

## COMPETITIVE RESEARCH CONTRACTS FOR APPLIED ON-FARM RESEARCH FOR PRIVATE FARMERS IN MACEDONIA

*Sreten Andonov PhD<sup>1</sup> and Aart van den Broek MSc<sup>2</sup>*

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#### Summary

The Adaptive Agricultural Research Programme (AARP) is one of the components of the World Bank financed Private Farmer Support Project, implemented by the Ministry of Agriculture, Forestry and Water Economy (MAFWE) of the Republic of Macedonia. AARP is formulated to enhance changes in the agricultural research system towards farmer orientation in agricultural adaptive research. Four calls for proposals were launched in the period between December 1996 and December 1998. The Agricultural Research Committee (ARC), established by the MAFWE, approved 25 research projects after assessment of all submitted proposals. The ARC took into consideration the priorities set for agricultural development in Macedonia and used a set of 10 criteria out of which the most important one was increase of farm profitability.

Researchers and extension officers who were involved in the research projects participated in a training course on 'demand-orientation in agricultural adaptive research', prior to research implementation. The concepts and principles of on-farm research and farming systems research were discussed during the course, using a participatory training method. The trial design (including number of farmers to be involved and control treatment) and socio-economic analysis required long discussions, thus leading to major changes in the research projects. The AARP co-ordinator monitors the projects through 6-month and annual technical reports, field visits, peer counselling and quality assessment.

So far little attention has been paid to the institutionalisation of the AARP. Some suggestions related to the training of University staff according to applied and adaptive research concepts have been forwarded. This forwarding also applies to the suggestions related to the establishment of a taskforce in the MAFWE for the execution of ARC decisions. Furthermore AARP needs some improvements regarding the multidisciplinary character of the research groups, the financial involvement of the beneficiaries, peer reviewing and a broader eligibility for application to the research fund. AARP experiences have shown positive influence of proper priority setting, competition between researchers, involvement of researchers, farmers, agri-business and extension officers in research implementation, training and monitoring.

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<sup>1</sup> Mr Sreten Andonov PhD is AARP co-ordinator and animal scientist at the Department of Animal Science, Faculty of Agriculture, University 'St. Cyril and Methodius', Skopje, Republic of Macedonia (e-mail: sandonov@vesta.zsv.ukim.edu.mk)

<sup>2</sup> Mr Aart van den Broek MSc is consultant/trainer for research-extension linkages at Stoas, Wageningen, the Netherlands (e-mail: abr@stoas.nl)

## **Introduction**

The Republic of Macedonia has 1.299.124 ha of agricultural land, of which 51% is arable land and 49% is pasture. Although the country has been facing serious difficulties in its national and market economy, agriculture has accounted for 15-20 % of the gross national income, which continuously increases. Up to 1990 the share of the public sector was only about 20 % of the arable land and the support of the government was mainly concentrated on the government owned production units such as agro-kombinats. Since 1990, as a consequence of transition towards market economy, the government has been provoked to pay more attention to private farmers. At the same time private farmers have begun organising themselves in associations and became an important power in the development of the agriculture sector.

## **Agricultural Research in Former Yugoslavia oriented to large scale production units**

Agricultural research in Macedonia started to be organised during the late forties, with the establishment of the Faculty of Agriculture in 1947. Later on Agricultural, Animal Science, Tobacco, Rice and Vegetable Institutes were established. Besides the basic research in agriculture, supported by the Ministry of Science and other donors, the adaptive research was mainly concentrated on solving problems in the kombinats. The new technology was initially adapted to the conditions in the kombinats, while private farmers accepted it indirectly through the experience as workers in the kombinats and through meetings organised by the Extension Service.

## **Private Farmer Support Project**

In 1996 the government of the Republic of Macedonia agreed upon a World Bank credit for the Private Farmer Support Project. The Ministry of Agriculture, Forestry and Water Economy (MAFWE) implements the project through the Project Management Unit (PMU). The project has several components. Besides the components of Reorganisation of the Extension Service, Farm Planning, Agricultural Market Information and Animal Health Service, one is in charge of Adaptive Agricultural Research Programme (AARP). There is a co-ordinator assigned to each component with responsibilities for the activities within the component during the credit period. The co-ordinator works in close relation with the PMU.

The activities of the AARP co-ordinator are approved by the Agricultural Research Committee (ARC), which consists of 9 persons:

- the Secretary of the MAFWE;
- the director of the PFSP;
- a representative of the Ministry of Science;
- a member from the Faculty of Agriculture;
- a representative of the Extension Service;
- a member from a Farmer Association;
- 3 farmers.

The selection of the Committee members is done by the MAFWE.

