plynů vznikajících při uskladnění semen za různých podmínek. / Detection and analysis of gases produced during storage of seeds under different conditions
9. Oxid titaničitý a jeho antimikrobiální vlastnosti / Titanium dioxide and its antimicrobial properties
11. Estimation of tropical soil dry density based on semi-empirical approach
13. Technological aspects of storage and processing of fruit species in the
14. Analysis of biomass briquetting process
15. Macroscopic analysis of solid bio-fuels’ structure
The Amhara National regional State is the second most populated regional state of Ethiopia. Like the national economy, the region’s economy is dominated by agriculture which is largely characterized by smallholder.

The region economy has been growing at higher rate for the last ten years and it has significant influence on the national economy.

There is conventional thinking that believes “output is fixed by preharvest practices”. This thinking has influenced many countries to focus on preharvest and give little attention to postharvest technologies. There has been a strong challenge to this argument and postharvest technology is getting much emphasis as an intervention to increase agricultural production and to reduce food insecurity. The **objective of the thesis** is to investigate the impact of new postharvest technology on the Amhara National Regional Economy. **The hypothesis** is that the introduction of new postharvest technology substantially improves farmers’ productivity and equity. It is proposed that by tapping the large irrigation potential of the region, the introduction of new postharvest technology will have a significant impact on yield increase through time saving and improving labor productivity. Furthermore, the study will cover the role of new postharvest technology for rural transformation of the region by strengthening human resources development in rural areas.
Topic 2: Rehabilitation of postharvest technology in Ethiopia – focused towards Grain milling and Edible oil processing.


Supervisor-specialist: Ing. Pavel Burian, Ph.D.

Funding: UNIDO project SAP id: 120554

Annotation (Recommend 150-200 Words):
The information from National Millers Association of Ethiopia confirmed increasing importance of the sector and its important role in import substitution for food-processing industry products. Nowadays, Ethiopia is not fully self-reliant in terms of food security in grain milling and bakery products industry. Ethiopia's total production of grain is not adequate to meet its demand; the national production only meets 65% of the country's requirements.

The deplorable technical state of machines and equipment for milling grain and pressing oils is the current big problem in Ethiopia. Main objective of the thesis is to design the technological process-flow guideline for the repair and reconstruction of mills and machinery for the production of edible oils. Proposal for developing a methodology for training in maintenance and repair of machines will be an integral part of the thesis. Hypothesis: Edible oil processing is a crucial area in the Ethiopian food-processing sector. It consists of micro and small processors who make up around 75% of all processors in the sector.


Supervisor-specialist: Ing. Pavel Burian, Ph.D.

Funding: project: Ethiopia Aid for Trade – MPO, ČR

Annotation (Recommend 150-200 Words):

Eastern Ethiopia produces a lot of waste from cottonseed oil production. Due to the toxicity nature of this waste, it cannot be processed into feed for livestock (except poultry). Given that this area suffers a shortage of firewood, this waste has a potential as an alternative energy source. It offers good spinoffs in the cottonseed oil production process (increased economic self-sufficiency of oil pressing shops).

At present the biomass utilization for the energetic potential in Ethiopia lies at the tail of UNDP raster of renewable sources energy utilization. Nevertheless, from biomass production point of view, Ethiopia being a cotton crop producing country, it is relatively well positioned to exploit the energy potential from the byproduct of cottonseed oil production. The objective of the thesis is to investigate energy potential of the cottonseed residues through the laboratory tests and measurements. The specific objective of the thesis will be focused on the behaviour of biomass from the cottonseed residues in the form of briquettes during combustion such as heat efficiency, NOx and CO2 emissions, moisture content and mechanical properties of briquettes. Hypothesis: Can this lays a foundation for reaching a 30% renewable energy share on energy needs for Ethiopia as prescribed in the National Strategic plan?
Topic 4: Developing a Business Model for Mechanization of Communal Irrigation Schemes - Limpopo Province, South Africa.

**Supervisor:** Doc. Ing. Vladimír Krepl, CSc.

**Supervisor-specialist:** Dr. Ing. Patrick Francis Kapila

**Funding:** UNIDO project SAP id: 120554

**Annotation (Recommend 150-200 Words):**

Agricultural production is the key to GDP in most African countries. Most of the population in Limpopo Province in South Africa as well as many SADC Countries are rural based. They depend on agriculture. Their agriculture is smallholder in nature.

