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E-CONCEPT OF AN AGRICULTURAL EXTENSION SERVICE

SUMMARY

Agriculture and agricultural advisory services face different challenges in the current environment and the nearest future, searching for optimal affirmation solutions of the agricultural extension service and the agriculture in Serbia.

The concept of e-agriculture, in line with the idea of the World Summit Information Society (WSIS - *World Summit on the Information Society*), was identified as a need to transfer knowledge and experience in the application of ICT (*Information and Communication Technologies*) in agriculture. Otherwise, the WSIS is supported by the United Nations, and for the full implementation of the concept of e-agriculture the responsibility was assumed by the FAO organization in 2006.

E-Agriculture is an emerging concept, which aims to improve agricultural and rural development using information and telecommunications processes. E-Agriculture involves the conceptualization, design, development, evaluation and application of ICT, especially in agriculture.

One of the priorities in the agricultural development of Serbia is raising advisory activities in general, as well as the constitution and affirmation of extension services to its full capacity. The work will show the status of agricultural extension services through legislation, the Agriculture Development Strategy of the Government of the Republic of Serbia, the type and model of its organization, financing, available human resources, the structure of the basic features, all in order of agriculture and rural development in general.

Keywords: Agricultural extension, e-agriculture, concepts

INTRODUCTION

General pressure of competitors and continual innovations make organisational systems considering permanently the way of doing their works and conduct their re-engineering. Such a re-engineering of business processes demand almost always support of a certain informational technology. Numerous applications of informational technologies are developed as well as different types of informational systems. Since functioning and development of organisational systems more and more depend on the level of application of certain types of informational systems, their creation, usage, management and

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maintenance has become essential for prosperity or even existence of many organisations.

Contemporary understanding of business dealing, starting from informational concept, was accepted with delay even in agriculture. Information became key resource in managing agricultural production and in the same time the expression of efficient penetration in this field. While erstwhile once adopted knowledge were sufficient for further 10 to 20 years, nowadays, due to changed dynamics of knowledge innovations, they have to be adopted faster as well as to be changed more often. The experience is still important as a form of gaining knowledge needed in agricultural production, but in changed conditions it becomes insufficient.

Agriculture, as economy field, is characterised by certain specificities which in transferring and promoting new knowledge into direct production demand different approach and the way of organisation of the whole process. Among the specificities, the following are specifically interesting:

–A great number of agricultural farms which differ according to size, developing level and production structure,

–Necessary checking and adjusting of new scientific achievements by agro-ecological conditions of every single area where the measure is to be applied and

–Lower level of education of a farmer compared to employees in other economy fields.

Above mentioned specificities create serious problems in promoting new knowledge, information and technologies in agriculture. That practically means that for their efficient penetration significantly more educated farmer is needed and one or more organisations which would help him in managing, that is in making managing decisions. As an expressions of such needs, specific function of extension service is organised in agriculture realised by extension organisations.

The aim of the research in the work is conceptual model of the supporting system for informational and coordination of the extension service function, for the needs of all mentioned relevant factors for agriculture development in Serbia.

Such default aim of the research delegated numerous tasks that us structure of the research in accordance to the following:

–To perceive the extension service function and its role in developing farms,

–To do analyse of former function development, current state and problems in organising systems of extension service in our country,

–To innovate model of organising function of extension in our country,

–To identify possible application of informational communicational technologies within integrated informational systems of organisation,

–To identify features and structure of informational agricultural systems of agriculture, and the place of informational systems of agricultural organisations and informational systems of extension in it,

–To develop the concept of informational system of extension service of the country,
–To perceive characteristics of making decisions by farmer, which can be supported by a function of extension that is its system of supporting decision making,
–To define conceptual structure of the supporting system of making decisions of extension function,
–To perceive possible methodological problems of projecting and building system of supporting making decisions and analysing feasibility of this task and
–To define a model of organisational – staff support of informational system of extension.

MATERIAL AND METHODS

In realising mentioned tasks of the research combined researching methods were used in this work. For analysing work of extension service and development of informational technology e-extension in agriculture is based on, theoretical "desk" research is applied, through studying available literature and analyse of achievement through internet searching.