The Agricultural Adaptive Research Programme (AARP) has been defined to ensure creative research proposals with direct impact on the profitability of the private farmers. A research team, field agent from the Extension Service and minimum 8 farmers should be involved in each AARP proposal. The responsibility for the whole project is transferred to the Principal Researcher, who is also responsible for the financial part of the project. The details between the MAFWE and the Principal Researcher are regulated with signed agreements for a period of 3 years.

## **Calls for Proposals by ARC and Approved Research Projects**

In order to receive as many proposals as possible 7 major topics (Table1) were specified in the open calls for proposals. Up to now 4 calls have been organised and 25 AARP proposals have been accepted (Table 2)

**Table 1.** Major topics and number of AARP proposals.

| Major topic                                       | Number of accepted AARP proposals |
|---------------------------------------------------|-----------------------------------|
| 1. Integrated Pest Management of crops and fruits | 6                                 |
| 2. Animal Production                              | 4                                 |
| 3. Farm management                                | 3                                 |
| 4. Effective use of water in crop irrigation      | 2                                 |
| 5. Effective soil cultivation                     | 1                                 |
| 6. Implementation of new varieties                | 6                                 |
| 7. Processing of agriculture products             | 3                                 |

**Table 2.** Date and number of accepted AARP proposals in calls.

| Date            | Number of accepted AARP proposals |
|-----------------|-----------------------------------|
| 1. July 1997    | 6                                 |
| 2. January 1998 | 8                                 |
| 3. July 1998    | 8                                 |
| 4. January 1999 | 3                                 |

In order to provide a unique system for evaluation of the AARP proposals, the ARC prepared 10 criteria for the evaluation with a total of 100 points (Table 3). Each of the criteria has a different weight. The highest weight is given to proposals with a high potential to increase profitability. This ensures a strong orientation of the researchers to the market economy.

**Table 3.** Criteria for evaluation of the research proposals.

|                                                                          | Points     |
|--------------------------------------------------------------------------|------------|
| Clear definition of the problem                                          | 10         |
| Hypothesis and research field                                            | 10         |
| Research team                                                            | 6          |
| Number of farmers participating in the project                           | 6          |
| Definition of the research plan (activities, place, time and commitment) | 8          |
| Potentials for increasing profitability                                  | 28         |
| Potential for increasing marketability                                   | 8          |
| Potentials for decreasing unemployment                                   | 4          |
| Participation of the research in the project budget                      | 10         |
| Participation of the farmers (associations) in the project budget        | 10         |
| <b>Total</b>                                                             | <b>100</b> |

Each member of the Committee evaluates each of the proposals according to the criteria mentioned above. Finally a list of the most competitive proposals is formed with accepted Projects.

In 17 of the 25 accepted AARP projects, the principal researcher is from the Faculty of Agriculture, in 5 projects the principal researcher is from the Agricultural Institute in Skopje, 1 project is organised by the Rice Institute and 2 are realised by independent researchers.

25 % of the budget for each AARP project is planned for equipment procurement in order to strengthen the Research Institutions in Agriculture. The rest of the budget is planned for other expenses necessary for the research, while the research team participates with their salaries.

### **Training on Demand-Oriented in Agricultural Adaptive Research**

After having received an approval for their research projects, the researchers and the collaborating extension officers attended a training course. Four issues were at stake in the course: i) actors involved in agricultural adaptive research, ii) concepts of on-farm and farming systems research, iii) communication and methodologies for interactive research and iv) linkages between research and extension. The main objective of the training course was to widen the horizon of the researchers and to offer them new perspectives for applied research and its organisation.

Concerning the methodology used for the training course two principles are considered important: participation and communication. During the research implementation good communication between the actors involved (farmers, researchers, extension officers) improves the quality of the trial results. The farmers should be given the opportunity to express their appreciation about the new technology and researchers should be open-minded, able to change the technology and to offer better adapted ones in the second research cycle (often a year). In such research process, communication skills should be well developed at all levels especially at the level of the researchers.

Although much has been said and written about participation, little of this experience has reached the agricultural researchers in Macedonia. Exercises, brain storming, small and plenary group discussions, questioning and probing to enhance the exchange of ideas among many participants were used at the training course. For the farmers' participation in on-farm research, a model developed by Biggs (1989) was presented at the training course. The researchers had the idea that they operate in a collaborative / collegiate mode of participation, but further enquiry revealed that for the proposed drafts, farmers have not even been consulted.

During the training course some issues required considerable discussions: number of farmers involved in the trial, socio-economic analysis of the research results (almost all research groups consist only of technical researchers) and trial design (what is a 'good' control). These issues relate directly to the characteristics of an on-farm research. In the first place an on-farm research should be implemented on the farm, but it still remains research. That means that replicates are needed for statistical analysis, but the question is how many farmers should be involved? Werner (1993) gives good indications about this. He proposed to include 12-15 farmers in the adaptation trials, while Macedonian researchers proposed to include up to 4 farmers or only 1 farmer, with a randomised complete block design with 4 replicates in one field.