The South African government has been supporting the rural community by providing them with access to water (irrigation schemes) and Land Restitution for those outside the Irrigation Schemes.

Many smallholders own land that they are unable to cultivate due to the non-availability of mechanized services.

Productivity enhancement requires the combined use of a broader range of tractor implements (attachments) that can as combined machinery set carry out primary and secondary tillage operations better for optimal seedbed preparation and long-term conditioning of the soil.

**Aim of Study:** Determine the unique African approach to Agricultural mechanization, focusing on rural small holder irrigated and rain-fed agriculture; and based on the findings quantify the value of the indirect benefits and direct benefits of improved agricultural productivity to the welfare of the small holder community in terms of rural development; To enhance water productivity in smallholder irrigated agriculture; Create a business model that guide future development decision-making processes to plan and deliver mechanized agriculture; Implement findings and sustainable community development approach in the Limpopo Community project, impacting on the quality of life of thousands of previously disadvantaged citizens in the area. **Objective of Study:** To develop a business model that will be used by Small Scale Tractor Operators, sustain Small Scale Tractor Operators’ business with a view of improving mechanized field service provision and enhancing productivity both in small-scale irrigation schemes and on restituted agricultural land. The specific objective will research the contribution of mechanized tillage methods to enhancing water productivity. **The hypothesis of the study:** Tractor Operator Business Model whose development is based on research findings that inform or conform to national agricultural policy can be viable and can enhance small-scale agricultural productivity.
Topic 5: Thermochemical gasification of biomass and cogeneration (pyrolysis) for the treatment of organic waste from palm trees.

**Supervisor:** Doc. Ing. Vladimír Krepl, CSc.

**Supervisor-specialist:** Ing. Petr Hutla, CSc.

**Funding:** firm LAVARIS Ltd. Libčice, ČR

**Annotation (Recommend 150-200 Words):**

A major environmental problem in the Third world countries is biological residues from the palm trees that greatly burden the environment. This is due to the fact that residues of palm trees (bark, leaves) are in a natural state slightly combustible. As an option for the treatment of "poor quality" of biomass the thermochemical gasification technology used biomass is known as "pyrolysis". Pyrolysis is a process in which organic materials are rapidly heated without access of oxygen to a temperature of 450-600 °C. Under these conditions, the feedstock is converted to stable gases and solid residue. The gases are discharged into the filter unit and then into the condenser where it condensed.

Furthermore, the gas is chemically treated and discharged to the cogeneration unit. **Objective:** To design technology unit processing plant of palm trees residues under the utilization of thermochemical biomass gasification technology and perform an economic evaluation of this technology. (value added chain)

**The hypothesis of the study:** Pyrolysis is a technology that allows to process low-quality biomass as residues from palm trees (all varieties). Positives of pyrolysis are: _ greenest processing and utilization of biomass, since there is no combustion but decomposition and decay of biomass _ using chemothermal response we are able to take advantage of the maximum energy value of biomass feedstock _ pyrolysis of biomass is not demanding in terms of quality input materials, maintenance and operation and can operate continuously; _ modesty technology - complete technology requires minimal space (very favorable ratio of space / performance); _ for separate use (operation in island); _ lower investment cost for 1 kW compared to other technologies; _ ability to work with biomass, which has a higher relative humidity (up 60%); _ the possibility of using low-quality biomass (bark, sawdust, wood waste, etc.).
Topic 6: Design of Water purification technology for potable and irrigative water in Syria (Latakia region)

Supervisor-specialist: Ing. Radomír Mališ

Funding: ICARDA + Latakia region resources (Support by EU ENPI)

Annotation (Recommend 150-200 Words):

Due the conflict in Syria to Latakia have immigrate about 1, 5 million refuges. The population in Latakia region this day presents the three millions. Consequently to the above mentioned fact a situation in the water management, particularly in the water quality is critical.

Till present, Lattakia city lacks waste water treatment facility, and all the waste water produced discharge directly to the coast areas which will harm and endanger the safety and health of inhabitants and impact fish resources as well. Statistics reveals that the quantity of waste water discharge at the coast of Lattakia city, in Afamia site reaches 100 thousands cubic meters per day, not to mention the industrial wastes, these quantities drives with them quantities of organic pollutants measured by (BOD5/ Biochemical Oxygen Demand) standard to reach 30 000 kg per day in addition to other organic pollutants of industrial origins measured by COD (Chemical Oxygen Demand) standard which have more dangerous impact on the marine aquaculture.

