MODELLING A REGIONAL AGRICULTURAL EXTENSION NETWORK AND ITS OPERATIONAL EXPERIENCES IN THE WEST HUNGARIAN REGION

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1. RESEARCH BACKGROUND AND OBJECTIVES

Following the changing of the political system in Hungary the structure of agriculture changed largely and the numbers of business participants increased and they became more heterogeneous. The continuous changing of the economic regulations and the frequent restructuring of the agricultural administration resulted in a more complicated technological and business information transfer.

Therefore the most radical changes happened in agriculture and in the rural society induced by the size and quality of the transition. Following the progress of transition in agriculture the bipolar structure of agriculture changed and small- and medium size agricultural companies were established in large numbers.

Together with the old-type structures the newly established private and joint companies soon found themselves in a completely different agribusiness and market economic environment. So the farmers and others living from agribusiness needed an extensive scope of information, which would help them to make their decisions under the tax and credit conditions and the new regulations, which would occupy the main part of their working time and they may probably not be able to make the right decision owing to lack of expertise.

An independent company - be either a private or a joint one - has to make such decisions almost every day. So they should be provided with the different information about the regulations, market and bank affairs, technological and biological development, which will enable them to make reasonable economic decisions. Extension should then provide services, which consider the business and farming conditions of the companies in order to make their agricultural business more effective. The extension service should inevitably be present in the information transfer. Without the participation of extension service the atomised farms would not have access to the necessary market information owing to lack of even personal links and would not survive under the given market conditions.

Based on the above-mentioned factors we can say that there is a need for an effective extension service in the field of agriculture. Farmers and agricultural companies can only be made competitive on home and international markets if they are provided with the same or better conditions than their competitors.

There were some steps made by the former agricultural administration but they were not successful enough. There was among them a system of extension supported and regulated by the state and it was based on private extension workers to render assistance for agricultural companies of new systems. Because this type of extension became a type of simple business affair it could not be approved by the farmers' society. As a result the agricultural extension system can be found in a transitional state at present. The most important one among its failures is that the objectives of extension service have not been identified yet.

Experience on successfully running extension networks in the developed western countries (European Union and USA) could be of great help in sorting out
our problems. Experiences accumulated there could be adapted in the process of establishing the Hungarian system of agricultural extension.

In order to realise the objectives the Thesis deals with a description of the agricultural extension in general and with the concepts of forming those systems in details. Further it introduces the model of a regional agricultural extension network controlled by the Faculty of Agricultural Sciences in Mosonmagyaróvár (as a knowledge centre) and its role in the given region. The main concept of the research was to analyse the modelled Regional Extension Service Centre as a possible solution, further to analyse its efficacy and the possibilities of correction.

The main objective of the research work was either to prove or to deny the hypotheses concerning the problem of research. The aim of research was to model a regional extension network based on the experiences of up-to-date home and international extension methods and to provide business and technological information for the agricultural companies in a larger region.

Therefore the Thesis includes the following main objectives:

- Studying the extension structures in the developed European countries and their adaptability.
- Modelling a possible regional extension centre
- Analysing the activities of providers and receivers of advice in the process of extension work
- Promoting the network of reference farms supporting the regional extension activity
- Promoting the new type of agricultural co-operatives supporting the farmers' purchasing and producing activities

The given research objectives are qualitative in sequence of their contents and practical in sequence of their nature. Since the extension activity can only be realised through synthesising different disciplines, therefore its realisation is of interdisciplinary character.
2. APPLIED RESEARCH METHODS

The research work was carried out in the Institute of Training and Consulting at The Faculty of Agricultural Sciences of the West-Hungarian University (further referred to as Faculty) from 1995 until now. The research work included the operation of an institution offering extension service in a defined region. Based on the experience and exact information the structural and functional model of a Regional Extension Centre (further referred to as REC) was established.

Own research covered five institutional systems, which are logically linked together through extension activity. The system consists of sub-divisions, which form a complex system of the regional extension service. I applied a system-theoretical approach in the methodology because using traditional methods any more cannot carry out the realisation of the concept.

The detailed description of the extension organisation (REC) controls and organises the extension activity in the region. Extension workers carry out their tasks controlled by the regional centre and the range of agricultural companies (small and supplementary farming, private and joint agricultural companies etc.) are the target groups of the extension activity, i.e. they are final users in the process of extension. Reference farms, the extension centre with its university background and the farmers build a complex system. The fifth component involves a new-type co-operation, which provides extension service as well. The applied methods are as follows:

- Literature review
- Study tours experiences
- The Model-method
- Methods of data collecting, processing and evaluation

In the process of literature review the analysis of results achieved in the EU countries were of great value as well as the achievements realised through other Hungarian researchers. My prior aim was to study the international (first of all EU) and Hungarian publications on extension in details and to give a historic review of the Hungarian extension service. Regarding the importance of the topic I considered the experience of the developed western countries (Austria, Denmark, Germany, France) and that of the former socialist countries (GDR, Czech-Slovakia, Poland) gained in the course of establishing the extension systems in the period of social and economic transition.