Many researchers also focus only on technical aspects of the production process, while family farms rather meet socio-economic problems like marketing of the produce, low prices offered, availability of inputs, reluctance of the older generation of farmers towards new technologies. Therefore researchers have to take into consideration these aspects as well, while most research groups consist of technical researchers only. The training course has stressed the multi-disciplinary and system orientation.

Researchers used to work on research stations and control the trial circumstances. They normally determined which treatment should be the control one. In an on-farm research however, it is indicated to use the farmers' normal practice as control and to compare this treatment with the experimental ones. In this case the farmers' normal practice is just monitored. This monitoring provides information about other problems in the production process and new ideas for future research. 'Good' comparison also offers sufficient information to assess the profitability (economic interest) of the new technology for the farmers. It also gives data for an ex post justification of the investment to the donor agency.

### **Research Monitoring**

The programme co-ordinator has built up a monitoring system for the research projects since the first projects started their implementation. Over period of 2 years the following elements have been added one by one such as reporting, field visits, peer counselling and quality assessment.

### *Reporting*

The researchers are reporting on management (organisational and financial) issues and technical issues. The report on project management issues concerns a simple and short monitoring report, submitted every 6 months. The report contains the following chapters: i) general part, ii) planned activities for the period, iii) realised activities (focusing on contacts with actors involved, training, problems and solutions, discussion and expenses), and iv) plan for the next 6 months.

A technical report is submitted once a year at the end of the growing season or after a research cycle. It describes after an introduction:

- the production system and the research factors,
- general influences on research and production,
- production results and analysis,
- economic results and analysis,
- farmers' characteristics and evaluation,
- other problems identified in the production system,
- discussion,
- conclusions and recommendations.

### *Field visits and Peer Counselling*

At least once a year the programme co-ordinator, supported by an international consultant, pays a site visit to the research projects. They discuss with the researcher(s), the extension officer(s), the farmers and any other actor involved in the project. Many issues are at stake: project design, collaboration and communication, knowledge transfer, actors involved and their understanding of the research, administrative issues. During the field visit the researchers receive comments and recommendations on the management and implementation of the research. These comments and recommendations are also written down in a mission report and disseminated to all the researchers.

The field visits are organised in blocks. Every 3-4 months the international consultant pays a visit to Macedonia and visits 10-15 research projects. After the field visits a wrap up, c.q. peer counselling meeting is organised for those researchers who have been visited. The researchers discuss in small groups about the questions related to problems they have confronted and solutions which they have given and implemented. After the first research cycle, the changes in the design and organisation become more important and are discussed. In all cases talking about the successes appears to be also important.

### *Research project management*

Problems regarding the project management emerged during implementation. The researchers were used to the management of projects issued by the Ministry of Science and Technology. This management differs considerably from the project management concepts, which are normally applied in internationally financed projects. In this regard transparency and budget discipline are the most important issues to be mentioned. The international consultant has provided information concerning these issues to the researchers during peer counselling meetings.

The discussions in the Macedonian Agricultural Institute led to changes in the financial management procedures. The problems identified from the researchers' reports obliged them to review their internal procedures and to discuss them with the Institute's management.

### *Quality assessment*

To be able to follow the improvements over the years, the project co-ordinator proposed to assess the projects on 5 criteria on a scale from 1 (bad) – 5 (excellent). The following criteria are: i) profitability for farmers and adoption, ii) research design, iii) communication and linkages, iv) knowledge and skills transfer, v) research management. The assessment criteria link the project implementation with the objectives of the research component of the Private Farmers Support Project and the main features of the training course. This assessment structure has recently been installed. The experience that will be gained in the next two years, would certainly lead to modifications in the whole monitoring system thus providing 'lessons learnt' for future institutionalisation.

## **Institutionalisation**

The AARP still is part of the World Bank financed Private Farmers Support Project. It aims at the development of new profitable technological innovations for farmers and development of a set of regulations, contracts and management tools for applied agricultural research under the Ministry of Agriculture, Forestry and Water Economy (MAFWE). From the beginning of the programme in December 1996 the Agricultural Research Committee (ARC), made up of representatives of farmers, agribusiness persons, extension agents and researchers, has been functioning to approve proposals and supervise the implementation of the research projects.

So far 4 calls for research proposals were launched in the period between December 1996 and December 1998 and the ARC approved 25 projects. After the project approval, research team leaders, research assistants and extension agents involved in the research projects have received training on 'Demand Orientation in Agricultural Adaptive On-Farm Research'. The most advanced projects have delivered their 1<sup>st</sup> Technical Report, after having submitted the third 6-month monitoring report in January 1999.