Thesis objectives: _ to determining kinds, level and sources of pollution in groundwater and surface water, with a focus on Chemical, Biochemical, Bacterial contamination and Hardness tests; _ to propose and design the appropriate cleaning water technology (drinking water, irrigation water); _ to provide the practical tests of water purification technology in Lattakia; _ to design a concept of appropriate technology for existing water management

Hypothesis: _The problem of pollution pose a threat to the existence of humans, animals and plants in region, thesis proposal must to resolve the problem or reduce impact of pollution on the life; _ previous studies have demonstrated the presence of more than one type of pollution from various sources in the region; _ most of the pollution sources are man-made and some due to installation of rocks and geological strata; _ specify the types and sources of pollution and their specifications in order to find cheap and adequate solution, Especially bacterial and microbial pollution( its Gross) and chemical fertility.
Téma7: Detekce a kvantifikace mechanického poškození semen vybraných obilovin


Pot. zdroje fin.: IGA, externí projekt

Anotace: Mechanické poškození semen (vnitřní i vnější) je nejčastěji se vyskytujícím poškozením s důsledky hlavně na kvalitu semen při jejich pozdějším zpracování a skladování. Poškozená semena jsou mnohem častěji napadána nemocemi a škůdci. Na poškození semen mají velký vliv jeho vlastnosti i podmínky sklizně a zpracování semen. Proto je třeba poškození detekovat a minimalizovat jeho důsledky. Cílem práce je navrhnout a vyzkoušet způsob detekce a kvantifikace tohoto poškození u vybraných semen, včetně způsobu odběru vzorků. Většinu operací se se meny lze provádět v laboratoři a získané výsledky jde naopak přenést do praxe. Jedná se o soustavnou a pečlivou práci převážně v laboratoři. Potřebné přístroje jsou k dispozici v laboratoři. Znalost statistiky a programu Excel je výhodou.

Topic: Detection and quantification of mechanical damage to the selected cereal seeds

Supervisor: Doc. Ing. Josef Pecen, CSc

Funding: IGA, project

Annotation: Mechanical damage to seeds (internal and external) is the most commonly occurring damaging consequences mainly on the quality of the seeds during their subsequent handling and storage. Damaged seeds are more often attacked by diseases and pests. Damage seeds have a strong influence its properties and conditions of harvesting and processing of seeds. Therefore, it is necessary to detect damage and minimize its effects. The aim is to design a test method for the detection and quantification of damage in selected seeds, including the method of sampling. Most of the operations can be performed with seeds in the lab and the results obtained on the contrary, goes into practice. It is a systematic and rigorous work mainly in the laboratory. Necessary devices are available. Knowledge of statistics and Excel is an advantage.
Téma 8: Detekce a analýza plynů vznikajících při uskladnění semen za různých podmínek.


Pot. zdroje fin.: IGA, externí projekt nebo projekt NAZV

Anotace: Dlouhodobé skladování semen vyžaduje dodržení vhodných podmínek, zejména teploty a vlhkosti, pro jejich delší přechovávání. To je vždycky doprovázeno vznikem plynů, jejichž analýzou můžeme monitorovat celý proces skladování semen. Podle toho se dají včas upravit podmínky skladování semen. Cílem práce je vyzkoušet na fyzickém modelu skladování vybraných semen (semena), monitoring vzniklých plynů a vliv především teploty a vlhkosti semen na jejich kvalitu při skladování. V laboratoři jsou na fyzickém modelu ověřeny základní příčiny vzniku plynů v souvislosti se změnou kvality uložených semen. Tyto poznatky jsou následně ověřeny v praxi. Jedná se o kombinaci laboratorní práce s použitím IT a aplikovaného výzkumu v reálných podmínkách.

Topic: Detection and analysis of gases produced during storage of seeds under different conditions.