The studies and papers presenting the role and the importance of agricultural extension work in international context were of great value to me, especially if they dealt with regional extension activities. Special priority was given to the related economic and legal regulations in the present practice of the Hungarian agricultural extension, besides reference books describing the past periods. The analysis of the situation of regional extension was carried out through analysing the activity of the institution controlling and organising extension activities, and through analysing the activities of advice giving and receiving groups (registered advisors and extension workers and the members of the target groups).
The SWOT method was used for analysing the activity of REC. I investigated the environment and the internal situation of the organisation (activities, structure of organisation, human resources, infrastructure, financing and marketing).

Questionnaires were used for the analysis of the advisors (registered advisors) and of advice receivers (target groups of extension activity). The evaluation of the collected data was carried out by using mathematical-statistical methods and (homogeneity analysis, range-correlation etc.) with the help of computer programmes (Word, Excel, Corel Draw).

In the course of study tours abroad I could obtain an insight into the agriculture and the agricultural extension system excellently running in the different western European countries (Austria, Germany, Denmark, France and Switzerland). In these countries extension workers and advisors are well qualified and priority is set for the extension service to deal with the future problems of family farms under the conditions of sustainable development.

The model presented in my work is of descriptive character and can be used for forming the base of scientific generalisation contributing to the development of the theory of agricultural extension through collecting, analysing and evaluating empirical data.
3. RESULTS

The Thesis gives the investigation and modelling of the activity of a regional extension centre established by an institution that looks back on to long agricultural tradition. The extension centre - directly and indirectly - carries out extension activities but its main task is to control and organise the links between the advisors and the farmers. The extension centre carries out the realisation of the tasks with the partners for the sake of meeting the requirements. One of the co-operating partners is the network of reference farms. They are the sources of practical information for other farmers and places of advisor training and acquiring of technological knowledge. Another important partner organisation is the new-type co-operative formed by the extension centre. Its existence proves the fact that the atomised farms need co-operative farming and trading organisations, which help them to utilise the benefits of actions concerted on the market. Persuasion and an extensive explanatory campaign are needed to convince farmers of the necessity of this type of co-operations, which should be included into the scope of extension activities. The REC involved into this investigation (commonly called ÖVÁR-NET) integrates, controls and organises the extension activity in a given region. The extension workers carry out their tasks - in some cases (group consultations) - directed by the regional centre. The private farmers and other agricultural companies (small and private farms, agricultural joint companies etc.) as target groups are the final users of the extension service.

The process of agricultural extension in a given region is bound to the participants of the Agricultural Knowledge and Information System (AKIS) (educational institutions, lecturers, researchers, experts, farmers etc.). Therefore the process of extension can be seen as a complex system (Figure 2), which, like every system, has controlling and controlled sub-systems (informational, decision preparing, decision making and realising) and it maintains links through the inlets and outlets with the external environment. In terms of taxonomy the target groups of the extension service are the elements of the controlled sub-system (farmers, co-operative farm, reference farm) and the elements of the controlling sub-system are the advisors controlled by the extension centre and sub-centres.