For connecting informational technology and philosophy with practical aims, needs and tasks of agricultural extension, it was necessary to conduct system analyse of agricultural extension. The system analyse is a method of breakdown of the research subject (in this case agricultural extension), which was treated as entirety (system) on disjunctive elements per certain logic (which is defined by the aim of the research). The basic aim of the system analyse is to notice elements of the system which are crucial for its functioning and development, and to act on them in terms of their improving, or problem solving. After that, elements are integrated again into the entirety, which is now improved in functional and developing terms.

RESULTS AND DISCUSSION

Agricultural extension (goals, tasks, organisation, working methods)

The primary goal of agricultural extension, regardless which types it belongs to and the way it is organised, is adjusting the state goals (makro) and farmers' ones (micro), which is implementation of agricultural policy of some country.

The goals of the country can be defined in four groups:

1.strategic – settlement of food needs,

2.economic – export of market surplus,

3.ecological – production of qualitative products, healthy food and environmental protection

4.sociological – reproduction of working staff in agriculture and development and prosperity of villages.

The farmers' goals are as follows:

1.economic – increase of economic efficiency and effectiveness,

2.technical – technological – increasing working productivity, facilitating working processes and improving working conditions, and

3.sociological – creating favourable living conditions and settlement of social needs.

By adjusting macro and micro goals, concretisation of basic goals and tasks of agricultural extension service is made:

-economic, technical-technological and general development of agriculture and villages,

-Improving production and economic efficiency of production (rationalisation of business dealing, production and work, increasing income per capacity unit, increasing profitability, production and so on),

-Balancing and structuring of production in accordance to he measures of economic policy,

-Influence on changing production structure in accordance with the needs and demands of local and foreign market,

-Direct application of scientific achievement and modern technical-technological solution into production,

-Collecting and processing information on production, technological, economic and social movements and problems of farmers aiming to reach possible positive impact on changing flows,

-Collecting and processing information on needs of producers and effects of measures of agricultural policy,

-Moral and material support to producers, what will provide restoring confidence of farmers into the state and stimulate them to develop agricultural production and their farms and

-Providing production of qualitative agricultural products in line with keeping and protecting environment.

Tasks of agricultural extension service for realisation of mentioned goals can be divided in the following activity groups:

A – TWO-WAY INFORMATION:

-Informing farmers on: supply and demand of agricultural products and raw material, measures of economic policy (premiums, regresses, loans conditions and so on), contemporary technical solutions and production technology, meteorological conditions, disease and pest appearance, and so on, and

-Informing the state, science and education on needs and problems of farmers and effects of measures of economic policy in agriculture, in order to correct them on time.

B – PROVIDING SERVICES: legal advises, administrative services (making requests for getting loans, insurance, reporting damage, reporting taxes and so on), business services (creating investment elaborates, optimizing

production structure, determining the level of production intensity and so on), production-technological services (soil analyse, diagnostic and preventive protection from diseases and so on).

C – EDUCATION AND TRAINING: technical – technological, organisational – economic, general,

Cultural and so on (trainings for handling modern means of mechanisation, application of protection means, keeping records in farms, using computers, making and conserving food and so on).

D – EXPERIMENTS: direct transfer of modern scientific knowledge into the practice (technical-technological, organisational, economic and so on).

E – CONNECTING AND COLLABORATION: with processors, equipment producers, raw material producers, scientific institutions, educational institutions and so on (Novković, Šomođi, 2001).

In accordance to the way of administrative organising of extension service, there are several types in the world:

1.Organising agricultural extension as farmers' organisation (cooperative). They are helped by the state and they collaborate with agricultural experimental stations.

2.Organising extension within scientific-educational institutions (agricultural faculties, institutes, schools). Educational functions and extension are united in one institution. Within the University they do educational, experimental, study work and extension activities. Services of extension are free of charge, and universities get financial support from the state.

3.Organising extension service within state administration (ministry of agriculture), and under its auspices are state researching institutions and experimental stations.

One of possible classifications of the methods being used in extension is division on:

1.TRADITIONAL METHODS,

2.BASIC METHIDS AND

3.APPLICABLE METHODS

Traditional methods, which can be very influencing and effective in transferring information and farmers' skills, and it varies from country to country and from village to village. In this group of methods of transferring information and skills are: drummers, music, songs, performances, puppet shows, theatre of shadows and so on.