Supervisor: Doc. Ing. Josef Pecen, CSc

Funding: IGA, project or external project NAZV

Annotation: Long-term storage of seeds required for compliance with appropriate conditions, especially temperature and humidity, the longer their possession. It is always accompanied by the formation of gases, the analysis can monitor the whole process of storing seeds. Depending on time can be adjusted by storage conditions of seeds. The aim is to try to model the physical storage of selected seeds (seeds), monitoring flue gases and the particular influence of temperature and humidity on the quality of seeds during storage. In the laboratory the physical model to verify the basic causes of the emissions associated with the change in the quality of stored seeds. These findings are verified in practice. It is a combination of laboratory work using IT and applied research in real-world condition.
Téma 9: Oxid titaničitý a jeho antimikrobiální vlastnosti


Pot. zdroje fin.: IGA, externí projekt nebo projekt NAZV


Topic: Titanium dioxide and its antimicrobial properties

Supervisor: Doc. Ing. Josef Pecen, CSc

Funding: IGA, project or external project NAZV

Annotation Antimicrobial and other advantageous properties of TiO2 have been known for a long time, particularly in the application of nanotechnology. Light-induced redox processes at the surface of the photocatalyst, are numerous applications and in agriculture. After irradiation and daylight surfaces are provided with TiO2 able to liquidate microorganismy, partly odors and reduce the concentration of ammonia in such objects. The ability of TiO2 depends on the intensity of light that must not fall below a minimum value and structure of its spectrum. The goal is to determine in the laboratory for TiO2 or similar substances that minimum threshold of light intensity and spectrum of the photocatalysis still ongoing. Thus obtained laboratory model of photocatalysis applied in practice in a farm house. The emphasis is now on trial minimum threshold lighting in practice.
Topic 10: Influence of glazing on drying kinetics and final product quality in solar drying

Supervisor: Doc. Ing. Jan Banout, Ph.D

Annotation:

Preservation of food materials such as meat, vegetable, fruit, spices and herbs by open-air drying in the sun was presumably one of the first systematic technological activities undertaken by human kind. Open-air sun drying requires little investment, but causes significant losses due to product humidity reabsorption during inadequate climatic conditions; contamination by pathogens, rodents, birds and insects; as well as by inorganic trash materials such as dust and sand. Conversely the artificial driers produce an improved quality of dried products as the velocity and the temperature of the drying air can be controlled, but they also consume a significant amount of energy to heat and move the air-flow resulting in higher capital and operational costs of those driers. Nowadays a food problem arises in most developing countries mainly due to the inability to preserve food surpluses rather than due to low production. So a reduction in the post-harvest losses of food products through suitable post-harvest processing technique should have considerable effect on the economy of these countries. The main objective of proposed topic is to investigate different materials used as glazing (e.g. Glass, plastic glass, polycarbonate, transparent polyethylene etc.) for direct solar driers. The influence of above mentioned materials on the kinetic of drying process together with possible differences in organoleptic properties of dried products will be studied during the research work. Finally the economic evaluation of used materials is also one of the study objectives.

Obor: SRD

Topic 11: Estimation of tropical soil dry density based on semi-empirical approach

Supervisor: Doc. Ing. Jan Banout, Ph.D

Annotation:

The semi-empirical model conception of soil dry density estimation will be tested in specific laboratory conditions. Soil water retention characteristic and log-normal distribution model is used. Pore size distribution is related to penetration resistance and water content. Actual soil dry density measurement uses acting cone in soil profile depth directly. Finally, proposed results will be compared with specific soil mechanics pattern. The main purposes of this work are: 1) defining a relationship between the pore radius (corresponding to the mean of a pressure head natural logarithm obtained from fitting the soil water retention using a log-normal distribution) and penetration resistance and 2) defining a relationship between the soil dry density and evaluated pore radius. The final objective is to incorporate the results, creating an improved soil resistance/soil state model, and the application for soil/tyre interaction studies.
Topic 12: Resource use and waste management in livelihood context of rural households in Vietnam

Supervisor: doc. Ing. Jan Banout, Ph.D.

Consultant: Ing. Jana Mazancová, Ph.D.

