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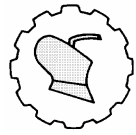

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THE ROLE OF AGRICULTURAL ENGINEERING IN SUSTAINABLE RURAL DEVELOPMENT IN SEE (SOUTH EASTERN EUROPE) COUNTRIES

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Abstract: Rural areas, especially in developing countries, are facing with numerous social, economical, cultural and environmental problems. Although there is a growing concern, in most cases, only very few farmers or inhabitants are able to follow contemporary, sustainable and environment-friendly methods in farming systems. The consequences of this are numerous, such as; poverty, significant migration to urban areas and unplanned suburban settlements. This has a significant impact on the national economy, demography, and environment.

The Association of Agricultural Engineering in South Eastern Europe (AESEE), recently have dealt with these significant problems of the rural communities of their region and herewith emphasized the role of agricultural engineers in overcoming the problems and providing applicable solutions for a sustainable rural development.

Key words: *rural development, sustainable agriculture, agricultural engineering.*

Introduction

United Nations Development Program (UNDP), in its Annual Report for 2007 (UNDP, 2007), warns the international community for the growing gap between rich and poor citizens, within both developed and developing nations, i.e. the richest 2% of the world's adult population now owns more than 50% of global household wealth whereas the bottom 50% own barely 1% and the gains from global growth are being highly unequally distributed. It is the poor who frequently end up with poor quality land, water,

fuel and other natural resources, which in turn limit their productivity. In trying to make a living, they may further degrade their immediate environment, leading to a vicious cycle. Environmental degradation and scarce resources both push people into poverty and keep them there, reinforcing inequities. Today, soil erosion, floods, draughts and pollution threatens the livelihoods of 2.6 billion people and over a billion people don't have clean water. Each year, sub-Saharan Africa loses more in productivity through poor water management than it gains through development aid and debt relief. It is, therefore, imperative to emphasize once again, the roles of agricultural engineering for rural development under these circumstances.

Status of the SEE Countries

Regarding the current general and economic indicators and the situation of agricultural structure and production in SEE countries involved within this study, namely Bosnia and Herzegovina, Bulgaria, Croatia, Romania, Serbia and Turkey, Table 1 and 2 are provided. As can be seen from the tables, GDP per capita is very similar with the exception of Croatia, and agriculture's share in the GDP of the countries seems to be very similar with a slight difference of Serbia and Croatia.

Average farm size of each of the countries is fairly small for a profitable and rational farming practice and the majority (more than approx. 85%) of the farm holdings are below 10 hectares of size. Detailed country reports are presented by Kosutic, et al (2007).

Sustainable Rural Development in SEE Countries

During World Congress of the CIGR, entitled "Agricultural Engineering for a Better World" held in September 2006 in Bonn, a new Working group called "Rural development and preservation of cultural heritages" was established. By this act agricultural engineers expressed their interest and willingness to help rural development, not only as a typical, but as a cultural problem as well. From the country reports (Kosutic et al, 2007) it is obvious that rural underdevelopment is a critical point in the region of South East Europe.

As a result of the two workshops organized by this Working group it is important to put forward the common properties of rural areas in SEE countries. Firstly, rural life and economical activities within these countries are significantly based on natural resources, especially agriculture. Secondly, the economical, social and cultural development is much slower than urban parts of the countries. Thirdly, traditions have a significant effect on the life styles and rules of the rural communities. Technological adoption and advancement in production and its reflectance on rural life is spread over many years. People of the rural communities have much wider face to face relations. And finally, social security opportunities such as employment, health, insurance, retirement, communication, education, cultural activities, etc are poorer within the rural parts of these countries in general.

For a sustainable rural development in these countries, natural resources, such as land, water, plant and animal genetic resources, should be properly managed and conserved, human needs for present and future generations should be satisfied, ensured,

technological and institutional change should be oriented accordingly. It is also important to mention that such sustainability should be environmentally non-degrading, technically appropriate, economically viable and socially acceptable.

The problems of rural areas in the region of South-eastern Europe and also worldwide are recognized. The most significant problems in the region are; poverty, migration to the cities, lack of appropriate infrastructure, size and fragmentation of farms.

The society and agricultural engineering profession should be aware of these problems of welfare of rural area inhabitants and provide solutions in order to achieve comparable living conditions with those in cities.

Role of Agricultural Engineers in SEE

Engineering is a critical component for helping to meet the challenges facing increased crop production. In the early years of the Green Revolution, engineering made many technical contributions to reduce drudgery and help increase labour productivity. The opportunity is for contributing to an integrated system from field preparation all the way through the chain to end users.