Table 1 shows the systematic operational mechanism of the extension centre and the outputs to be achieved.
Figure 1 Model of the regional extension service in the aspect of systematisation
Source: Own research, 2000
<table>
<thead>
<tr>
<th>Activity</th>
<th>Method of communication</th>
<th>Output</th>
<th>Target groups</th>
<th>Dissemination</th>
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</thead>
<tbody>
<tr>
<td><strong>Higher education/ Training</strong>&lt;br&gt; - Extensionist specialised engineer training&lt;br&gt; - Plant control specialised engineer training&lt;br&gt; - Training of extension workers</td>
<td>- Lecture&lt;br&gt; - Group methods&lt;br&gt; - Practical Demonstration&lt;br&gt; - Study tours&lt;br&gt; - Correspondence courses&lt;br&gt; - Computer science</td>
<td>- Engineer specialised in extension&lt;br&gt; - Engineer specialised in Plant protection&lt;br&gt; - Qualified extensionist</td>
<td>AKIS organisations&lt;br&gt; - Agricultural branch&lt;br&gt; - Administration&lt;br&gt; - Banking&lt;br&gt; - Insurance&lt;br&gt; - Input material trade&lt;br&gt; - Business development</td>
<td>Local&lt;br&gt; Regional&lt;br&gt; National</td>
</tr>
<tr>
<td><strong>Education and training of agricultural entrepreneurs</strong></td>
<td>- Lecture&lt;br&gt; - Demonstration&lt;br&gt; - Consultation&lt;br&gt; - Course&lt;br&gt; - Methods of data processing</td>
<td>- Certificates&lt;br&gt; - &quot;Green booklet&quot;&lt;br&gt; - Qualification&lt;br&gt; - Training of agricultural entrepreneurs</td>
<td>Small farmers&lt;br&gt; - Primary producers&lt;br&gt; - Private companies&lt;br&gt; - Joint companies&lt;br&gt; - Extensionists</td>
<td>Local&lt;br&gt; Regional</td>
</tr>
<tr>
<td><strong>Computerised data base extension</strong>&lt;br&gt; - Software for the preparation of decision making</td>
<td>Computer&lt;br&gt; - CD&lt;br&gt; - Floppy, Programmes</td>
<td>- Data base of plant protection agents&lt;br&gt; - Database of plant diseases&lt;br&gt; - Database of field plant varieties&lt;br&gt; - Database of wine and fruit varieties&lt;br&gt; - NOKUDATA</td>
<td>Small farmers&lt;br&gt; - Primary producers&lt;br&gt; - Private companies&lt;br&gt; - Joint companies&lt;br&gt; - Extensionists&lt;br&gt; - Manufacturers&lt;br&gt; - Traders&lt;br&gt; - Research</td>
<td>Local&lt;br&gt; Regional&lt;br&gt; National</td>
</tr>
<tr>
<td><strong>Professional publications</strong></td>
<td>Printed materials&lt;br&gt; - Journal edition&lt;br&gt; - Farmers booklets&lt;br&gt; - Periodical publications</td>
<td>- The journal of &quot;Növényvédelmi Tanácsok&quot;&lt;br&gt; - Gazdafüzetek (Farmers booklets)</td>
<td>Producers&lt;br&gt; - Small farmers&lt;br&gt; - Primary producers&lt;br&gt; - Enterprises&lt;br&gt; - Extensionists&lt;br&gt; - Business development</td>
<td>Local&lt;br&gt; Regional&lt;br&gt; National</td>
</tr>
<tr>
<td><strong>Rural development projects</strong>&lt;br&gt; - Product of the region&lt;br&gt; - Reference farms&lt;br&gt; - Biomass research&lt;br&gt; - Utilisation of natural energy sources&lt;br&gt; - Village catering</td>
<td>- Printed materials&lt;br&gt; - Meeting&lt;br&gt; - Workshop&lt;br&gt; - Group work</td>
<td>- Tenders, proposals&lt;br&gt; - Projects&lt;br&gt; - Feasibility studies&lt;br&gt; - Development plans</td>
<td>Producers&lt;br&gt; - Small farmers&lt;br&gt; - Primary producers&lt;br&gt; - Enterprises&lt;br&gt; - Self-governments</td>
<td>Local&lt;br&gt; Regional</td>
</tr>
<tr>
<td><strong>Extension service for farmers</strong>&lt;br&gt; - Technological&lt;br&gt; - Management&lt;br&gt; - Economic&lt;br&gt; - Laboratory service</td>
<td>- Office consultation&lt;br&gt; - Farm visiting&lt;br&gt; - Group work&lt;br&gt; - Printed materials&lt;br&gt; - Telephone</td>
<td>- Tender, project&lt;br&gt; - Business plan&lt;br&gt; - Technologies&lt;br&gt; - Evaluation results</td>
<td>Producers&lt;br&gt; - Small farmers&lt;br&gt; - Primary producers&lt;br&gt; - Enterprises</td>
<td>Local&lt;br&gt; Regional</td>
</tr>
</tbody>
</table>

Source: Own research, 2000.
The table shows the activities carried out by REC covering a large spectrum of the possible and necessary tasks of extension service. REC applies the methods of communication including traditional and modern information technologies. The third column of the table presents the outputs of the extension process according to the activities. The target groups systemise the possible target groups through the outputs (natural persons, AKIS organisations, etc.). The presented activities reveal that most of the realisations and dissemination are of local and regional character. But in case of certain activities it exceeds the borders of the region.

Table 2 shows the results of the SWOT analysis covering the extension activities of REC i.e. the operational environment and the internal situation of the organisation (activities, structure of organisation, human sources, infrastructure, financing, marketing). Data listed in the table represent the references (strengths) and emphasised activities (weaknesses), which mean the necessary improvements (opportunities) to be done in the given situation and in case of external threats.