Anotation:
Since almost 80% of Vietnamese population live in rural areas, sustainable management of resources (energy and water) and conceptual approach to waste management are essential factors influencing livelihood strategies at household level. The objective is to analyse past and expected future changes in livelihood activities in selected rural areas of Vietnam by using of quantitative and qualitative analysis at the community and household level. The combination of different analytical tools, such as resources and waste management optimisation models and qualitative and dynamic livelihood analysis, will provide new information to design livelihood pilots for better adaptation. The research will be divided into two principle phases: (i) field survey leading to characterization of the actual livelihood activities related to resources and waste management of selected communities, and (ii) field survey analyzing past and future changes and responses to changes of different livelihood activities related to resources and waste management. Outputs of these analyses will provide better understanding of constraints and opportunities in different communities, qualitative assessment of the capacity of those communities to respond to changes, and an assessment of the expected future changes and aspirations of the households in resources and waste management development context. Results will be used in a Decision Support System composed of resources and waste management optimization models to design livelihood pilots.
Topic 13: Technological aspects of storage and processing of fruit species in the Republic of Moldova

**Supervisor:** prof. Ing. Bohumil Havrland, CSc.

**Consultant:** doc. Jan Brindza, CSc. (Slovak University of Agriculture in Nitra)

**Funding:** development project ACSA Moldova

**Anotation:** Moldovan agricultural cooperatives with developed production of apples and other spherical fruits (plums, peaches, cherries) were provided with the technical equipment for the fruits preservation and storage within the bilateral cooperation. The objective of the present Thesis is to improve the conditions and a storage process of selected fruit species and varieties. The Thesis will be focus on the measurement, analysis and subsequent suggestion of the most appropriate parameters and technological solution for storage of seasonal fruits in controlled and modified atmosphere. The enhancement of the storage technology can contribute to the reduction of respiratory activity by 30 times and prolonging of the shelf life twice.

This topic will be elaborated in collaboration with the Agricultural University in Nitra, with Research and Breeding Institute of Pomology Holovousy and with the Moldovan farmers.

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Topic 14: Analysis of biomass briquetting process

**Supervisor:** prof. Ing. Bohumil Havrland, CSc.

**Consultant:** Ing. Tatiana Ivanova, Ph.D., prof. Viktor Pobedinsky (State Agrarian University of Moldova)

**Funding:** development project SAUM Moldova

**Anotation:** Briquetting - pressing and compacting under the pressure is one of the basic principles of the processing of waste and deliberately grown biomass. Nowadays, there are high requirements on solid biofuels quality according to EU standards. The quality is assessed by chemical, physical and mechanical properties of produced briquettes. The briquettes solidity is one of the most important quality indicators, important in terms of manipulation. The topic of the present Thesis is focused on mathematical modelling of force and pressure destruction along the pressing chamber of the hydraulic piston press. Tensometric sensors will be used for the data measurements. The main mechanical parameters such as mechanical durability and the briquettes density will be measured and evaluated as well. The research will contribute to optimization of the briquetting process and improvement of the briquettes quality. However, these principles will be applicable in practise for a wide range of compacted materials.

The Thesis will be elaborated in cooperation with the Moldovan State Agrarian University.
Topic 15: Macroscopic analysis of solid bio-fuels’ structure


Consultant: Ing. Tatiana Ivanova, Ph.D., prof. Viktor Pobedinsky (State Agrarian University of Moldova)

Funding: development project SAUM Moldova

Annotation: Use of solid bio-fuels made of different types of biomass including agricultural wastes and energy crops became perspective alternative to fossil fuels. Nowadays, the production of quality bio-fuels with good mechanical, chemical and energy properties is highly required. Composition of input raw material has one of the biggest impacts on the briquettes structure/texture.

The objective of theoretical and experimental research of the present Thesis is a structure analysis of briquettes made of different biomass materials and identification of agglomeration rules during the pressing process of raw material mixtures. The work is focused on studies of particles’ interconnection, reasons the defects and cracks formation in the briquettes surface, lignin excretion and functioning. The briquettes structure will be observed by microscope technologies equipped with special software for the image processing and data measurement. The understanding of raw-material agglomeration process will help to improve regimes, parameters and technological aspects of briquetting equipments and, first of all, will ensure high quality of biofuels with suitable technological properties.

The topic will be elaborated in cooperation with the Moldovan State Agrarian University.
b) Department of Economics and Development

1. Cooperatives and informal farmers’ institutions in rural development: An analysis of efficiency of related governmental development policies of Czech ODA and EuropeAid.

2. Efficiency of government-sponsored schemes of tertiary level formal education in agriculture and rural development for students from developing countries.