Agricultural Engineers have, for some years, been discussing the present and future position of their profession. Actions like changing the name of the higher education institutes and title of the degrees to those more attractive and publicly well-known and acknowledged terminology or converting the agricultural engineering to and/or merging more with biological systems engineering were taken. However, besides these public awareness efforts, significant focus should also be given to how to realize their roles in sustainable rural development as engineers of agriculture.

Agricultural engineers should therefore;

- ensure an adequate and safe food supply for an expanding world population,
- manage and protect the world's vital water, soil, air and energy resources,
- help people through contribution to food production, food quality and safety, food storage, food processing, transport, packaging and marketing,
- help reduce the rural poverty and improve farmers' welfare,
- help poor farmers raise their incomes by "face to face" contacts,
- avoid environmental degradation, conserve natural resources and control pollution,
- reduce drudgery of work carried out in rural life, ensure labour productivity whilst enabling more timely operations for a better production.

It is important to note that young generations in both developed and developing countries prefer living in urban areas and leaving parents on their own at rural activities. This limits the sustainability of rural development.

As United Nations Framework Convention on Climate Change (UNFCCC) and the Intergovernmental Panels on Climate Change (IPCC) warn about the impacts of global warming and climate change, such as scarcity of food and water supplies, draughts, floods, migrations, increasing frequency of natural disasters, safety of food and water resources etc. In light of these climate change considerations, promotion of sustainable forms of agriculture; research on, and promotion, development and increased use of, new and renewable forms of energy, and of advanced and innovative environmentally sound

technologies are to be implemented. All these and many other measures are directly related with the profession of agricultural engineering.

It is also foreseen that climate change will bring serious risks of draught and flood conditions in Southern and Eastern parts of Europe. It is, therefore crucial to pay particular attention to conservation and management of soil and water resources, adaptation and breeding of draught-resistant crop and livestock varieties and create awareness of rural communities through intensive training and extension services in the region. Agricultural engineers will certainly play a critical role in fight with these impacts of climate change.

For a sustainable rural development, farmers need to secure their income through adequate prices and also secure market conditions. Integration of farming activities with agro-industry, in other words a complete chain of food production from farm to consumers brings about an important role for agricultural engineers.

This paper, co-authored by scientists from many of the South East European countries, all of whom are members of the Executive Committee of the Association of Agricultural Engineering in South Eastern Europe, will give a focus on current problems of rural development in the SEE region and the role of agricultural engineers in dealing with these problems.

Recommendations

Agricultural engineers, besides their common professional activities, should create the awareness of the rural area problems in the society through educational process and media.

Multi functionality and non-economic values of agriculture should be recognized by the society, i.e. preventing desertification, preserving the environment and landscape.

Continuation of rural life enables preservation of cultural heritage and contributes to cultural diversity.

The working group set up on this issue in the frame of CIGR should be supported for an effective study.

Agricultural engineering must support development of on-farm processing up to getting shelf-ready products especially of traditionally home made foods.

Assurance and control of safety and quality of this production is a special challenge for agricultural engineering.

Extension services of any model of organization should be supported in any means, but reinforced in the quality, being able to help solving also other herewith identified needs or rural area.

Indigenous knowledge should also be respected and included in tools aimed in participatory rural development.

A multi-disciplinary regional project is needed to state problems of rural areas more precisely, to define possible solutions and needed tools. Such a project will include diverse expertise from the scientific fields of sociology, demography, economy, technology, etc.

Implementation of renewable energies can be a good tool for development of rural areas through which local materials and human resources can be used. It is necessary to search for funds and draw a concept of a regional project on this topic.

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ULOGA INŽENJERA POLJOPRIVREDNE TEHNIKE U ODRŽIVOM RURALNOM RAZVOJU

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Sadržaj: Ruralni regioni, posebno u zemljama u razvoju, suočavaju se sa brojnim socijalnim, ekonomskim, kulturološkim i ekološkim problemima. Iako se o ovim problemima često govori jako mali broj farmera je u mogućnosti da prati savremene, održive i ekološki prihvatljive tehnološko-tehničke sisteme poljoprivredne proizvodnje. Posledice ovoga su brojne i ogledaju se u siromaštvu, migraciji u urbana područja i neplanskoj gradnji u prigradskim naseljima. Ovakve pojave značajno utiču na nacionalnu ekonomiju, demografiju i životnu sredinu.

Udruženje inžinjera poljoprivrede Jugoistočne Evrope se u poslednjih nekoliko godina bavi ovom problematikom. U ovom radu je analizirana uloga inžinjera poljoprivredne tehnike u prevazilaženju problema ruralnih područja u regionu. Shodno tome, data su i neka aplikativna rešenja koja vode ka održivom ruralnom razvoju.

Ključne reči: *ruralni razvoj, održiva poljoprivreda, poljoprivredna tehnika.*