Basic methods of extension depend on size of auditorium, and can be:

INDIVIDUAL METHODS, which include home visits, discussions in extension centres, individual researches and informal contacts.

GROUP METHODS, which include: demonstration (results and methods), mutual discussions, informal group discussions, field days, group professional visits, lectures, meetings, symposiums, seminars, panels and modified conference

methods (Workshop, Brain-storming, Listening team, Simulation games and so on).

MASSIVE METHODS: wall paper, boards, brochures, banners, tables, prepared materials, static media (posters and displays) and audio – visual means (radio, television, films, projections, slides and so on).

Applicable methods are:

Method of factors, according to the principle "an innovation for a show" (for example, application of new semen, fertilizer, protective mean or some other factor).

Method of products, where promoting of increasing yield or product quality, in some production by application of different innovations (sorts, type of fertilizers, protective means and so on).

Method of farms and households, which implies more complex approach, treating farms or households as an examining unit (for example projects of developing some product units and agricultural households).

Method of integral agricultural development, which implies integral approach in developing system of agricultural production in certain region.

Method of integral rural development, which implies development, not only agricultural production, but the whole development of rural communes, by applying different innovations (Novković,1992).

E-agriculture as a concept of modern development of agriculture

Business survival, as a precondition of successful business dealing, demands continuous self improvement and finding new ways for raising their own capabilities. The end of previous century created, in technical – technological view, revolutionary assumptions, which directed business dealing toward one totally new concept, known in economic theory like „New economy ". Regardless many professional discussions on justification of introduction term „New economy "into economic theory, it is obviously impossible to neglect more and more evident new trends on business dealing (Balaban and collaborators 2008). Tempestuous development of information and communication technologies (hereinafter ICT – *Information and Communication Technologies*), it can be freely stated, presents one of the basic characteristics of previous century, and involvement of ICT into all parts of modern business dealing totally justifies given statement. All of this brought to that that the previous century is also called "information century" (Jessup, Valacich, 2008).

Creating, disaminacija and usage of information would not be possible a known shape for us, without realising the following assumptions:

- –Creating hardware assumptions materialised through the concept of personalised computers what made computers available and widespread.
- –Development of communicating assumptions, before all through the progress of communicational technologies.
- –Appearance and development of internet and creating, logically viewed, global area of informational availability.

Above mentioned assumptions contributed that distances in business concept become insignificant or less significant. Technical technological achievements coupled with global area of information availability for many business subjects are, observing territorially, the whole world made as their interest zone. The end of previous century made such globalisation of world economy, which maximized the market but also brought very strong competitors. Business survival has never been more questionable as ever, and raising self abilities has never been so important. In accordance to above mentioned we can conclude that application of ICT in business dealing include three technologies (Turban et al, 2003):

–Computer science,

–Communicational and

–Technology of managing information

New concept of business dealing with the usage of ICT, known as electronic business dealing, (e-Business) pretends to be a dominant way of business dealing, and all business subjects which, do not assimilate to the new way of business dealing, are in danger to disappear. Different economy development of the region in the world makes this process unevenly implemented. It is obvious that less developed countries still try to protect their own business subjects by legal barriers, but because of danger of self isolation these measures are weaker and are doomed to failure (Turban et al, 2010).

Beside different regional integration in business dealing of ICT, there is also uneven sector representation. If we divide the whole industry onto primary, secondary and tertiary, lagging of ICT application within the primary industry is evident. However, the newest trends show significant steps in the primary industry sector.

World summit on the information society (hereinafter WSIS – *World Summit on the Information Society*) held in Tunis in 2005, in its final document identified a new concept named e-Agriculture (*Action line (C.7/21): ICT Applications: e-Agriculture*). The concept was identified for the needs, and in accordance with the whole idea of WSIS, transfer of experiences and knowledge in ICT application in agriculture in from developed regions of the world to less developed ones. Nevertheless, WSIS is supported by United nations, and for complete application of E-agriculture concept responsibility took the organisation FAO (*Food and Agriculture Oraganization of the United Nations*) 2006 (Rudgard, 2008; FAO, 2005).

E-agriculture presents a concept in formation which aims to improve agriculture and rural development by application of information and telecommunication processes. E-Agriculture includes conceptualisation, design, development, evaluation and application of ICT, first in agriculture (3).