3. The role of information transfer in market access strategy for agricultural sector

4. Development of an information system application module for supporting sales in a strawberry market of the Republic of Moldova

5. Food security in Syria: options for post-war recovery; a quantitative study deploying models and evaluating policy options in scenarios

6. Future of small scale farming in the globalised world

7. Analysis of the performance of different types of microfinance institutions and offered services to macro-economic indicators

8. Microfinance in southern states of the European Union (Subtropical zone) and the financial crisis

9. Microfinance in Calakmul, Yucatan, Mexico focused on financing of small-scale wood processing industry

10. Neglected and underutilised crop species: Their role in livelihood strategies in different farming systems
**Topic 1:** Cooperatives and informal farmers’ institutions in rural development: An analysis of efficiency of related governmental development policies of Czech ODA and EuropeAid.

**Supervisor:** prof. Ing. Ladislav Kabát, CSc.

**Supervisor-specialist:** Ing. Jiří Hejkrlík, Ph.D.

**Expected funding:** FTA/People in need EuropeAid/Czech ODA project in Georgia

FTA Czech ODA project in Mongolia

**Annotation:** Cooperatives and other informal farmers’ institutions are increasingly being recognized as an effective form of social entrepreneurship. Correspondingly, they are often in the focus of donor policies, including EuropeAid or Czech Development Cooperation. However, at the same time, they have been the subject of criticism by many economists, who base their arguments on different economic theories like property rights, agency theory and frequent anecdotal evidence. Even in the framework of Czech ODA failures of cooperative approach are being discussed on implementation as well as policy level.

The main aim of the Ph.D. thesis is theoretical and case-study analysis of effectiveness of the cooperative approach in the policies of Czech and other donors. Barriers to voluntary farmer groups will be critically evaluated as well. Influence of various economic, cultural, social, geographical and psychological factors will be evaluated by the econometric modelling. At the same time, existing small producer farmer groups will be evaluated based on criteria like participation of the poorest farmers, economic performance and democratic principles. Development policy of EuropeAid and Czech ODA, and practical examples of implemented project of Czech ODA mainly in Georgia, Ethiopia and Mongolia will be studied and evaluated. The financing will be covered within EuropAid or Czech ODA project currently implemented by FTA.
Topic 2: Efficiency of government-sponsored schemes of tertiary level formal education in agriculture and rural development for students from developing countries.

Supervisor: prof. Ing. Ladislav Kabát, CSc.

Supervisor-specialist: Ing. Jiří Hejkrlík, Ph.D.

Funding:

Annotation: In 2011, there were about 4.3 million tertiary students studying abroad, which represents only a fraction of the 215 million migrants worldwide. Most of the international students study on a commercial basis, independently from government aid. At the same time, however, there is a growing number of international and/or intergovernmental agreements facilitating student exchange. Some governments, as for example the Czech Republic, provide scholarships as a part of their development co-operation. Decades of providing scholarships to students from developing countries as a part of the Czechoslovak/Czech development co-operation have left thousands of Czech and Slovak-speaking graduates of the Czechoslovak (and, later, Czech) universities in virtually all developing countries and possibly even in all the developed countries as well. However, the Czech Republic is also an example of the long-lasting lack of evidence of the development effectiveness of the scholarship programmes.

Effectiveness of international tertiary education is currently emphasis by many studies. Therefore, the aim of the thesis will be to provide insights into the effectiveness of the educational policies of the development co-operation in the field of agriculture and rural development. The thesis will focus on “push and pull” migration factors influencing the decision making of student, concepts of “brain drain”, “brain waste”, “brain circulation” and “brain gain” also borrowed from migration theories. Critical evaluation of skills, experience and knowledge gained during studies abroad will be conducted as well.
Topic 3: The role of information transfer in market access strategy for agricultural sector

Supervisor: prof. Ing. Ladislav Kabát, CSc.

Supervisor-specialist: Ing. Alexander Kandakov, Ph.D.