Two issues are important for the institutionalisation of AARP:

- policy development for adaptive agricultural research in the MAFWE,
- (further) training of researchers in adaptive agricultural research.

### *Policy development for adaptive agricultural research in the MAFWE*

Although the initial paper on AARP, annexed to the Staff Appraisal Report of PFSP, mentioned about 6 fields of importance for agricultural development in Macedonia, the submitted research proposals on the calls cover many fields mostly without taking in consideration farmers' problems and needs or market opportunities. Looking into sub-sector orientation of the approved research projects, compared to the main agricultural sub-sectors in Macedonia the ARC selected research projects on: fruit and grape production (9), vegetable production (5), livestock production (5), others (6). When the approved projects are arranged discipline-wise, it becomes clear that market and economy oriented, as well as animal feeding projects are underrepresented: plant protection (7), breeding/variety testing (6), processing (5), soil & water (3), marketing/economy (3), animal feeding (1).

Donor agencies have recently started agriculture sector studies. Based on these studies the Ministry can establish an agricultural research strategy leading to conclusions about sub-sectors important for future agricultural development, main problematic fields (plant protection, fertilisation, animal feeding) in these sub-sectors, as well as up- (input supply) and downstream (processing, marketing) constraints for production improvements. Furthermore, this agricultural research strategy document will describe ways to implement adaptive and applied research, necessary means, financial structures, organisation of research activities and (inter)national contacts.

During strategy development and later for implementation purposes, some officers in the MAFWE should have the responsibility for co-ordination and necessary linking with other actors involved in agricultural development such as researchers in the Faculty of Agriculture and the Agricultural Research Institutes, the Extension Agency, Farmers and Farmers Associations, Agri-businesses, (Inter)national Traders. In future the actual operational ARC will also have the task for necessary linking with the sector, the Ministry of Science and Technology, and also the task of a think- tank and reflection group.

### *Training of researchers in adaptive agricultural research*

About 25 researchers of AARP, with PhDs, and another 25 assistant researchers with MSc have been trained in the new concepts of adaptive agricultural research, like On-Farm Research (design, statistical analysis, multi-disciplinary research) and Farming Systems Research (interactive system -, problem - and client oriented research). For future calls for proposals other applicants such as researchers, members of farmers associations, research and development (R&D) employees in agri-businesses will need training.

Even for longer term, students of the Faculty of Agriculture need to be trained in these and other concepts of adaptive and applied research.

It is important that some researchers actually involved in AARP projects get opportunities to specialise themselves in adaptive and applied research. The improvement of knowledge about the concepts of adaptive/applied research can be mentioned as a first aspect of this specialisation. Secondly they need skill training; not only further up-grading of their technical and organisational skills, but they should also improve their skills in training, teaching and coaching of their fellow researchers and students in interactive, participatory research. Well skilled, technical and training wise, enthusiastic, dynamic researchers can guarantee the further development of the agriculture sector in the long run.

### **Conclusions and Recommendations**

The AARP experiences of the last 2 years have shown a number of positive results:

- setting priorities, related to important agriculture sub-sectors and/or issues on which research is needed (such as I.P.M. and farm management), orients researchers in their proposals and the assessing committee (ARC) in (dis)approving of the submitted proposals; the same applies for the proposal assessment criteria (profitability is the most important criterion);
- training on demand orientation in agricultural adaptive research for researchers and extension officers involved in the AARP projects, enhanced the changes in the research design, research implementation and communication with the actors involved;
- in each AARP project researchers and farmers/processors are involved, and in most cases also extension officers; much attention is paid to the transfer of the results through various media;
- a competition for the funds has taken place: out of about 30 submitted proposals after each call, few (between 3 and 8) have been selected;
- monitoring through reporting, field visits and peer counselling, has proven to be important for further changes and creation of learning situations.

It is recommended for a future AARP:

- to take into consideration only those proposals in which multidisciplinary research groups are involved, this means technical researchers to collaborate with (socio-)economists;
- to require higher financial involvement of the beneficiaries; this will improve the demand/client orientation of the research(ers);
- to open the proposal submission also for research groups such as ones having an extension officer as team leader or having members of farmers' associations as leading body; in these cases it is recommended that they associate with a researcher for reasons of proper on-farm research design and analyses;
- to formalise the collaboration between researchers, extension staff and the agri-business sector;
- to install peer reviewing at the stage of proposal approving and during research implementation;
- to put emphasis on sustainability and gender aspects of the proposed technologies;
- to institutionalise the results of the first AARP, through training of University staff in concepts of applied and adaptive research and through the establishment of a taskforce in the MAFWE, implementing ARC decisions.

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