**Table 2 SWOT analysis of the Regional Extension Centre**

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
<th>OPPORTUNITIES</th>
<th>THREATS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Environmental factors (external environment)</strong></td>
<td><strong>Unsettled system of land tenure</strong></td>
<td><strong>- Strengthening the farmers co-operations</strong></td>
<td><strong>- Ageing population</strong></td>
</tr>
<tr>
<td>- Excellent habitat features</td>
<td>- Farmlands in foreign tenure</td>
<td>- Rationalising structure of the land tenure</td>
<td>- Population migration from rural regions</td>
</tr>
<tr>
<td>- Agrarian branch of long traditions</td>
<td>- Monopoly position of contractors</td>
<td>- Organising machine circles</td>
<td>- Brain drain through foreign and home economic centres</td>
</tr>
<tr>
<td>- Developed food industry</td>
<td>- Low rate of home capital</td>
<td>- Higher rate of alternative energy sources</td>
<td>- Glasshouse effect, higher draught losses</td>
</tr>
<tr>
<td>- Extensive production</td>
<td>- Low rate of capital re-draw</td>
<td>- Larger direct marketing</td>
<td>- Longer association period to the EU</td>
</tr>
<tr>
<td>- Nearby EU markets</td>
<td>- North-south contrast, south regions are in less favourable conditions</td>
<td>- Extended use of ecological farming methods</td>
<td>- Reducing biodiversity</td>
</tr>
<tr>
<td>- Rich environment</td>
<td>- Income differences within the region</td>
<td>- New jobs and retaining working places</td>
<td>- Qualified labour changes for the better paid economy</td>
</tr>
<tr>
<td>- Modern infrastructure</td>
<td>- Environmental conciseness</td>
<td>- Improving village tourism and catering</td>
<td>- Possible use of protected areas for tourist purposes</td>
</tr>
<tr>
<td>- Qualified labour</td>
<td>- Cut down of research and development supports</td>
<td>- Product supply meeting the market demand better (Hungaricum)</td>
<td></td>
</tr>
<tr>
<td>- Low unemployment</td>
<td>- Low rate of data processing technologies</td>
<td>- Extension of regional market</td>
<td></td>
</tr>
<tr>
<td>- High rate of foreign capital</td>
<td></td>
<td>- Border crossing co-operation</td>
<td></td>
</tr>
<tr>
<td>- Increasing the rate of non-quota production</td>
<td></td>
<td>- Network forming</td>
<td></td>
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<tr>
<td>- Potentials in forestry</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>- Important wine regions</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>- Important research development capacity</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>- Agricultural higher educational capacity</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

| Extensive activities (internal environment) | | | |
| - Agricultural engineer training | - Long term training of extension engineers | - Organising new type co-operations | - Longer association period to the EU |
| - Education, training of agricultural businessmen | - Low rate of correspondence training | - Improving agro-tourism | - Quick changing of supporting system and regulations |
| - Software development | - Low rate of profiles such as economy, animal husbandry, machinery | - Environment conscious way of thinking | - Continuous changing of public administration |
| - Editing printed materials | - Project for regional development on long term | - Improving the methods of correspondence education | |
| - Forming the network | - Personal consultation | - Missing profiles (animal breeding, economy, machinery etc.) | |
A questionnaire was used for analysing the activities of the extensionists. It included their qualification, expertise, main characteristic features, and type of extension work (advice giving to the farmers) and their affinity towards extensionist training.
Analysing the personal traits of the extensionists I observed that advisory activity is mainly carried out by a group of more experienced and middle-aged people (average age: 49.2 years) i.e. they are involved in this activity on average for 8.6 years. But the age of the extensionists or their working period do not correlate with the quality of their performance. The qualification and application of the methods of extension and liability are more important. The product of an extension action may be simple market information, but also a special advice. The performance always depends on the qualification of the extensionist, on the efficiency of information transfer, on how well his activity is organised and last but not at least on the fact if he regularly takes part in training courses.

Analysing the type of extension service (advice) we may conclude that the rate of technological advice (for farmers running a farm or agricultural business in main or secondary occupation) dominates and shares a rate of 58.4-63.5%. Within the technological advice plant growing is ranked number 1, number 2 is plant protection and number three is horticulture. The high rate of plant protection clearly shows the unfavourable trend going on in the agrarian branch.

Analysing the future estimations of the extensionists the priority of technological advice will remain but its preference compared to the other types will mainly reduce (by 20-25%) and legal advice is expected to rise as well, though the preference of financial-accounting and management advice will stagnate compared to the present situation.

In the circle of clients demanding advice, the rate of agricultural producers (main or secondary occupation) is the highest and together they make 70%. The rate of natural persons dominate at 51.1%, the rate of the small holders makes 13%, and medium sized companies share 10%, but the rate of big enterprises is as low as 6%.

I analysed the efficacy of the forms of making business contact e.g. the communicative methods applied, the techniques of extension and the preference of the office equipment. Among the methods applied, personal communication shared 29% and was ranked number 1, followed by demonstrations (21%) and the rate of the printed communication forms made 14%. Similar preferences were to be observed by the following three methods: lectures (13%), courses (12%) and other group methods (11%). The Rank-correlation coefficient of the job status (primary or secondary occupation) proved to be significant in case of analysing the rate of technological advice demanded by farmers having different types of occupations (R_{range}=0.9744).

The most important place among the different sites of extension was the farmer's place with personal consultations (55%) followed by consultations on the phone or in the advisor's office (17-17%) completed by other methods (clinical advice etc.) sharing 11%. This latter one presumes that the advisor is available on his office phone (day and time).