Funding:

Annotation: The dissertation project will be oriented on the analysis of economic and political situation of selected developing country with specific focus on its rural regions. Primarily, it will deal with historical, current state and future perspectives of agricultural information collection, processing, dissemination and practical use. The research project will be oriented especially toward identification of the main sources and channels of information transfers in rural areas. The role of responsible agricultural information services, methods of information collection and processing and their efficiency will be studied. The benefits of information transfers for small and medium-scale farmers will be analyzed and evaluated. The dissertation project is considering both, primary and secondary data sources as an object of analysis. Particularly the quality of the data will be under scrutiny. For data processing the standard mathematical and statistical methods (time series analysis, regression analysis, discriminate and cluster analysis and Data envelopment analysis (DEA) techniques) will be used.
**Topic 4:** Development of an information system application module for supporting sales in a strawberry market of the Republic of Moldova

**Supervisor:** prof. Ing. Ladislav Kabát, CSc.

**Supervisor-specialist:** Ing. Alexander Kandakov, Ph.D.

**Funding:**

**Annotation:** The dissertation project will be oriented on development of an information system for supporting sales management in a strawberry market for small and medium-scale Moldovan agricultural producers. Special focus of this project is on so called “fruit business” within which the strawberry production, marketing and sale could play important role, but still it is not enough supported by proper services in the Republic of Moldova, which would mediate marketing information by using the appropriate systems and extended modules. It is why the “sales decisions” are taken by small farmers (Moldovan strawberry producers) usually on a hazardous basis and local level market information mediated by an oral communication with other farmers, which is not supported by factual information about strawberry market trends. A new application module within the agricultural marketing information system will provide efficient dissemination of information and sales documents to Moldovan strawberry producers and will improve their marketing, decision-making and promotion processes.

The research costs will not exceed the economic benefits of strawberry fruit for Moldovan fruit sector, because the dissertation project will focus on data (situation on local markets and monitoring trends) available from the Agricultural Marketing Information System (AMIS), which is currently in use in the Republic of Moldova since 2007 and was developed in the framework of the Czech Republic Development Cooperation. The main idea is to develop an information system’s module to support sales management of strawberry producers, located in Singerei region - the northern part of Moldova, where local farmers principally engaged in fruit cultivation. The new model of the system will monitor trends, provide analysis and forecasts on future price trends, based on data from strawberry markets.
**Topic 5: Food security in Syria: options for post-war recovery; a quantitative study deploying models and evaluating policy options in scenarios**

**Supervisor:** doc. Ing. Tomáš Doucha, CSc.

**Supervisor-specialist:** RNDr. Ing. Tomáš Ratinger, Ph.D.

**Expected funding:**

**Annotation:** Syria's civil war has brought the country's economy to its knees. Only agriculture has been saving the country. Before the war, unemployment was below 10 percent; now every second Syrian is without a job. Sixty percent of all Syrians now live in poverty - twice as many as before the war. No doubt, once the war ends the country will be exposed to recovery challenges. A big issue will be how to enhance food security during the post-war transition.

The objective of this PhD study will be to explore various options for improving food security in the country shattered by civil war.

The methodology will rest in a quantitative approach deploying models and evaluating policy options in scenarios. Data will be take form pre-war statistics, UN reports and completed from model for countries which experienced similar post war recovery. The decision on the model (sectoral or macro) will be taken during the first year, depending on the interest of the student and the availability of data.

**Topic 6: Future of small scale farming in the globalised world**

**Supervisor:** doc. Ing. Tomáš Doucha, CSc.

**Supervisor-specialist:** RNDr. Ing. Tomáš Ratinger, Ph.D.

**Expected funding:**

**Annotation:** During several last decades, world agriculture significantly commercialised and industrialised. During this process, farms have grown in size. However, there are still many places where subsistence and semi-subsistence farms play an important role. In many regions, subsistence and semi-subsistence farms co-exist with commercial farms well integrated in the food supply chain.

The objective of this PhD study is to review theoretical concepts and empirical studies on very small farms in relation to food security, employment opportunities and public goods provided by these farms, and to build up a farm level model for a selected region to test relevant scenarios of future development of this small scale farming sector.

The methodology should combine quantitative modelling with opinions of experts from academia, international organisations, NGOs and local bodies. There are two options for modelling: i) to develop a set of farm level models representing various farm types, or ii) to build an agricultural sector model with the division to commercial and semi-subsistence sub-sectors. Models will be programming based.
Topic 7: Analysis of the performance of different types of microfinance institutions and offered services to macro-economic indicators

Supervisor: doc. Ing. Karel Srnec, Ph.D.

Supervisor-specialist: Dipl. Kfm. Tomáš Hes, Ph.D.