For conducting concept of E-agriculture, working group was founded by FAO. The most important world organisations from the field of agriculture supported foundation of this working group, what was concreted in June 2006 in

the first meeting of EAWG (*The WSIS E-Agriculture Working Group*). EAWG conducts activities through three ways of media (Rudgard, 2008):

–Web based platform (www.e-agriculture.com),
–Verbal meetings and happenings and
–Mediation in specific countries

Application of ICT in agriculture, in accordance to the results and experiences of those who did the most in this field, can be conducted through the following:

–Application for managing resources in business dealing (ERP)
–Application for supporting e- business dealing;
–Applications for automatisation of the office;
–Usage of the system based on knowledge;
–Usage of IT learning;
–GPS applications;
–GIS applications;
–Automated systems for controlling machines

Assumptions for implementation of the concept e agriculture in Serbia

The republic of Serbia adopted the Strategy of development of agriculture of Serbia in August 2005 (7) where it is clearly presented the ambition of entering of Serbian agriculture into worlds integrations. Such ambitions without application of the concept of e-Agriculture are not real, so it is needed to approach the problem of application of this concept in Serbia seriously. It is obvious that during that process some specificities of Serbia have to be respected and in accordance with above mentioned trends build long term model for implementation of the e-Agriculture concept in Serbia.

Existing state of agriculture in Serbia is marked by series of factors starting from natural to politic ones, that is socially economical ones. Concerning its natural characteristics of soil, climate and water resources, Serbia has great potential which is not used in total, so there is still a room left where directly or indirectly a great number of people can be employed, and so eating safety of people would be provided, rural development, ecological balance and significant part in foreign market.

On the other side, the agriculture in Serbia is loaded by many unsolved issues. Consequences of centrally-planned economy in part of ownership and usage of soil as well as political reasons and pressure of interest groups make creation of the ambience for modern agriculture as it is in developed countries slow that is directing policies toward commercially oriented agriculture farms (Novković, Šomođi, 2001).

Implementation of the concept of e-Agriculture in Serbia

E-Agriculture overcomes technologies, it improves integration of technologies, multimedia, knowledge and culture, aiming to improve communication and creation of processes among different actors in agriculture, in the local, regional, national and international level. Through benefits, support

connected to standards and norms, technical support, education, education on scientific and practical achievements, by information on offers of goods market and capital, presents e-Agriculture as leading model of modern production where satellite systems are involved, global systems of positioning (GPS), new generations of computers and electronic systems.

Using global and international knowledge and experiences which were applied in developing countries it is necessary to determine the concept and a model of developing e-Agriculture. Among these makro and micro level in the system of agriculture it is a great number of participants, in our context, assumed "stakeholders" who have their own influence on total effects of agricultural production. Those are Specific Ministries, organisational systems (enterprises, cooperation, private farms), scientific research institutions (institutes, referent centres, meteorological bureau), educational organisations (faculties, high and secondary schools), libraries, funds (forests, water, soil), Cooperative association, business council and associations, banks and other financial institutions, insurance communities, stock exchange, centres for cattle reproduction and selection and extension services.

Needs for data and information of all participants are different and have to satisfy conditions of adjustment, complementation and timelines. Information exchange between different participants' levels is permanent. Information are per purpose and a content heterogenic and can be: informative, advisable, forecast, technological, scientific technological, reporting or of some other nature.

Participation of advisory service in implementation of e-agriculture

Aiming to determine a concept of implementation of e-agriculture in Serbia, an idea of researching in this work related to the concept of coordination of extension service as a key stakeholder among all other interested relevant factors for further affirmation of the agriculture.

The base for application of such a concept was found, firstly in the base of extension service itself. The task of organisations which primarily do the extension service is to do education and training of farmers providing them different services, advises and information, in order to make them easier and faster adopt and apply new knowledge and so improve the efficiency and effectiveness of their production. Beside this primary task, extension services have many other secondary tasks related to realisation of aims and interests on the state level, that is providing information for the needs of managing agriculture as an entirety.

The need of organisation of the system of extension services noticed many countries in the world, and so within the policy of their own policy of technological development of agriculture accessed to forming extension service organisations. In the countries with the highest level of agriculture development, such organisations exist and successfully function for many decades. Even in our country some steps were made in the direction of realisation of such an organisation.