The time spent on extension activity shared the highest rate (more than 60 min. a day) if advice was given to those who did the job as a main occupation (52.8%). Approaching the lowest time interval (at least 15 min. a day) the rate changed and advice giving dominated if it was given for those who did the job as secondary
occupation. The rates reflect reality, because full-time farmers have a greater volume of farming and they need higher level and more time consuming advice. Analysing the working time of the advisors we can say that advice giving shares 59%, office work 25% and administration the rest of the working time.

I also analysed the range of knowledge the extensionists need for practising their activities according to general and personal importance. As a result of the questioning general fields of expertise were listed, which have to be known by every advisor in case they want to solve the tasks successfully. The answers revealed the fact that most of the advisors were not able to make a difference between "generally important" reflecting the public opinion, and "personally important" reflecting their own experience. The Khi values (13.56-13.62) got in the analysis for homogeneity prove that there are still statistically significant (between age groups) differences. This was also proved by personal interviews

Analysing the willingness to take part in training, 92.9% out of the questioned advisors participated in some training in the last three years and 71.5% said that they would take part in training course longer than they used to. It is obvious that the more time they use for their education the better chance they will have to keep up with the development in their professional fields. According to the answers of the questionnaire most of them (15.8%) rank training on the regulations of the EU and related information very high. This is the first time when the answers do not show the preference of technological type on the sides of both the clients and the advisors. This reflection meets the expectation of the advisors, namely the special type of extension will gain in importance covering the improvement of business results, management, improvement of efficiency and making EU-proposals and projects.

During the analysis of the operational mechanism of REC I also examined the opinion of the (advice receiving) farmers running their farms in the region of the organisation. The results based on the answers reflect well the farming conditions, and the preferences in asking for advice by the end-users of extension service (farmers questioned).

A summary of the answers for economic type questions helps us to determine the conditions under the agricultural companies have to run their businesses, how innovative they are if they have to make a decision on changing the production profile and the risks that are involved. In order to throw light on this problem I also analysed the correlation between the frequency of credit use, making use of agricultural support and development possibilities.

The examinations show a significant correlation in this respect, i.e. the innovative farmers, who are planning long term, and regularly make use of the opportunities offered by supports and credits (producing, investment etc.), are only capable of making new investments. This fact is confirmed by a homogeneity investigation examining the time of experience of the farmer in relation to the use of credit and initiation of new investments. In all three cases the more experienced farmers (between 6-10 years and over 10) take over the risks of investments.

If the farmer is not able to cope with the burdens of managing and organising labour, maintaining external contacts by himself, he will need professional help.
Lack of required expertise or experience motivates them to ask for advice in the form of extension service.

The intensity of demanding advice differs according to the fields of expertise. The analysed farms demand advice most for solving problems of risky decision-making (investment, plantations etc.) as they may determine the mobility adaptability of the farm to the market conditions for a long term. In other cases the relatively high technological costs (e.g. chemical weed control) may greatly influence the natural and financial yields.

Farmers are still very much interested in plant growing and protection followed by accountancy and finances, as well as organisation of co-operations, but animal breeding is on the last place. This can mean that animal breeding and related activities do not require help in decision-making or they do not require much of it. The reason for this little demand on advice may be because of the withdrawal of the time and labour consuming animal breeding or the periodically occurring marketing problems discourage them from running it.

In demanding advice farmers are also motivated by the fact that they will be assisted by marketing problems, variety selection or cost reduction. Remarkable is the rate of farmers (about 15%) who discuss their decisions with other farmers or use them as a source of information. Experience is a very important moment of motivation as it has the greatest influence on the decisions of the farmers involved.

Lack of required expertise or experience motivates them to ask for advice in the form of extension service.

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There is a most intensive interest is still shown in plant growing and protection followed by accountancy and finances, as well as organisation of co-operations, but animal breeding is on the last place. This can mean that animal breeding and related activities do not require help in decision-making or they do not require much of it. The reason for this little demand on advice may be because of the withdrawal of the time and labour consuming animal breeding or the periodically occurring marketing problems discourage them from running it.

In demanding advice farmers are also motivated by the fact that they will be assisted e.g. with marketing problems, with variety selection or cost reduction. It is remarkable that 15% of the farmers discuss their decisions with acquaintances, family members or other fellow farmers, or use them as a source of information. Experience is a very motivating factor, because it influences farmers in decision making very much.

Based on the investigations I can agree with the definition “searching for information is a sort of demand, which is induced by hesitated decision making, if experiences based on earlier decisions are not satisfying for solving the problem”.

Summarising the opinions of the farmers it was made obvious that motivation is originated in economic interest. So farmers need advice of special type (marketing, new technology, investment etc.), which help them to make the right decision and which will be beneficial for the profitability of the business.

The institutional system of the reference farms consists of the triangle of the extension centre, of the university as centre of knowledge in its background and of the farmers. In the past it turned out that training farms attached to higher educational institutions are of great importance as places of practical demonstrations, but being under-financed they are not able to follow the changes in the economy and society and are not able to fulfil the educational requirements induced by them quick enough. A public institution – especially if it is carrying out productional activities – cannot be able to adapt to the changed conditions from day to day and change its profile. The lately established system of reference farms could contribute to solving this problem. Reference farms are in the range of REC activities and their excellently organised farming practice can set as examples not only for fellow farmers but for students as well. Therefore reference farms being run in a given region could preferably be the places of practical demonstrations for educational, research and extension service activities. But the farmers running these reference farms of course can rely on the services of extension (professional aid, help with applications, proposals for support and subsidies etc.).