Expected funding:

Annotation: Analysis of the relative performance of different types of microfinance institutions to selected socio-economic indicators focuses on the relationships between the performance of components economies and the performance of different types of MFIs and their services, such as private MFIs, cooperatives or non-profit institutions and their products, such as credit and savings and trying to express what types of institutions are responding and what intensity changes of selected socio-economic indicators, such as women's employment, education, openness of the economy, urbanization or development of the banking sector. Analysis of aggregate global data structured in the major regions of the world and trying to understand the sensitivity and the logic of mutually influencing the development of the microfinance sector and the economy as a whole.

The aim of the research is to find connections that allow understanding how changes in the development of the microfinance sector will affect the economy and, conversely, how changes in the economy may affect the microfinance sector. The output is a recommendation for the regulation of the microfinance sector.

Topic 8: Microfinance in southern states of the European Union (Subtropical zone) and the financial crisis

Supervisor: doc. Ing. Karel Srnec, Ph.D.

Supervisor-specialist: Dipl. Kfm. Tomáš Hes, Ph.D.

Expected funding:

Annotation: The impact of financial crisis on the economics of southern states of European Union was different due to the differences of the types of crisis, e.g. in 2008 and the crisis in the nineties of the last century. The dissertation is to analyze the differences, the nature of the differences as well as the impacts on the microfinance sector and to recommend the development of microfinance activities, regulatory frameworks, sectorial focus and organizational evolution to make these economies less vulnerable, especially from the point of view of crisis. This particular topic is the more important as there is high volume of analytical literature considering microfinance as a potential buffer against economic crisis, due to the nature of the products and services which are not focused on areas that are highly interconnected with international flows of goods and capital, and therefore represent a potential shock absorber.
Topic 9: Microfinance in Calakmul, Yucatan, Mexico focused on financing of small-scale wood processing industry

Supervisor: doc. Ing. Karel Srnec, Ph.D.

Supervisor-specialist: Dipl. Kfm. Tomáš Hes, Ph.D.

Expected funding:

Annotation: One of the main causes of deforestation of tropical forests due to burning of forest land, due to need for corn producing fields. Traditional techniques require using the burned land for consequent two years corn plantation and after that leave it in order to search for next areas. The used terrain called “Acahual” needs to rest for 20 years before it can be used for corn plantation again, and thus it was used by Mayan cultures. Due to population growth many of these terrains are overexploited in shorter cycles which lead to a complete degradation of land that loses forever its producing powers. There are methods however that make use of Acahual lands, extracting wood without affecting the quality of the forest and transforming the woods into carbon sold for small scale uses. This strategy has proven to be beneficial for both nature as well as for local populations in terms of sustainable income. There is however lack of capital for machinery and lack of working capital. The project consists in the proposal for framework of financing of small scale producers on statal level, connecting CSR, microfinance and wood processing industry.
Topic 10: Neglected and underutilised crop species: Their role in livelihood strategies in different farming systems

Supervisor: doc. Ing. Tomáš Doucha, CSc.
Supervisor-specialist: Ing. Vladimír Verner, Ph.D.
Expected funding: FTA/People in need EuropeAid/Czech ODA project in Georgia

Annotation: Commercialization of traditional local products is considered to be effective strategy for sustainable development, not only in Europe, but in developing countries as well. Any long-term success and effectiveness of such strategy depends on several factors, such as infrastructure, structure of farming systems and local ecosystems, human capital, and, institutional framework. One of the options how to increase the market orientation is to focus on non-timber forest products (NTFPs), or, on neglected and underutilized crop species (NUS).

These species are grown as minor or subsistence crops within small-scale agricultural systems or they are collected in the wild. Within agroecosystems, those species are grown especially in homegardens, which are globally considered as an irreplaceable, on-farm, agrobiodiversity conservation units. Furthermore, economic potential of alternative crops gives local households the opportunity for income diversification. This trend is described mostly in developed countries, but the potential can be found in countries known as developing as well. Increasing market orientation of farming systems, however, tends to have a negative impact on the surrounding ecosystems, particularly in cases of increasing intensification of agricultural production, poor water resources management, or, over-exploration of natural resources by hunting or gathering.

The overall objective is to better understand the complex decision-making behaviour of households and to identify solutions preventing overexploitation of natural resources. Based on the findings to design and assess strategies for management and use of both farm and natural resources in such way that improvement and sustainability of the living standard of mountain farming population can be ensured.