By returning a part of the belongings to farmers and by leaving the concept in accordance to which only state farms were rights bearer of agriculture development, the policy of agriculture in the Republic of Serbia has significantly been changed, and by that in the first plan came the need for developing the real extension service organisations. The individuals and their associations or their private organisations, were neglected in their development, finally came onto the stage. In order to change their position, beside changed policy of the country, it is necessary to provide them actual and correct informartion. Farms, that is those farmers dealing with agriculture for the market, such information as support to management, that is decision making, have to provide through extension services.

Adequate processing of information is a precondition of their successful use in collecting information and management decision making. That is why the need appeared for introducing computers into extension services, in collecting relevant data for decision making, as well as in providing efficient support to the managing process itself. In the system of advisory sector and extension services organisations have to develop all types of information communication technologies. Concerning that extension services do a lot of tasks, primary as well as secondary, they are not only for the use of farmers, but also other users in the systems of agriculture. That is why, in this work it is proposed to expand the field of observing, and all the segments of the management making decision system are treated in the function of extension service which would be directed towards the needs of managing and deciding of all the stakeholders in realisation of their activities, before all to realisation of agricultural production and the whole.

CONCLUSIONS

Stabile and continuous economy development has just proportional to technical technological inocations and so called “knowledge economy”. Economy transition, first agriculture of Serbia, in direction of bigger applying of knowledge on innovations and new technologies are obliged to do detailed reform in the sector of education, science, research developing institutions and conductive models of implementation where extension service has to take very important position. As our society is in transition, in all these reforms the state has first to provide institutional and economical frame. Legal regulations and its conducting are necessary condition for re establishment of confidence and partners relations in economy. By making environment for of encourage, the one which provide free flow of knowledge, information provide rule of Law, intellectual property protection and so encourages investment in information and communication technologies.

In abovementioned conditions, and counting on objective chances connected to inflow of assets from international community and funds for affirmative projects recognised by developed world, development of agriculture in Serbia has its perspective.

Extension service in such a concept has to build its place and to impose itself by affirmative functioning in the field in terms of providing qualitative and prompt information to all partners connected to production in agriculture, by their own continuous specialisation and knowledge distribution.

E-agriculture is a concept, which is affirmed in developed countries in the world and becomes inevitable factor of improving and development of rural regions in undeveloped countries in the world.

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E-KONCEPT POLJOPRIVREDNOG SAVETODAVSTVA

SAŽETAK

Poljoprivreda i poljoprivredno savetodavstvo suočavaju se sa različitim izazovima u aktuelnom ambijentu i neposrednoj budućnosti tragajući za optimalnim rešenjima afirmacije poljoprivrednog savetodavstva i samog agrara u Srbiji.

Koncept e-poljoprivrede, u skladu sa idejom Svetskog samita informatičkog društva (WSIS – *World Summit on the Information Society*), identifikovan je kao potreba transfera iskustava i znanja u primeni ICT-a (*Information and Communication Technologies*) u poljoprivredi. Inače, WSIS je podržan od strane Ujedinjenih nacija, a za potpunu primenu koncepta E-poljoprivrede odgovornost je preuzela organizacija FAO, 2006. godine

E-poljoprivreda predstavlja koncept u nastajanju, koji ima za cilj unapređenje poljoprivrednog i ruralnog razvoja primenom informacionih i telekomunikacionih procesa. E-poljoprivreda uključuje konceptualizaciju, dizajn, razvoj, ocenjivanje i primenu ICT-a, pre svega u poljoprivredi

Jedan od prioriteta u poljoprivrednom razvoju Srbije je podizanje nivoa savetodavne delatnosti uopšte, kao i konstituisanje i afirmisanje poljorivredne savetodavne službe u njenom punom kapacitetu. U radu će biti prikazan status poljoprivredne savetodavne službe kroz zakonsku regulativu, Strategiju razvoja poljoprivrede Vlade Republike Srbije, tip i model njenog organizovanja, finansiranja, raspoložive potencijale humanih resursa, strukure prema osnovnim obeležjima, a sve u cilju razvoja poljoprivrede i ruralnog razvoja u celini.

Ključne riječi: poljoprivredno savetodavstvo, e-poljoprivreda, koncepti