At the Faculty is promoting regional extension service through submitting offers for winning the title “Reference Farm of the University”. Awarding the title is based on a well-elaborated system of criteria, and well-organised institutional concept, which is presented in Figure 2.
Figure 2 Logical steps in the establishment of a network of reference farms
Source: Own research, 2000
Based on the concept more than 40 candidate farms of different size and profile were registered. These farms run their business in an excellent and profitable way and at high level of expertise. They are able to set an example for other farmers of the region and can assist higher education and research.

At first the tender was put for candidacy for reference farms in the county and there were 11 candidate farms. After evaluating the applications the judging commission selected 4 farms of different profiles (bio-farm, arable farm with seed production, cash crop production, mushroom and compost production and canning) and they were awarded the title Reference Farm of the University together with a certificate and a decorated plate.

During the coming years more candidates are to be expected and a desirable co-operation could serve practical extension and could promote the development of the Hungarian agriculture in general. Later on we are going to introduce a tender again but now for a larger area than the county, but the whole western region for covering a larger profile of agriculture. This way reference farms that can be involved into practical education and research could actively co-operate in utilising extension methods in practice efficiently.

The fifth element of the system is the new-type co-operative farm and its extension service, which is modelled in this paper. This type of co-operative farms struggle with many problems, like lack of capital, insufficient equipment, lack of expertise and uncertain legal background.

Initiatives coming from farmers towards forming associations or co-operative farms have the objectives to arrange wholesaling to exclude retailers partly or fully. They can only satisfy these expectations if they offer a wide range of extension service for their members.

The First Rape Growing Co-operative (FRGC) of Mosonmagyaróvár, as a quasi reference farm - could be an example of establishing EU-conform model farms, which are able to satisfy the needs of their members in providing extension service (sales, marketing, finances etc.). FRGC developed a model for rapeseed growing at branch level.

Table 3 shows a system of the extension methods and the scope of application in relation with the activities of the co-operative.
### Table 3 Methods of extension applied by FRGC

<table>
<thead>
<tr>
<th>Activities</th>
<th>Methods</th>
<th>Techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buying in</td>
<td>Specific biological and technological advice</td>
<td>Field visitations, giving advice on the phone, printed documents, visitations in dead seasons</td>
</tr>
<tr>
<td>Selling</td>
<td>Marketing advice</td>
<td>Forwarding information (prices, receptive markets contracts etc.)</td>
</tr>
<tr>
<td>Co-ordination of financing</td>
<td>Individual, group or printed methods</td>
<td>Suggesting financial actions</td>
</tr>
<tr>
<td>Co-ordination of services</td>
<td>Group methods</td>
<td>Group working, workshops</td>
</tr>
<tr>
<td>Education training</td>
<td>Group methods</td>
<td>Lecture, course, demonstration</td>
</tr>
<tr>
<td>Management</td>
<td>Individual, group or printed methods</td>
<td>Consultations, publications on extension</td>
</tr>
<tr>
<td>Organising and running machine circles</td>
<td>Group methods (dissemination of information)</td>
<td>Lecture, demonstration, consultation</td>
</tr>
<tr>
<td>Research development</td>
<td>Project realisation</td>
<td>Dissemination (conference, lecture, demonstration etc.)</td>
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Source: Own research, 2000

Making use of the services offered by FRGC (trading, financing, giving advice etc.) the members of the co-operative running their own independent farms get better chances on the market and can buy products and sell their produce at favourable prices in greater volume by excluding retailers. This way farmers having not enough experience in marketing affairs will not be exposed to chain-traders and unfair buyers. If the financing activities operate well new members will join the co-operative, which will then promote the sales volume of the produces and raise the need on extension service and will result in strengthening the organisation.
4. NEW RESEARCH RESULTS

New and original research results achieved in harmony with the objectives of the research work

1. Based on the latest results I elaborated the model of a regional extension network in northwest Hungary. I systemised the activities, the communication methods to be applied for their realisation, the outputs to be achieved, the possible target groups and the scope of dissemination to be carried out by an existing and operating regional extension centre based on scientific research results.

2. In order to complete the educational activities of the institution of training farms I elaborated the concept of a network of reference farms. The concept proved to be effective in its practical application and meant the construction of an operative institutional system. Its most important element is the so-called system of criteria, which is the base for selecting the candidates applying for the title of reference farms.

3. Further on I established the system of activities of a co-operative farm integrating independently running farms. As a result I elaborated the methods of relevant extension work and the techniques of extension service to be applied.

4. I worked out the relevant part of the educational programme for the post-graduate extensional engineering course.

As a summary I would say that the results achieved in the extended research work could be used for establishing an operative system of regional extension networks in the Hungarian agriculture. The research results are also adaptable in the process of forming EU-conform extension systems.
5. SUGGESTIONS FOR THE UTILISATION OF THE RESULTS IN PRACTICE

Analysing the results and the introduction of the institutional systems being involved in the process of extension I came to the following conclusions and suggestions:

1. An extension centre working in a given region could have an important role in supplying professional knowledge. Analysing the operation of the model I can conclude that realisation and dissemination of activities is mostly local and regionally bound, but in relation to certain fields it can be nation wide as well, i.e. REC sometimes carries out extension work exceeding the borders of the region. Outputs deriving from the realisation of activities can be directed to specific and future target groups in a larger territory and wider spectrum as well.

2. The present profiles of the regional extension centre developed during the successful realisation process of a PHARE project. The correct selection of the profiles were confirmed by the experiences of the past years, when the MARD initiated and introduced a nation wide regional extension activity programme based on higher educational institutions in 1999. By this time REC has already developed references, infrastructure and human resources that served as a background for carrying out these honourable but not at all easy tasks.

3. Traditional human resources (higher level of agricultural education, courses for farmers etc.) and modern means of information transfer (software development, publishing, rural developmental projects etc.) played equally important roles in providing the target groups with professional information and knowledge. In the process of extension work highly elaborated information was to be transferred with the help of different means of information transfer (lecture, demonstrations, computerised data bases, publishing etc.) and through visitations (searching for reference farms, technological and management consultations, organising demonstrations, laboratory service, writer-reader meetings) The system development, which serves the extension activities (network of reference farms, promoting co-operatives) and the research work (bio-mass research-development, promoting local products etc.) involving the university as knowledge centre render the institutional, informational and communicational background.

4. In the process of elaborating the curriculum course programmes were organised, which were induced by the social and economic situation in the mid-nineties, like essential structural changes in agriculture (proprietorship, land tenure, structure of production, changes in numbers and heterogeneity of business partners etc.) and the needs of the economic sector (the need for an effective extension service) and international obligations (preparation for the association to the EU). All these will have to contribute to the establishment of an efficient system of agricultural extension service in Hungary.

5. The results based on the answers in the questionnaires reflect well the farming conditions and the preferences in asking for advice of the and-users of extension
The organisation of farming activities and making contacts with external partners put the decision makers in a situation, where they are not able to solve all the problems alone any more, so they need professional advice. Lack of adequate expertise or experience in farming motivates farmers to make use of extension service.

6. The intensity of demanding advice differs according to the professional fields. Farms that were analysed ask for advice in making decisions, which may determine their business (investment, plantations etc.) and their accommodation to the actual market conditions for a long term. Relatively high technological costs (weed killing) may considerably influence the yields of production and the financial situation as well. We may conclude that motivation originates in economic interests. Farmers ask for advice in professional fields (sales, new technology, investment), which will support them in making the right decision and will favourably influence the profitability of their management.

7. In the scope of REC a new-type and EU-conform co-operative was formed by the farmers, which resulted in a higher number of member farms as time passed. Therefore the member farms of the FRGC have a higher production volume, which enables them to gain better market positions in selling their produce and buying goods. This type of co-operatives has to face with a lot of problems (lack of capital, equipment, expertise etc.) and uncertain legal background hinders their activities greatly. The objectives of the new-type co-operatives include wholesaling in order to exclude retailers partly or totally. Co-operatives can only meet the requirements if they offer an extended extension service for their member farms.

8. Nowadays-small farmers have problems with selecting information being necessary for running their farms according to the needs of the market. There were more than 200 programmes (lecture, demonstration, consultation) organised in the frame of extension activities, supported by the state and free of charge during the past one and a half year. The extension programme conducted with the kind assistance of village advisors and the county offices of MARD is one of the most important activities of FRGC. In the process of realisation of the extension programmes modern and traditional means of marketing communication were applied. One of the most important elements is publishing printed documentation, which are regularly used in group-consultations (Farmers’ booklets, the journal Növényvédelmi Tanácsok, course materials etc.) handed out during the lectures and demonstrations.

9. It is well known from the experiences of EU countries that the most effective form of extension is the individual or personal one. I think later on if the system is well running this form of extension should be preferred and the extension network should include it. Questionnaires sent out following group consultations and programmes confirmed it as well. In the course of selecting topics for programmes we should give priority to economy, animal breeding, horticulture and machinery. Horticulture is especially important, as there are no quotas for vegetable and fruit products in EU agricultural regulations.
10. SWOT analysis revealed the resources of REC that are necessary to carry out its functions. Further it helped to determine the trends of development - internal situation - and the macro-economic environment. Analysing the internal conditions (activities, organisation structure, human resources, infrastructure, financing, marketing) the strengths, the weaknesses and also the opportunities together with internal and external threats could have been determined as well.

11. In the process of establishing the organisational structure the introduction of so called sub-centres proved to be a very good idea. The availability of local information and knowledge contributed to better organisation of local programmes and satisfying the needs of the target groups (farmers, associations etc.) in the process of extension work (group and other types of giving advice). For the sake of a better co-operation the process of decentralisation should be carried on taking into consideration the agricultural activities, the objectives of production and the ability to retain rural population through creating new working places in the micro-regions. In the course of updating the extension work the competence of REC should be clearly determined excluding the present asymmetric territorial traits. It should be realised in harmony with the rural development policy in the EU.

12. Research on this topic confirmed that extension should be based on educational and research settings in the given region (higher educational institutions, research stations and vocational schools together with the training farms) in the future as well.

13. Considering the situation of the extension service in the Hungarian agriculture the most urgent task is to establish a well running regional network for satisfying real needs and for supporting the farmers in the given region. The system of sub-centres within the regions could be based on vocational schools and their training farms together with the research stations. Advisors (human resources) could be selected from the Register set up by the Ministry of Agriculture and Rural Development (MARD) at the early stage. But it pre-assumes that the sub-centre has a wide range of knowledge about the actual scope of activities done by the regional advisors and as a result they could cover the extension activities in the region according to the profiles. This again pre-assumes that the extension workers have access to an adequate system of infrastructure and regular training and the problem of financing should be sorted out as well.

14. The demand on extension service is induced by the constant development of science and technology. Vocational training is not capable to offer the most up-to-date knowledge and technological details. This is the task of extension work. It also includes that the receiving party should have basic knowledge. If he has not got a certain level of education in its business, he will not be able to realise the advantages of making use of the relevant advice. Therefore our task is to reorganise the system of extension service and to provide the farmers (family, small and medium sized farms) with the necessary information in order to make them capable to respond to economic challenges among others to those of the
conditions of the market economy. This work should be done within a relatively short period, within 2-3 years, which will pass until our EU association. Therefor state support (financial, organisational and controlling) should especially be strengthened in the field of agricultural extension service.

15. In the past years it was proved that training farms at higher educational institutions have a main role in the educational programme, but owing to the fact that they are under-financed they are not able to keep up with the latest scientific development and technical achievements. As a result they cannot satisfy the needs of education and training totally, as they cannot change profile or accommodate to the changed conditions from one day to the other. Reference farms in the region of REC could take this task upon themselves as they are running excellently and profitably and can serve as sites of practical demonstration, research and extension work, although they themselves would need special advice (e.g. special professional help in preparing proposals and applications etc.), too.

16. The network of reference farms should be extended, developed and promoted in the future through involving farms of new profiles. Through the network of reference farms other farmers of the region would have access to the latest achievements of science. Extension work would give the direction of technical development to be followed. Modern technical development should be handled in its complexity, i.e. it includes biological, chemical, technical and human activities. Biological development would contribute to the introduction of new varieties (variety show/year); chemical development informs about the use of chemicals and animal food additives etc.; technical development would introduce the latest developments in machinery and farming technologies. Human factor ensures the conditions of training and education (courses, higher level of education). Extension service and reference farms utilising all the achievements would promote the Hungarian agriculture, which will then be capable to meet the challenges of the European Union. The realisation of the objectives requires high amounts of investments though they will surely return.

17. The integration contacts (sales etc.) of the farmers working under atomised conditions should be established by using the methods of extension work. There is a definitive demand to be observed in the region, which was confirmed by the answers in the questionnaires and by the publications on the experiences in the EU member states. Integrated organisations should be developed to such an extent that they could cover the whole scope of the production creating competitive products on the market for a long term. The regional extension workers being employed by the regional extension centres could play a very important role in forming farmers' associations and co-operatives. The First Rape Growing Co-operative (FRGC) in Mosonmagyaróvár that was founded in 1997 should be mentioned in this respect as it functions as a quasi reference farm, too.

18. We may assume that later on (but especially by the time of the full EU membership) the rate of free of charge services will be lower as the demand will
go forward to some special types of extension service. A system supported by the state will not be capable to maintain these expensive types. A further reason will be the extended and accumulated work in the agricultural administration owing to the association. We should then consider involving external experts into the regional extension service. The strengthening of economic and market attitude will be unavoidable in future in respect to extension centres or organisations. In my opinion the package of extension activities financed by the state will include information on the agricultural policy, regulations, market conditions, technology, management, nature and plant protection, and the package of activities against payment will include the specific extension service.

As a summary I may conclude that the research results deriving from the research work can be utilised in the establishment of an effective, regional network of the agricultural extension system in Hungary. The results may contribute to the realisation of a EU-conform extension system and would promote actions in preparation to the decision making process respectively. It is obvious that really effective work can only be done during the modernisation of extension service, if extension workers and those who are related join forces and get support from the state at a greater extent.
6. PUBLICATIONS ON THE THEME OF THE THESIS

Scientific publications:


Popular science:


Lectures: