

Extension and Dissemination Strategies: Review of International Cases and Its Implications for Central Asia

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Introduction

Agricultural extension traditionally has referred to the work of a professional body of agricultural experts, often government employees, teaching improved methods of farming, demonstrating innovations, and helping farmers to organize and solve their problems. Extension has also served as a link between farmers to transfer the "best practices" of one farmer to another, and as a channel to introduce – and sometimes enforce – agricultural policies. Agricultural extension activities presently encompass a wide range of activities (in the public, private, non-profit, and non-governmental sectors), but the exchange of information continues to be the primary focus of extension activities (Umali and Schwartz, 1994).

Ultimate goal of extension and research is to increase the productivity of the agricultural production of farmers, especially small scale. This involves technological modifications at the farm level and it depends on its turn on development and dissemination of improved technologies and involves socio-cultural and behavioral adjustments. All these can be institutionally possible only through well-established links between the research and extension services. The presented document is the review existing agricultural extension approaches, strategies derived from the international experience mostly from the developing countries where reforms, donor initiatives and local innovations brought different types of agricultural extension and in most cases successfully. A part from that where appropriate the cases from developed countries were also incorporated as well. This review is intended to help the new SDC initiative called Water Productivity Improvement at plot level (WPI) to recommend some of the generally accepted, well-tested and successful extension strategies to be adapted to the Central Asian context. The study suggests some innovative ways of diffusion of the water knowledge, effective institutional linkages and includes some policy suggestions, discusses diversity issues (combination of public, private, NGO and service provider); suggest some positive lessons on improved financial mechanisms and sustainability issues. At the conclusion, part report outlines the integrated and comprehensive models (options) extension with the key role of state recognized for better uptake of WPI results and knowledge that is going to be gained.

Background

Land reform and farm restructuring have always been a major component of the transition from plan to market in all formerly socialist countries, including Central Asian countries, which had its unique development since independence. An extension service of old Soviet systems was incorporated within the former kolkhoz (collective farm) system and supported through the centralized state. The farm had its own agronomists, veterinary, construction specialists, mechanical engineers, economists and irrigation engineers. The farmers, it would be true to say – hired workers – just left to follow their pre-defined instructions. The higher education system (universities and subjective technical universities) used to prepare five-year higher-level specialists (irrigation engineers, agronomists, biologists, mechanical engineers etc.), while middle professional and specialized education such as Technicums (technical schools) and Uchilische (vocational schools) prepared middle level specialists. Ministry of agriculture and Ministry of water and melioration, two separate sectors then, had its own specialized design and research institutes, which dealt different aspects of agriculture and irrigation. During vegetation (weeding) and harvest (cotton picking) period all the students were used to be sent to rural places to help collective and state farms with routine agricultural works and as well as to gain some practical life experience. The completely agricultural

production system was designed to spend tremendous amounts of money for large-scale production and higher scale outputs, where research, education and administration systems – elements of extension - were present, incorporated, one-way and fragmented at the same time.

With regard to Soviet agricultural research, in 1929, a number of elite agricultural research institutes were united in the Soviet Academy of Agricultural Sciences, also called VASKHNIL after V. I. Lenin. In the Soviet era, development of agricultural science reflected societal development, since society was highly politicized by the Communist party, the science was politicized as well. VASKHNIL had a dual role in the Soviet agricultural research system. It was both an association of institutes and an association of scientists. Its structure, and that of agricultural research itself, was marked by constant flux. Over time, however, two distinct organizational patterns emerged. The first pattern, which dominated in the 1960s, was VASKHNIL as a union of a few specialized institutes, with a significant amount of agricultural research being conducted by institutes under the Ministry of Agriculture, outside VASKHNIL's management. The second pattern shows VASKHNIL as a giant organization managing almost all the agricultural research in the USSR with a complex structure of departments and regional branches (See Figure 1).

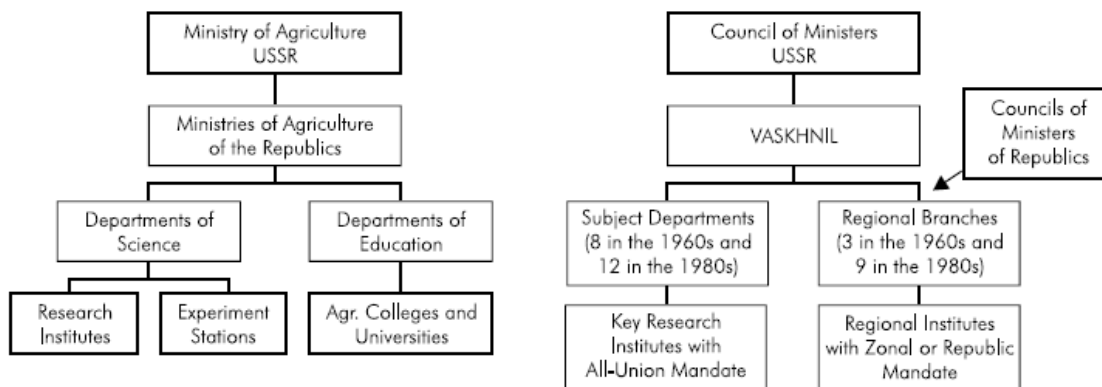


Figure 1. Agricultural research structure in Soviet Union

Regional institutes with zonal mandate had extension services built in. For example, the Central Asian Regional branch of the Academy was based in Tashkent.

Post independence (from Soviet Union) reforms in Central Asia in agricultural sector varied from country to country:

- In Kyrgyzstan, fragmented and small sizes of lands, private ownership and freedom to grow crops;
- In Uzbekistan farming units with long term land lease (ownership) but the state quota system for main crops (wheat and cotton) and fixed prices for them remained;
- In Tajikistan, big collective and cooperative farms remained with some private ownership, although there is no official state quota but farmers are tied with debts from old dismantled farms and engaged into dependence with futurist companies, which dictate farmers to grow monoculture.

Nevertheless, every state has one similar problem. Before reforms, each *kolkhoz* or *sovkhos* had its own specialists – agronomists, hydrotechnicians and head of the *kolkhoz* who had special agricultural education, who in their turn managed the complete agricultural process within these big farms. Now each individual farmer has to manage small plot of land with no special background. There are other issues related to extension:

- Detachment of research from practice
- Lack of state support for extension

- Not accessibility of donor driven extension services to farmers due to high costs and lack of awareness
- Findings indicate the need of knowledge for “new” farmers

The creation of suitable extension advisory services in Central Asia remains a challenge. The countries, which exercised socialist, centrally planned and supply based economy for a very long period, are struggling to shift to market-oriented economy. With the privatization of state collective farms (in Kyrgyzstan, partially in Tajikistan, long period lease in Uzbekistan), and distribution of land among public, hundreds of thousands of private farmers (semi-private in Tajikistan and state owned but long leased in Uzbekistan) have become a reality. The newly emerged farmers whose backgrounds are varying (schoolteachers, doctors, police officer etc.) have limited knowledge of profitable farming and are in desperate need of technical advice. They also need assistance in agrotechnical measures, marketing, inputs, irrigation etc. The extension advisory services comprise mostly those persons who worked, as specialists on state farms or elsewhere in very narrow agricultural disciplines, have no knowledge or experience in comprehensive farm management. The research, education and agriculture systems are fragmented. There are some donor activities to push some private extension services, which does not make much sense under present circumstances.

Qamar (2002) suggests that unless appropriate national extension systems are established in Central Asia through institutional reforms, backed up by national policies outlined within the context of comparative agricultural advantage of different countries within the region, these countries would not be able to exploit their full potential in agriculture.

Methodology

The study reviewed the technical, discussion and country reports of FAO, World Bank and other research papers. Because of the focus of the research, specific objectives of WPI project and Central Asian specifics the following criteria is used to review the international cases:

- Developing countries, because the Central Asian countries are in transition from planned economy to market, where main role and guarantee of reforms play state;
- Public sector extension, because the state funded organizations seem more sustainable with some strengthening and modernization compare to – ever changing focus and dependence on the source and direction of funding – private and non governmental organizations;
- Heavyweight agricultural countries such as India, Pakistan, Indonesia
- Plot level orientedness of the WPI project

Due to time and resource constraints, wherever possible the team was able to collect sufficient information and relevant materials. More than 60 reports and papers were collected and organized into a database for future use under the WPI project during the implementation. While reviewing these materials, which included cases from Asia and Sub-Saharan Africa, it was obvious not to consider the specific country cases where success stories are presented but to concentrate more on analysis and discussion papers that analyze the impact of rural development and strengthening of extension services in late 1970 and 1980s mainly led by the World Bank, FAO, ADB and where the extension development was related to the specific capital investments to ensure agricultural sustainability in these regions.

1. Basic Principles of Agricultural Extension

1.1 What is Extension?

There is no single definition of extension which is universally accepted or which is applicable to all situations. Extension is an informal educational process directed toward the rural population. This process offers advice and information to help them solve their problems. Extension also aims to increase the efficiency of the family farm, increase production and generally increase the standard of living of the farm family. The objective of extension is to change farmers' outlook toward their difficulties. Extension is concerned not just with physical and economic achievements but also with the development of the rural people themselves. Extension agents, therefore, discuss matters with the rural people; help them to gain a clearer insight into their problems and to decide how to overcome these problems. Extension is a process of working with rural people in order to improve their livelihoods. This involves helping farmers to improve the productivity of their agriculture and developing their abilities to direct their own future development.

The above statements are presented to illustrate the range of interpretations that can be found about extension. They contain a number of common points. They all stress that extension is a process, which occurs over a period of time, and not a single, one-time activity. They also all underline extension as an educational process, which works with rural people, supports them and prepares them to confront their problems more successfully. If statements such as those above are examined more carefully, and if the current ideas and practice of extension are considered, four main elements can be identified within the process of extension:

- knowledge and skills,
- technical advice and information,
- farmers' organization,
- motivation and self-confidence.

1.2 Key actors involved

There is a wide range of suppliers of agricultural extension services: the public sector (represented by Ministries/Departments of Agriculture), non-governmental organizations, non-profit organizations (e.g. universities and commodity foundations), international research centers, and the private sector. The private sector may include: (i) farmer associations whose membership is organized by locality or commodity (ii) private production and marketing firms such as input manufacturers and distributors, agro-marketing and processing firms, and trade associations; and (iii) private consulting and media companies (publishing and telecommunication firms). Figure 1, shows the results of the survey that FAO conducted worldwide in 1989 in 113 countries and which confirms the highly dominant role the public sector plays in the agricultural extension sector. Approximately 81% of the extension work around the world is carried out through the ministry or department of agriculture, at the national, state, or provincial levels.

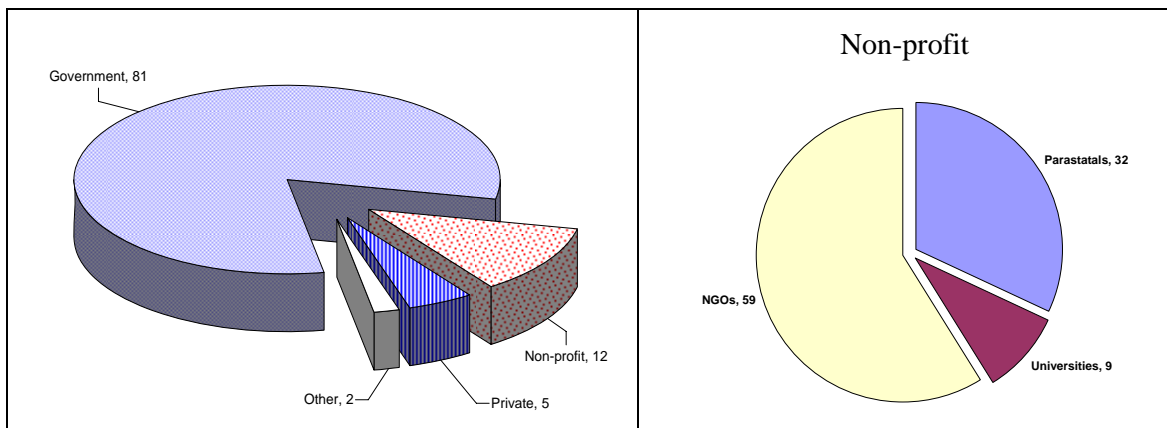


Figure 2. Distribution of Extension Organizations by FAO (Swanson et. al., 1990)

Several lessons can be drawn from the reviews of the nature and extent of institutional participation in the delivery of extension services across countries. First, private sector extension is generally confined to commercially produced, often high value commodities. A large bias towards catering to the specialized needs of medium to large-scale farms also exists. Second, smallholders, if organized into associations, however, can be strong customers as well. Third, fiscal constraints are a pervasive problem in both developed and developing countries, thus, strategies for: (i) streamlining and cost recovery measures and (ii) promoting the development of private sector extension are often necessary and unavoidable. This, however, does not necessarily imply public delivery, subcontracting to the private sector is also an option. Lastly, considering the limitations of the public sector and the selectiveness of the private sector, the participation of other institutions, such as non-profit and non-governmental organizations in delivering agricultural extension services will be crucial. Figure 3, presents the key actors involved in agricultural extension and channels of delivery (Umali and Schwartz, 1994).

1.3 Extension Information

According to Umali and Schwartz (1994), agricultural information transmitted to and from farmers via the agricultural extension system can be classified into two broad groups: pure agricultural information and agricultural information inherently tied to new physical inventions (Figure 4). Pure agricultural information refers to any information, which can be used without the acquisition of a specific physical technology. It includes all types of self-standing advice on practices in four main areas: (i) cultural and production techniques (e.g. timing of land preparation, planting and harvesting, optimal input use, animal husbandry and livestock health, crop protection, and farm building and design), (ii) farm management (e.g. record keeping, farm budgeting, financial and organizational management, and legal issues), (iii) marketing and processing information (e.g. prices, market options, storage procedures, packaging techniques, transport, and international standards for quality and phytosanitary requirements), and (iv) community development (e.g. the organization of farmers' associations).

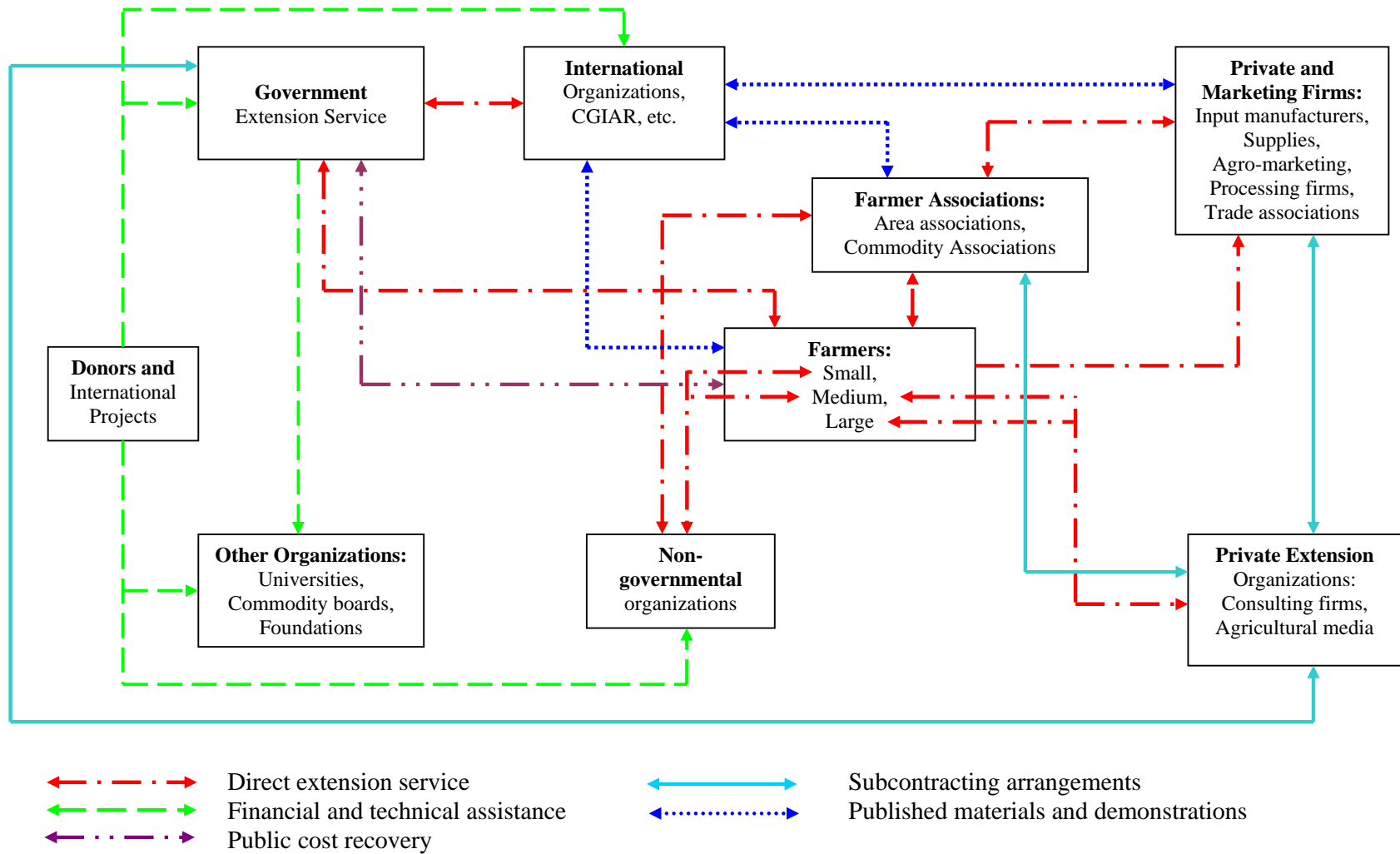


Figure 3. Major actors in the agricultural extension.

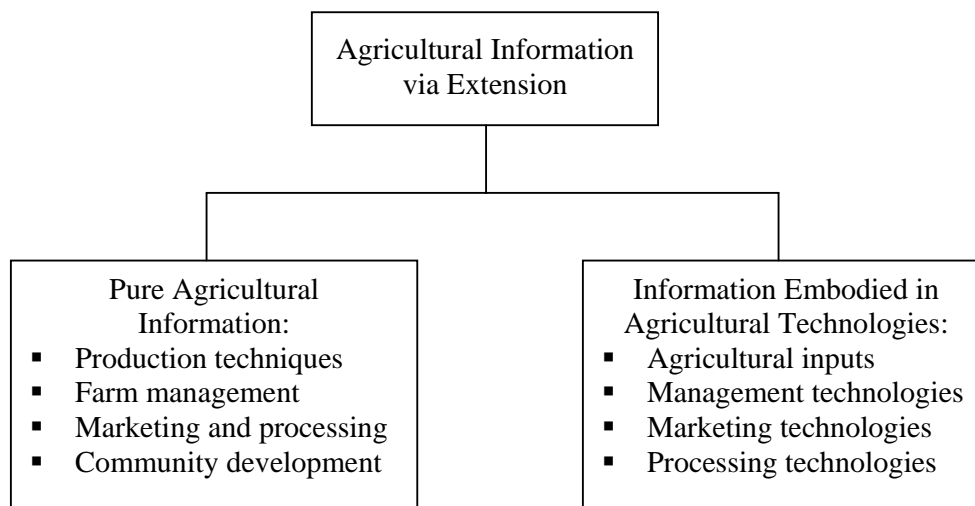


Figure 4. Types of agricultural information transferred through extension

Agricultural inventions or technologies generally come in the form of: (i) inputs to farm production (e.g. new agricultural machinery, agricultural chemicals, seeds, livestock breeds, and livestock supplies and pharmaceuticals); (ii) technologies facilitating farm management (e.g. electronic, telecommunication and laboratory equipment and computers and computer software); and (iii) marketing and processing equipment (e.g. drying, milling, storage, and packaging technologies). These technologies have often promoted as a package, including credit and technical assistance; the frequently cited examples of which are the Green Revolution technological packages of high yielding crop varieties (rice or wheat), irrigation water, credit, fertilizers, pesticides, and extension. At the same time, the agricultural extension system serves as the channel for the reverse flow of agricultural information. It transmits to researchers and policy makers, information about the nature of farmer problems, constraints, and needs that help shape the nature and structure of future research and technological development.

2. Review of International Cases of Agricultural Extension

2.1 Decentralization Cases

Agricultural extension systems in developing countries are struggling to prove their importance and relevance to agricultural and rural development. In order to solve complex development problems, national extension systems need to encourage the active participation of rural people in planning, implementing, and monitoring extension programs, especially at the regional, district, and county level. To achieve this participation, extension organizations will need to formally decentralize or transfer the control of specific program planning and management functions to the local system levels where extension programs are actually implemented. However, shifting from a top-down agricultural extension system to a decentralized one is an intricate process, which requires not only strong commitment from the top, but also careful planning and implementation. Decentralization is a major undertaking that requires the full understanding of all parties involved, systematic capacity building at the lower system levels, and careful coordination to ensure successful implementation (Rivera and Alex, 2004).

Three major factors are involved in decentralization: (a) transferring specific decision-making functions to local levels, starting with simple managerial functions, such as program planning and implementation; then priority setting and fund allocation; and ending with other administrative functions including accountability and financing/co-financing; (b) encouraging public participation, reflecting the degree of authority that is transferred to rural people, starting with advisory capacity in program planning and implementation, and ending with assuming control over selected financial planning and accountability functions; and (c) expanding local government involvement, which reflects the level of control government or local institutions, including private firms and NGOs, assume for specific functions, starting with state, provincial and/or regional levels, and ending with district, county, and municipal levels (Ameur, 1994).

2.1.1 China: An Extension Contract System

Agricultural extension in China is traceable as far back in time as three-four thousand years ago, whereas modern institutionalized extension services only developed at the beginning of the 20th century. Since founding of China in 1949, agricultural extension has undergone many modifications. The move to household responsibility system in 1979, agricultural production increased tremendously and this economic reform was key in achieving self-sufficiency (Chaung et. al., 2004).

Prior to reforms in 1979, there were many separate agricultural development agencies serving farmers at the county level. These individual agencies were weak duplicated efforts, and were poorly linked to township extension offices. To develop a strong, grassroots extension system, these different county agencies were integrated into a new County Agro-Technical Extension Center (CATEC). At the same time, the new CATECs were expected to guide extension activities within reorganized Township Agro-Technical Extension Stations (TATES) by providing training and technical support for the township extension staff. The TATES were responsible for organizing front-line extension activities by working through farmer technicians and demonstration households in each village. The current Agro-Technical Extension Center (ATEC) system consists of five administrative levels: national, provincial, prefecture, and county and township. At the end of 2001, the ATEC system was composed of approximately 371,350 professional, technical, and administrative staff, 500,000 farmer technicians who primarily operate at the village level, and 6.6 million demonstration households. The reforms also included decentralization of funding, where extension programs has been responsibility of corresponding level. For example, each county is responsible for its own CATEC. The similar pattern can be observed in other levels. Except that each ATEC can apply for outside funding. For example CATEC submits proposal to the county Department of Science and Technology, and if they decide that this proposal can improve the productivity usually they finance it.

2.1.2 Contract based or fee based extension

Farmers' demand for new technologies has increased tremendously over the past two decades with the commercialization and specialization of agricultural production. In responding to this new situation, some extension units have begun offering technical contract extension services at the village or farm level. One approach involves the TATES director signing a technical contract with the village head. The contract calls for the TATES staff to provide farmers in the village with specific types of technical services, such as information on new production technologies, disease and pest forecasting and protection, marketing information, and better

access to high-quality production inputs. These contract extension services are provided directly to individual farmers in the village or through a village committee. In return, each farmer is expected to pay the TATES for these services at the end of the season. In this case, extension becomes essentially a fee-based service. Technical contract extension services are mainly found in the areas of high-value or specialized farming, such as vegetable, fruit, and nursery stock production, animal raising, fish keeping, and Chinese herb production. On the other hand, contract extension for basic food crops has been very difficult to implement, due to low profit margins for these crops, which limit farmers' ability to pay for these advisory services. In some provinces, individual extension staff members have signed technical contracts to provide fee-for-service advisory services to specialized crop farmers. Again, the underlying assumption is that if the farmers receive valuable advice that increases their productivity and income, then they should be willing to pay for this service (Chuang, 2004).

2.1.3 Farmer Associations as a Form of Cost-sharing

As China moved toward a market economy, the structure of its agricultural sector has also changed to reflect these new opportunities. Over the past 15 years, specialized farm households (SFHs) have formed to focus on higher-value crop and livestock enterprises, such as vegetables, apples, pigs, ducks, mushrooms, and so forth. Most of these new SFHs have been initiated by younger (<35 years of age), better educated farmers (many with nine years of technical education) who have specific interests in different higher value enterprises. To assist these SFHs gain access to new technology and markets, the Agricultural Support Services Project financed studies, study tours and conferences to determine the most effective ways of organizing these SFHs into Farmer Associations (FAs). In many cases, specialized FAs that started at the village or township level have now merged with other FAs at the county level or beyond, essentially developing commodity specific supply chains to service major urban markets. By 2001, there were 13,360 new FAs organized at the village and township levels in over 700 project townships. Farmer Associations are generally viewed as a participatory mechanism that can help improve feedback to extension and, thereby, improve extension programs. At the same time, FAs have gained some importance in cost-sharing. Although FAs commonly use TATES classrooms for their monthly meetings, their need for advanced technical, marketing, and management information frequently outstrips the capacity of the subject matter specialists (SMSs) at the TATES and even at the level of the local CATEC. Therefore, many FAs contract with university professors or other specialized consultants to provide training and technical advice on specific problems. In these cases, the FAs finance the cost of fees and travel for these consultants from their own funds (Ameur, 1994).

2.1.4 Private and Privately Funded Extension

In recent years, an increasing number of private agribusiness firms have been signing production contracts with individual farmers. Under these contracts, most companies specify or provide specific varieties of seed, planting material, and other types of technical inputs that the farmers are expected to use to ensure product quality. These private companies may also provide direct training to farmers or they may subcontract needed extension and training activities to the local CATEC or TATES. At the end of the season, the company collects each farmer's production at a fixed price. Under this approach, both the company and farmers benefit. Contract production is commonly found in the areas of high-value vegetable, fruit, and dairy milk production. It is also being used to produce high-quality rice, wheat, and corn for export or specific end-use markets. Where the company provides inputs and training, the

approach is called the Company + Farmers model. In cases where the local extension service is involved, it is called the Company + Extension + Farmers model (Chuang, 2004).

Most interestingly, research institutions, agricultural colleges, and individual scientists and teachers in China may sign contracts with rural units or farmers to provide technical support on an annual or a continual basis. Many research institutions which are not under the Ministry of Agriculture's authority are engaged in extension activities. To increase the utilization rate of research results, the Government decided a few years ago to commercialize the national science and technology system. As a result, some research results are now directly sold in the marketplace. At the same time, China is enforcing a patent law to protect proprietary rights to research results. What is quite remarkable in the case of China is the bold introduction of the extension contract system and the rapid shift of extension from the large agro-complexes to the many small households. Some argue that contract extension in China derives mainly from farmers' interest in getting access to high-quality inputs that are in short supply. While this may have some truth, as the professionalism of extension personnel improves, the contract extension approach should increasingly fly on its own merit (Ameur, 1994).

2.2 Vietnam: Pluralism under the State coordination

According to Beckman (2004) poverty in Vietnam has been substantially reduced during the past decade, from 58 percent in 1993 to 37 percent in 1998. Agricultural incomes rose by 60 percent and living standards are rising, as reflected in various indicators of human development. The nature of poverty is also changing. Ten years ago, almost the entire population was poor, and policies that stimulated overall growth in the economy would almost automatically benefit the poor. That is because of the pluralistic nature of the extension system. The extension service is under the Ministry of Agriculture and Rural Development (MARD) later referred to as the 'Extension Organization'. Under the MARD structure the Plant Protection Organization, the Veterinary Organization, the Forestry Organization and Fisheries Department all undertake extension activities. Other ministries are involved through development programs, which include extension components. Other actors include mass organizations such as Youth and Women Unions, Farmer Associations, village organizations, farmer groups, cooperatives, private entrepreneurs, and state and private input supply companies. Vietnam follows a type of collaborative model of extension, as the range of actors in extension is ultimately accountable to the government. The distinction between state and civil society in Vietnam is blurred. In spite of strong links to the government, community organizations operate with considerable independence. There are advantages and disadvantages with the close relation between the community organizations and government. There is an institutional structure for communication between supply and demand for services, through which people can voice demand. However, there is a risk that the mass organizations spend most of their time mobilizing for state policy decisions already made at the expense of their role as a channel for popular demand.

The Vietnamese concept of socializing extension (*xa hoi hoa*) means that extension is in fact a responsibility of society as a whole and that all organizations play a part in raising production, improving technologies, and spreading production knowledge. Part of the national budget for extension is allocated to the mass organizations. National policy is to gradually move toward cost-sharing of extension services for commercial production and free services in the remote mountain areas. The poor have more difficulties in accessing formal services, but mass organizations play an important role in making extension knowledge widely available through community meetings.

2.3 Private extension

The input providers, which operate with state certificates, either independently or on a contract base with cooperative or commune authorities, undertake such services to promote their products to use through demonstration models and seminars in coordinated manner with state Extension organization (Beckman, 2004). There are also cases where state extension agents provide private extension at fee base. It is becoming common in Vietnam to form interest groups, or economic cooperatives to join forces to purchase, negotiate and get technical support on agricultural inputs, where communal system of villages incorporate poor farmers.

2.3.1 Staff, finance and state support

There is a national and local budgets allocated for the extension. Provincial services have about 900 staff (15-20 per province), at district level there are 2000 staff (1-4 per district). The salary rates are low but compensated by the extra commercial extension activities. State subsidies are often used to encourage diversification into new areas of production and to break traditional patterns. Certain crops, such as beans, groundnuts and pepper are encouraged and seed is subsidized or distributed free. Vietnam experienced an exceptional growth in exports of agricultural produce during the 1990s. The agricultural economy has been transformed from an almost exclusive focus on subsistence and the domestic market, to becoming the second or third largest international exporter of a number of agricultural crops including rice, coffee, pepper, rubber, and cinnamon. The boom in export of crops other than rice has largely occurred in the midland and mountain areas. The expansion of cash crops, such as coffee, is the result of massive government campaigns, with the provision of land tenure certificates, credit, and input packages (Beckman, 2004).

2.4 Training and Visit (T&V) System

Agricultural extension placed in the middle of the huge network of inputs, information and services that is often highly inconsistent, particularly in more remote areas especially in developing countries. Three out of four farmers in Asia have no contact with extension service (Maalouf et. al., 1991). Therefore, the extension's main job, if organized properly, is to bring and develop that network. However, the key role of extension is to link research with farmers in a continuous way. While this is not the job of extension to provide inputs (such as fertilizers, seeds, machinery) and services (veterinary and irrigation water) extension must make providers aware of farmers' needs and as well as to watch these services are provided properly – advocacy and information function. Worldwide the public sector (about 81% according to Davidson, 2001) plays a major role in providing the agricultural extension and mostly carried out through the ministry or department of agriculture (see Figure 5).

2.4.1 Agricultural Extension in India

India is a vast country with regional diversities in agro-climatic environment, resource endowment, and population density. It is characterized by spatially uneven economic and agricultural development with eastern, northeastern, and many of the semi-arid central areas faring poorly. Agriculture (including cropping, animal husbandry, forestry and agro-forestry, fisheries and agro-industries) currently accounts for 26% of the national gross domestic

product (GDP) and provides employment to about 70% of the work force. The distribution of land holding is highly skewed; 78% of farm holdings are small (less than 2 hectares) and in 1991 they commanded only 33% of the total net cropped area. The average size of holding was 2.28 ha in 1970/71, but fell to 1.55 ha in 1990/91 due to a steady increase in the number of agricultural families but virtually no expansion of agricultural land.

1. **Professionalism.** Appropriate advice to and support of farmers to enable them to increase their incomes can only come from an extension service that is professional at all levels.
2. **Single line of command.** The extension service must be under a single line of technical and administrative command. The department within which the service is located should be solely accountable for the operation of the extension system.
3. **Concentration of Effort.** Only by concentrating on the tasks at hand can then impact of extension become visible and can progress be sustained ... All extension staff work only on agricultural extension ... Non-extension activities ... undermine the professionalism of extension and its credibility
4. **Time bound work.** Messages and skills must be taught to farmers in regular, timely fashion ... The village extension worker must visit his farmers regularly on a fixed day. ... Any break in this time-bound system of training and visits makes effective extension difficult.
5. **Field and farmer orientation.** Contact must be on a regular basis, on a schedule known to farmers, and with a large number of farmers representing all major farming and socio-economic groups. ... [All extension workers] spend a large part of their time in farmers' fields.
6. **Regular and continuous training.** Regular and continuous training of extension staff is required both to teach and discuss with them, the specific production recommendations required by farmers ... and to update their professional skills.
7. **Linkages with research.** Effective extension depends on close linkages with research. Linkages are two-way ... Research's awareness of and research to actual farm condition is increased through responding to problems that have been put forward by extension workers.

Figure 5. The Fundamentals of T&V (Source: Rivera and Schram, 1987)

Before mid 1970s, in India, there were the village extension workers that dealt with multiple tasks but not agriculture and practically had no linkage to the research. Research in general in its setup and manner of finalization, with more focus on developing new standard crop varieties, no adaptation of these to the farming situations and was highly centralized. Indian Council of Agricultural Research (ICAR) supervised some thirty Central Research Institutes and twenty State Agricultural Universities (SAU). All research activities were funded and supervised by ICAR. Guided and coordinated centrally the research not responsive to the farmers' needs.

However, in 1978-79 the state two important decisions were taken – the first is the introduction of professional extension in the form of T&V system and second is National Research Program (initiated by WB). ICAR and SAUs were training subject matter specialists under T&V system where extension and research personnel could meet from different zones, monthly workshops, zonal workshops, state research and extension committees were organized. Under NARP recognition of multidisciplinary research in every agro-climatic zone, the Zonal Research Advisory Committees (with both research and extension personnel participating) were established and localized with power to coordinate and initiate research programs and this was approved by ICAR. Therefore, decentralization of research happened and professional extension was established by structural reforms. Now extension fed research with constraints that farmers have in adoption of research recommendations and can rapidly respond to specific problems; research had opportunity to get direct feedback through joint with extension field visits; the flow of information from field to research was initiated through a forum - monthly meetings under T&V where continuum is achieved farmer-extension-

research. There was also opportunity for researchers to learn from, test, adopt farmer's own traditional experiences, which better fit farmers' situations than general recommendations (Cernea et al., 1985).

However, in 1990s, many States found T&V unaffordable and state initiated the experimenting with the provisions of extension services. These experiments included decentralization (extension planning and control under elected bodies at the district/block level), contracting NGOs for some extension activities, the adoption of group approaches (instead of the earlier individual approach), the use of para-extension workers (as substitutes for DoA field extension workers, and the setting up of multi-disciplinary SAU teams at the district level. Another trend has been the formation of specific organizations (which are less bureaucratic, more flexible, and have wider expertise) to implement special programs related to agricultural development.

The national research organization (ICAR) now has 261 branches (138 in SAUs, 26 within ICAR institutes, and 90 in NGOs and government bodies) organizing vocational training for farmers. The Council has also strengthened 53 Zonal Agricultural Research Stations (ZARS). ICAR's other programs include 8 Trainer Training Centers, 70 Institute Village Linkage Program (IVLP) Centers, and 60 Centers of Technology Evaluation and Impact Assessment. Under the National Agricultural Technology Project (NATP), ICAR is presently establishing 40 Agricultural Technology Information Centers (ATICs), 25 in SAUs and 15 in ICAR institutions. Through the ATICs farmers can get many of the following services from the same place, delivery of research products, information, and other services (Sulaiman and Georgina, 2002).

The sustainability of the T&V agricultural extension model has often been doubted, particularly the ability or willingness of states to continue to fund a system that is more staff intensive than the one they had before. Experience has shown that sustainability has not, so far, become a major issue in India. Most states are increasing their financial allocations for extension, extension staff that were redeployed or newly recruited for the T&V extension services are not being transferred to other duties on project completion and the regular training and disciplined field-based farmer visits are being retained, mostly without dilution. Lack of sufficient operating funds is a problem in some states, but this is more a fund management issue as the net shortfall is in an amount marginal to the total agricultural extension budget. T&V-based state extension services have also proved resilient to a fractured single line of command. For example in Gujarat, Maharashtra and Andhra Pradesh, where considerable powers over extension staff have been delegated to elected district bodies, extension services are working as well as elsewhere. For several years now, the T&V extension approach has been applied flexibly with innovation encouraged so that extension is tuned to meet state-specific needs (Macklin, 1992).

2.4.2 Transformation of Extension in Pakistan

Pakistan's agricultural sector contributes more than 24% of GDP, employs about 44% of the labor force, and directly sustains 75% of the population and accounts for 30% of exports. More importantly, it accounts for about 50% of total foreign exchange earnings. If the processed raw material from this sector is included, then its share of total exports is more than 60%. Moreover, this sector provides raw material to domestic agro-based industries such as sugar, ghee, leather, and textiles. Pakistan's main cash crop and second highest earner of foreign exchange after rice is cotton. Today, Pakistan is the fifth largest producer in the world, with 3.15 million hectares under cultivation (Davidson et. al., 2001).

In Pakistan, agricultural extension services have traditionally been organized as part of the provincial Ministry of Agriculture. Several extension models and styles have been tried since independence, which are discussed below in chronological form.

The Village-AID started in 1952 was the first well-organized and concrete effort toward agricultural development by the new government of Pakistan. Initiated with the assistance of USAID and Ford Foundation (Axinn and Thorat, 1972). Special emphasis was placed on developing qualities such as leadership, discipline, initiative, self-help and self-service in the trainees. Moreover, the Village-AID workers were assigned a broad range of duties including the formation of village councils and acting as advisers to the councils. Overburdened with job responsibilities, they were unable to provide farmers with sufficient guidance on agricultural problems. Consequently, the program was abolished in 1961 for staff's lack of basic agricultural qualifications, ineffective coordination between village-AID workers and staff of other government departments (Davidson et. al. 2001).

Basic Democracies System (BDS) was designed to achieve developmental objectives with the maximum participation of the people in the rural development process, decentralization of authority, with responsibility delegated to lower levels of the organization. While BDS can be credited with creating political awareness among the people of Pakistan, it ultimately failed to create any long-lasting positive changes in the agricultural sector; the BDS was therefore abolished after yet another change of government in 1970.

Integrated Rural Development Program (IRDP) was embarked by the state in 1971 and was based on the idea of close coordination and cooperation among all governmental development agencies involved in rural development. IRDP remained in operation for about a decade but also failed to realize its stated objectives. In 1978, it was subsumed into the Local Government Department and quickly resulted in an unwieldy bureaucracy (a problem shared by the previous programs). The main reasons for its failure were the lack of mutually agreed objectives between participating agencies, conflicts of interest, and jurisdictional infighting among departments.

The Inputs at Farmers' Doorsteps was an effort to improve agricultural productivity during the latter years of the IRDP, the government assigned extension personnel to deliver agricultural inputs such as improved seed, fertilizer, and pesticides to farmers. The state provided substantial subsidies to the farmers in an effort to encourage the use of inputs deemed essential for increasing agricultural production. The extension personnel succeeded in popularizing the use of agricultural inputs, resulting in a significant increase in agricultural production. Although there was an increase in agricultural production, this approach nevertheless had the unintended consequence of turning extension workers from agents of change into sellers of agricultural inputs, and the highly specific assignment left them little time to carry out educational programs for the farmers. The approach also proved costly and ultimately paved the way for the privatization of agricultural inputs and phasing out of the subsidies borne by the Government. The approach was replaced in 1978 with a new system of extension known as the Training and Visit system.

Within the T&V system, field extension personnel are relieved of non-extension duties such as selling seeds, pesticides and other agricultural inputs. This enabled them to concentrate their efforts on informing and educating the farmer about best farming practices, from crop husbandry to plant protection. The T&V system replaced conventional extension in an effort to improve and enhance the performance of public sector extension. Unfortunately, the T&V system also failed to yield the expected results; instead, it further exacerbated the hierarchical

tendencies of centralized management and top-down planning. Moreover, T&V placed more emphasis on operational procedure than in getting the message across to farmers. In Pakistan, bureaucrats appreciated T&V, because the pattern of internal communication in the Department of Agriculture is asymmetrical (geared to control rather than to create understanding) and top to bottom.

The public sector's T&V system was predicated on the central premise of contact farmers conveying information received from extension agents to neighboring farmers. When this was put into practice, however, it soon became apparent that the selection of contact farmers was biased toward the large resource-rich farmers, those better positioned to adopt new technologies. The local landed elite of the past simply became the contact farmers of T&V, leaving small and farmers out of extension. However, in 1999, the Ministry modified its extension strategy significantly, while not abandoning T&V. Instead of focusing on individual (contact) farmers, now the agents deploy group meetings as effective dissemination. Some examples can be Farmers' Day, demonstration fields. This also opened space for inclusion of private sector into extension. Today both sectors exhibit bias towards farmers – when public sector concentrates on small and average farmers (according to Davidson et. al., 2001, about 93% of farming communities comprised of small farmers with 81% cultivating lands with less than 3 ha), while private tend to focus on high profit and farmers with large landholding sizes. Davidson and others (2001) suggest that privatization may not necessarily provide the best solution, which worsens the information gap between rich and poor.

3. New Funding Mechanisms

With the decline in public funding and donor support, extension systems are seeking diverse funding sources and financing models to address the long-standing issue of sustainability. Not only central governments, but also local governments, donors, external NGOs, and users themselves can finance extension. Most of these emerging mechanisms are described in the recent Neuchatel publication (2007), which stresses approaches that enhance sustainability, accountability, and empowerment. Despite frequent calls for privatization of extension services, workshop participants agreed that public financing is still critical. There is scope to tap additional funding sources, however, especially through community development funds, user fees, and cost sharing. Where public funds are employed, they maybe allocated more efficiently and effectively through mechanisms such as competitive funding or contracting to private service providers. Most of these mechanisms combine empowerment of users with co-financing for specific services, member fees paid to farmer organizations, or levies on agricultural production. They also involve competition between service providers and contractual relationships between the financing agency and service provider, or a tripartite contractual arrangement among the financing agency, the users, and the service provider. Figure 6, presents how directions of funding and accountability can be dramatically altered under new mechanisms that put farmers in the driver's seat.

Traditional approach: accountable to financier

New approach: accountable to client

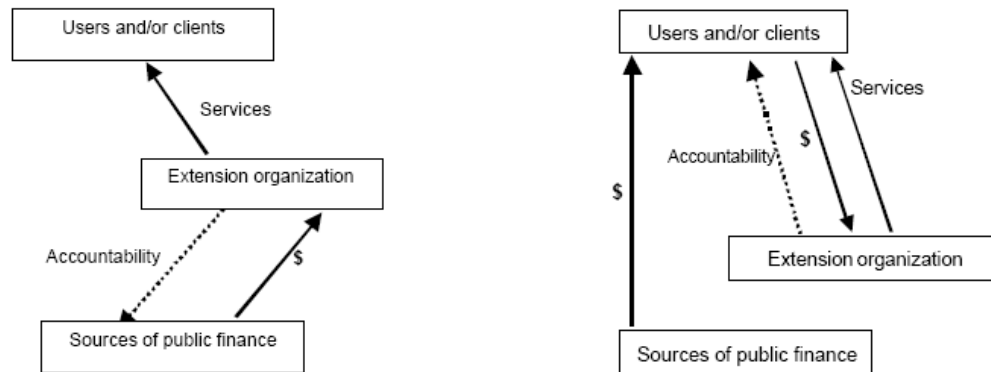


Figure 6. Financing mechanisms of old and proposed systems (Source: Neuchatel, 2007)

3.1 Community-driven development

Community-driven development funds offer a major opportunity to fund extension because donors and some governments now provide a large share of support to rural development through these funds. In a case in Guinea described during the workshop, extension micro-projects at the community level are identified through participatory diagnosis involving agriculture staff, and approved at that level by a selection committee with a majority of producer representatives. Rural producer organization (RPOs) contract the necessary technical expertise to prepare the micro-project and implement it with some co-financing from users. A very similar mechanism operates in Kenya, where private service providers (often NGOs) and users partner to prepare technology transfer proposals that are then screened by a local stakeholder committee. Even where public funds dominate, they are now allocated through a variety of competitive and contractual mechanisms. Contracting and competitive funding mechanisms differ principally in how activities to be undertaken are defined (Alex et. al., 2004).

3.2 Contracting for agricultural extension

Contracting for agricultural extension by the public sector takes many forms and may involve contracts with public sector agencies, nongovernmental organizations, universities, extension-consulting firms, or rural producer organizations. In contracting systems, in general, the agency—such as a public funding agency—draws up terms of reference and details of services to be provided, and then contracts for them, usually on a competitive basis. Services to be contracted are usually identified in consultation with users, although the programs tend to be longer term and more program-oriented. Contracts may be administered by national governments (as in Mozambique), the national government in collaboration with lower level government (as in Venezuela), or by governments with an NGO that then contracts with private companies (as in Honduras). There is also some “reverse” contracting of public extension agents, often subject matter specialists, by NGOs/private sector and farmer organizations, as in Uganda and Pakistan (Alex et. al., 2004).

3.3 Competitive funding systems

Competitive funding systems are generally based on bottom up proposals solicited from user groups alone or in partnership with a service provider. These generally involve award of a contract to implement the approved project proposal and are generally for time-bound projects – often seed money to initiate activities – and for open-ended proposals with special emphasis on innovations and piloting new ideas. Financiers view competitive funding as a mechanism to elicit bottom-up expression of demands and catalyze changes around innovative ideas and pilots. It is also a way of screening proposals against agreed *ex ante* priorities. In practice, there is great diversity in how these mechanisms operate. A number of projects financed by the World Bank in Colombia include competitive grants for both research and extension and operate in a decentralized manner. In addition, the USDA provides an increasing share of its funding for extension through competitive grants. In nearly all of these cases, users pay at least a part of the cost of the service (Alex et. al., 2004).

4. Revitalizing the Role of State

Public sector extension services have come under increasing pressure to reform in the face of sometimes dramatic changes. Listed below, are some of the changes that have affected public sector extension services proposed by Collion (2004):

- The state financial crises that lead to a sharp decrease in overall public investments, leading to pressure to downsize and consider more cost-efficient extension methods away from the labor intensive, Train and Visit (T&V) management type approaches.
- The increasing criticisms of poor performance of public services extension such as (a) their lack of accountability to clients; (b) the lack of relevance and quality of their programs, due to poorly trained extension agents; (c) their limited coverage, in terms of area and type of clients, as they insufficiently address the needs of the poor, women farmers, and farmers in disadvantaged areas; and (d) their lack of sustainability.
- The emergence of other actors and service providers that can disseminate agricultural knowledge and information; in particular, producer organizations, NGOs, and private sector.
- The political forces linked to liberalization and decentralization which in conjunction with financial constraints and emerging new actors, leads to redefining the role of public services and rethinking extension methods away from top-down, supply-driven approaches.
- The development in information and communication technologies which provides new vehicles for supplying information.
- The changes in agriculture and, therefore, in the information needs of farmers. Extension has to embrace a broadened mandate such as information on marketing. There is also growing public concern about environmental conservation and poverty reduction, which adds to the extension mandate.

Public funding of extension is essential; but that does not necessarily mean that public extension institutions should carry out or run extension services. Agricultural extension is a medium- and long-term investment in the same way as education and research, so the investment of domestic and external public resources is fully justified. It is essential to develop extension approaches which match the country's financial resources. Continuity of activities cannot depend exclusively on external (or donor funding like in Kyrgyzstan and Tajikistan). Proper evaluation of the financial return of specific activities improves sustainability. While providing funding, governments may contract out some or all of the

implementation to non-governmental institutions (farmer organizations, water user organizations, specialized consultants, NGOs). If the contract terms are sufficiently precise, this often delivers a better quality of service. In order to do this effectively, governments must develop the capacity to monitor and evaluate the activities they finance in this manner. Having producers and private sector actors co-finance extension, either individually or through their professional organizations, can result in savings and more efficient use of public resources.

The case studies in this section illustrate one or several aspects of the ways in which public sector services responded to these pressures.

4.1 Agricultural Extension Reform in Bangladesh

The Department of Agriculture Extension (DAE) is the largest and the oldest public sector organization providing agricultural extension services to farmers in Bangladesh. The organization was established with a network of field extension agents—designated as Union Agricultural Assistants (UAAs)—extending down to the union level. The Train and Visit (T&V) model was introduced and extended throughout the country with World Bank support from 1978 to 1992. Under this system, the country's 4,484 unions were divided into 12,000 blocks with approximately 1,000 farm families in each block and the Union Agricultural Assistants were re-designating as Block Supervisors (BSs). Reforms became necessary to increase efficiency of the agricultural extension system by shifting its narrow, top-down approach to a wider, bottom-up system with greater beneficiary participation and by strengthening the institutional base needed to sustain the new system. In the T&V model, messages were passed down from research to contact farmers (about 10 percent of the clientele), who were expected to transmit the same to the rest of the clientele. Farmers' problems and needs were not directly and properly addressed. Thus, a reform initiative stemming from the need for changes in the T&V model of extension was formulated, envisioning fundamental changes in the extension system and in methods of extension delivery. Against the backdrop of dwindling support for the T&V model and the emergence of NGOs and private agri-business, the government launched the Agricultural Support Services Project (ASSP) in 1992 with partial financing from the World Bank and the U.K. The project introduced some changes in the operational procedures of T&V and equipped the DAE with necessary logistics and trained manpower to carry out more comprehensive and effective agricultural extension work. Building on initial experiences, a comprehensive package of reform measures was introduced in 1995 under the second phase of ASSP and subsequently, from 1999 under the Agricultural Services Innovation and Reform Project (ASIRP) (Hassanullah, 2004).

In Bangladesh, the Department of Agricultural Extension recognized the opportunity created by the emergence of non-government development organizations and agribusiness enterprises to replace some public extension services by partnership programs involving the three actors: public, agribusiness and NGOs in order to meet the diverse needs of farmers. To facilitate the design of partnership programs, a hierarchy of committees was established from the upazila (sub-district) to the national levels. A Partnership Initiative Fund (approximately US million \$ 22.6) was established to finance the collaborative programs involving various combinations of public services, NGO's and private sector. This is another case of "contracting-out."

In Bangladesh, Farmers Information Needs Assessment and Problem Census methodologies were introduced, to provide an input into annual extension program planning. Different extension methods, adapted to different target groups have been piloted in an effort to

improve cost effectiveness of extension approaches. In Bangladesh, extension programming is taking place at the upazila (sub-district) level. To this effect, upazila planning workshops and upazila Agricultural Extension Committees were introduced. In Bangladesh, the Department of Agricultural Extension elaborated a New Agricultural Extension Policy in 1999 that provides a framework for the various actors to complement and reinforce their extension activities. The Department of Agricultural Extension is increasingly working as an umbrella organization, providing technical support and linkages among service providers. The strategic planning process is now institutionalized with the revision of the strategy in 2001.

Lessons learnt from Bangladesh illustrate that introducing reforms sustainability in an old bureaucratic extension system is a slow and long process. It takes convincing of all stakeholders that the system needs change, in order to develop a positive attitude to change and build consensus and commitment for introducing reform measures. The process requires the support of reform “champions” within the system (i.e., a small and cohesive core of dedicated professionals). It also requires political commitment at a very high level. According to the authors, political commitment was achieved with the formal adoption of the New Agricultural Extension Policy (NEAP), elaborated by a high-level task force in which all stakeholders were represented to ensure legitimacy to the process. The NEAP provided supportive policy measures that institutionalize the changes. An extensive training program aimed at improving organizational and managerial capacity as well as broadening technical skills supported the introduction of reforms. The reform implementation process was continuously monitored, using specific tools: a seasonal extension monitoring system; knowledge, attitudes and practice surveys; and technical auditing. Of great importance, the Ministry of Agriculture was committed to the reform process, regardless of government changes, thus providing the necessary continuity in direction (Collion, 2004).

4.2 USA: From Agricultural to Rural Development Extension

In the United States, the extension system is an outreach arm of the Land-Grant universities and operates in some degree of concert and occasionally in harmony with the United States Department of Agriculture. It is called the Cooperative Extension Service because support and funding comes from three levels of government (a) the federal through the USDA, (b) the state through the Land-Grant University of the state, and (c) county or local government. In the past 35 years, the federal contribution has dropped from more than 40 percent to less than 24 percent on average across the country and the federal influence has declined with it. The U.S. extension system was established primarily as an agricultural extension system because more than sixty percent of the population was agricultural at the time of the Morrill Act that established the Land-Grant system in 1862. However, as early as 1911 and prior to the actual establishment of extension under the Smith-Lever Act of 1914, there were debates within the American Association of Land-Grant Colleges and State Universities about the portfolio of Land-Grant colleges being too narrowly restricted to agriculture. Rural development has been a part of extension in the U.S. for the past 50 years but no movement was there. The most significant federal encouragement for rural development extension occurred with the passage of Title V of the 1972 Rural Development Act that gave US\$10.4 million for the effort annually for several years and became the charter for extension to have a role in rural development. The Act established four regional rural development centers to coordinate and facilitate rural development research and extension but with little in the way of appropriations. By 1985, earmarked appropriations for community and rural development were limited to small sums that barely kept the regional centers operating. Despite the presence of the regional centers that have helped to maintain a minimum presence of rural development in Land-Grant research and extension agendas, only one state,

Wisconsin, has really been able to make rural development a significant part of its extension agenda. The average proportion of the extension portfolio nationwide committed to rural development was 7 percent but in Wisconsin, in 1998, the rural development effort was 20 percent of their program (McDowell 2004).

The adoption of rural development as an integral part of the USDA/Land-Grant extension system is far from complete. Although there are widespread pronouncements by extension leaders about including rural development as a central part of extension, there remain states where rural development in one or another of its forms is prohibited by state edict.

The major difference between agricultural extension and rural development extension in practice turns on the difference between individual and collective decisions. Because farming decisions are mostly individual, a “best practice” from science and technology can be recommended. Because much of rural development is collective decision-making there will be multiple “best practices” depending on the preferences in the collective. Thus the knowledge base supporting the collective decisions must be richer and more flexible. The extension agent cannot know all of the knowledge and must have access to a large resource base of expertise. Indeed, there are no best answers in many of the collective decisions to be made in rural development.

5. Demand Driven Approaches

Demand-led is a relatively recent label for a notion that has been around since people began to write about extension as an academic discipline and educational practice. It captures the idea that the information, advice and other services offered by extension professionals should be tailored to the expressed demands of the clients or recipients of the service: not just to their “needs” as identified by various stakeholders (government, corporations, scientists, extension professionals), but the things they say they want (Garforth, 2004).

5.1 What is a Farmer Field School?

A farmer field school takes place in one of the farmer's fields for the duration of one cropping season. About 15-20 farmers of one village come together once a week to increase their knowledge and skills of crop management. Most learning in the field school takes place in the field. Learning is based on doing experiments in the field in which e.g. the IPM practice is compared with their own practice and on sharing of observations and experiences between farmers and facilitators. Through experimentation, observation, discussion and decision making farmers increase their crop management skills. The field school trains farmers in analyzing their own environment and farming practices, thereby enabling them to make decisions on crop management based on observations and to use the resources that fit with their environment and farming systems. Through this process of experimentation and improved decision making, the school aims to assist the farmers in solving their production problems and developing a more sustainable farming system.

The training approach of the farmer field school

The training in the farmer field school is based on the following principles:

1. Doing is better than hearing or seeing.

Farmers learn best from doing rather than from hearing. In other words, it is better to train farmers to use new techniques or practices by helping them to apply them than to tell and show those techniques. Therefore, in the FFS, practice and the farmer's own experience are very important. Farmers are encouraged to try out their own suggestions and to conduct small experiments.

2. Experiences are the start of all learning.

Most learning takes place after analysis of experiences and the application of the outcome of this analysis to new situations. For this reason, the field school provides farmers with a lot of new experiences, which they then compare with old experiences. This process of experience - analysis - conclusion - application is called the experiential learning cycle and actually describes the way most people learn. It is the role of the facilitators to assist the farmers in going through all the steps of the experiential learning cycle and in gaining a lot of practical experiences, because learning new things starts with analyzing experiences. The learning approach in the Field School is therefore a participatory learning approach.

3. The field is the classroom

The field is where the farmers work and that is where the training should take place to make it relevant to the farmers (Kikkert, 2005). Because learning in the FFS takes place in a field similar to their own, it is easy for the farmers to apply what they have learned in the FFS to their own field. In the FFS, farmers learn to observe familiar aspects of their crop in a new way and they collect life specimens in the field that can also be found in their own field. FFS participants learn about the vegetable crop by means of regular observations and hypothesis testing.

4. The topics in the farmer field school should be linked to the actual field situation and should be relevant to the local needs and conditions.

The curriculum of the field school is flexible. It is adapted to the field situation and the season. Topics are discussed when they occur in the field, so farmers can learn from the field situation and apply what they have learned straight away. If farmers have a management problem, it should be discussed in the field school. This is one of the reasons that each farmer field school starts with a baseline survey and making a cropping calendar.

5. Farmers become experts.

The farmers in the field school normally conduct a number of field trials and numerous small experiments. The subjects of these trials and experiments are often selected by the farmers themselves and are based on the field situation. During the FFS, the farmers follow the steps of doing research, leading to an analysis of the outcome of these trials and experiments. This is followed by a discussion of the applicability of their findings to their own situation. Farmers will no longer be dependent on extension workers to provide them with solutions and they will be able to evaluate solutions that are being offered to them.

6. Farmers are decision-makers.

The field school deals with the practices of farming in a real context, with farmers mastering and applying field management skills and with implementing their own decisions in their own field. Farmers learn to identify problems, discuss possible solutions, field-test these solutions, analyse the results of these tests and draw conclusions. Based on these conclusions, they make

crop management decisions. The field school aims to improve the decision-making skills of farmers by providing them with tools for decision making.

The Farmers field school process, besides its emphasis on field ecology, provides participants not only to learn about the cause and effect relationships, which exist in the field, they also acquire a require greater understanding of human relations.

They analytical processes employed in the FFS enhance farmers' capacities to examine the conditions in which they live and work. Participants, having completed their FFS, are able to take decisions on actions, which would improve those conditions. The increased understanding of participants regarding human social dynamics enables them to develop collaborative efforts that ensure that planned actions are implemented. The horizon of benefits from IPM training through FFS exists for several years into the future because they can continue (Kikkert, 2005):

- To conduct field studies to expand their understanding of field ecology;
- Effectively evaluate and adopt available technologies;
- Effectively manage their agro-ecosystems;
- Organize changes, which impact large number of farmers.

FFS involves farmers carrying out observations and experimentations in their own fields throughout the cropping season. The learning process does not depend on lectures, demonstration plots, or recommendations issued by extension workers. Instead, farmers examine what is happening in their own fields; they apply different practices, they make weekly observations, they keep records, they discuss the results, and they make their own conclusions.

The FFS approach want to be more holistic to crop protection and crop production and aims to be an alternative to a recipe-based approach in a 'T & V' training and visit setting in which the extensions takes the lead and the farmer stays the passive and dependent recipient.

5.2 Farmer Field Schools (FFS) in Africa

The aim of an FFS is to build farmers' capacity to analyze their production systems, identify problems, test possible solutions and eventually adapt the practices most suitable to their farming system. The knowledge acquired during the learning process enables farmers to adapt their existing technologies to be more productive, profitable, and responsive to changing conditions, or to test and adopt new technologies (Arnoud et. al., 2006).

The water and soil services of FAO in collaboration with ICRISAT and national extension have been especially active in Eastern and Southern Africa developing FFSs for soil husbandry, minimum tillage conservation agriculture, soil conservation, water harvesting and water moisture management in rain-fed systems like a project in Kenya to tackle land degradation. These new field schools combine both educational and participatory technology development (PTD) methods. In West Africa FFS developments have largely remained in diversification to other crops. In Africa, FFSs are becoming the foundation of field-based food security programs and taking on a new role. Farmers learn to better manage their crop for efficient use of water and other resources. After the FFS, which is typically one to two seasons, farmers graduate with new skills. In fact, many groups of farmers in FFSs decide to continue their group as some type of informal or formal association as they have built trust and confidence together. This is a natural occurrence. A critical role of FFSs is the ability to up-scale by spreading out. Up-scaling is possible because farmers can lead the largely hands-on activities of a well-designed FFS. In these programs, the FFS complements other methodologies including farmer-to-farmer methods that have been found to be best for

straightforward see-and-do methods such as water harvesting and storage as well as PTD methods for production systems where new solutions emerge from collaboration between farmers and researcher experts. Radio and other mass media play a role for motivation and information exchange especially where farmer interviews are used (Arnoud et. al., 2006).

Arnoud and others (2006) suggest that FFS can stimulate innovation in the following ways:

- Carry out research with farmers to develop technologies that are based not only on sound science but that also work in farmers' conditions (markets, climate, labor availability, access to land, etc.) and that are acceptable to local farmers in terms of their purposes and culture. In other words, FFS allow farmers and researchers together to make the pre-analytic choices that determine the outcome of research.
- Establish effective linkages between research and farming communities by creating Participatory Learning and Action Research (PLAR) groups of men and women farmers who are elected by rural communities.
- Strengthening farmer leadership and organization to increase the effectiveness of farmer interaction with research and technology development, and with the agencies that can create the conditions for the effective use of the outcomes of research.

6. Other types of extension

6.1 Irrigation Advisory Services

Irrigation advisory services can play an importantly role in assisting users to adopt new techniques and technologies for more efficient water use and increased production (Smith and Munoz, 2002). Such services can be provided by private, public or co-operative agencies. Increasingly commercial agencies can take over the traditional role of the public agencies, although often restricted to the more lucrative parts of irrigation sector. Critical in the promotion of irrigation advisory services is the financial sustainability of such institutes, as in particular in many developing countries inadequate funding is available to finance public services. Below are few already existing cases of Irrigation Advisory services:

The Irrigation Training and Research Centre (ITRC), (<http://www.itrc.org>) established in 1989 in the California Polytechnic State University San Luis Obispo works closely with the irrigation industry for testing of new irrigation technologies. Providing short courses on irrigation management and assistance in the analysis of irrigation district efficiencies.

The Center for Irrigation Technology (CIT), Fresno California, (<http://cati.csufresno.edu/cit/>) provides similar services as the ITRC. It has established Wateright, an web-based irrigation scheduling tutorial for water managers directed towards agricultural users as well as home owners and commercial turf growers. The interactive web program addresses a range of concepts and familiarizes irrigators with options to improve their irrigation (<http://www.wateright.org/index.asp>).

University of Florida, (<http://edis.ifas.ufl.edu/index.html>). The Cooperative Extension service promotes irrigation scheduling with evaporation pans. Installation of standardized NWS (National Weather Service) Evaporation pans and providing Pan factors and Kc factors allow to set up a simple water budget.

University of Georgia, (<http://www.ces.uga.edu>). The Cooperative Extension service assists in the introduction of irrigation scheduling methods, based on water balance methods with

calculations of crop water use curves, pan evaporation pans or tensiometers and electrical resistance blocks.

Texas Cooperative Extension, (<http://texaset.tamu.edu/index.php>). The Irrigation and water management section of the Texas Cooperative Extension department provides information on various techniques related to crop irrigation and ET, salinity, water control, irrigation equipment, groundwater wells, and surface water preservation. Weather information provided and information on irrigation scheduling methods. On line site to determine irrigation water needs. Extensive information on various irrigation equipment and irrigation companies.

Utah State University Extension, (<http://www.engineering.usu.edu/Departments/bie/software.html>). Provides a range of irrigation information leaflets with detailed information per county on crop water use and irrigation timing for sprinkler systems, using simple irrigation calendars.

University of Minnesota, (<http://www.extension.umn.edu>). The Extension outreach of the Biosystems and Agricultural Engineering systems of University of Minnesota promote irrigation water management with the objective to enhance irrigator and crops advisor skills in soil-water management and understanding of decisions tools including real-time crop water use and to increase irrigation awareness of the potential impact of irrigation practices on degradation of water quality. Methods promoted includes the computerized Minnesota Checkbook, daily ET phone messages, web information and crop advisors. Service bulletins on irrigation scheduling methods.

6.2 4-H USDA – Youth Development Program

4-H is the Cooperative Extension System's dynamic, research-based, non-formal, educational program and organization for youth (5-19 years). The program combines the cooperative efforts of youth, volunteer leaders, state land-grant universities, state-local governments, and the Cooperative State Research, Education and Extension Service (CSREES) of the U.S. Department of Agriculture. 4-H didn't really start in one time or place. It began around the start of the 20th century in the work of several people in different parts of the United States who were concerned about young people. The seed of the 4-H idea of practical and “hands-on” learning came from the desire to make public school education more connected to country life. Early programs tied both public and private resources together for the purpose of helping rural youth. During this time, researchers at experiment stations of the land-grant college system and USDA saw that adults in the farming community did not readily accept new agricultural discoveries. But, educators found that youth would "experiment" with these new ideas and then share their experiences and successes with the adults. So rural youth programs became a way to introduce new agriculture technology to the adults. A.B. Graham started one such youth program in Ohio in 1902. It is considered the birth of the 4-H program in the U.S. When Congress created the Cooperative Extension Service at USDA in 1914, it included boys' and girls' club work. This soon became known as 4-H clubs - Head, Heart, Hands, and Health (<http://www.national4-hheadquarters.gov/>).

6.3 Making local knowledge accessible locally

Making local knowledge accessible and usable locally: A case from IWRM Ferghana project initiative of IWMI.

Strategies to facilitate the local interaction

- Identifying the locally recognized, experienced (or even retired) leaders of former kolkhoz, water managers of *rayvodkhozes*, *kolkhoz* hydrotechnicians, ditch riders, former brigadiers, agronomists, irrigators available within Water User Association (WUA) or nearby with consent of WUA;
- Train and equip the local consultants on water management concepts that are promoted under IWRM¹ principles (hydrographic, demand oriented, participatory, user oriented, simple water rotational mechanisms, bottom up WUA concept; role of water users in the governance, WUG² concept);
- Linking them as local consultants with existing WUAs in the project area and making a “consultants resource pool” available for need based extension for WUA specialists, farmers, water users, WUG leaders and water managers on request. He or she will be available to the WUA members on a fee base individual (private farms) or group consultations;
- Facilitation of informal and nominal payment mechanisms at the affordable level of water users such as in kind from the harvest, collection of some fees, labor help etc.;
- WUA/WUGs will organize and coordinate the service and payment - a nominal payment mentioned above and collected from the beneficiaries for case by case (not a full time and salary based employment);

Role of the project

- Periodic process monitoring, constant follow up and methodological back up from project side provided by the members of Social Mobilization and Institutional Development (SMID) team;
- Facilitation and promotion of these local “freelance” consultants within and outside WUAs through WUA informal networks;
- Facilitation of knowledge transfer from local research and academic institutions to local consultants through link established between local academic and research institutes with the freelance consultants;

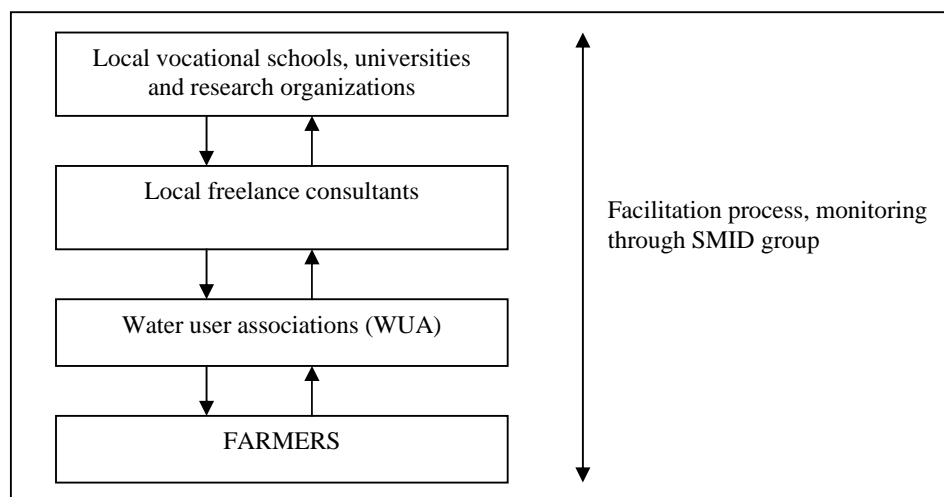


Figure 7. Making local freelance consultants available within WUAs

¹ IWRM – Integrated Water Resources Management (it is meant adopted IWRM principles along IWRM Ferghana project supported by the SDC).

² WUG – water user groups organized along tertiary and below level canals to fill the institutional vacuum below WUA to reach hundreds (Uzbekistan and Tajikistan) and thousands (Kyrgyzstan) of farmers.

7. Existing Extension Strategies in Central Asia

7.1 Tajikistan

7.1.1 Existing AE systems

The main public actors involved in the agricultural extension (AE) are the Ministry of Agriculture (MoA), and Ministry of Melioration and Water Resources (MoMWR). MoA, has not invested in the creation of functioning and wide reaching extension advisory services. According to the desk study report by SDC (2008), the MoA's Agroprom has officers in all oblasts and rayons but their functions are mostly supervisory (Reporting to Hukumats), as well as collecting data for statistical purposes (including yield forecasting based on highly unreliable methodology). Agroproms are more sustainable structure exists with some more institutional and methodological strengthening needs. There are four levels of administration in Tajikistan: national, 13 oblast (province), rayon (district or nohiya), and kishlak (village or jamoat). At each level, there is an executive body (hukumat) and an advisory body (majlisi). There are oblast/city and rayon level administrations (hukumats), as well as village administrations (jamoats). Overall organizational structure of existing agricultural extension systems is presented in Figure 8.

The Association of Dekhan Farms and Businessmen was established in 1996 as a non-governmental organization, an independent and a self-governed social association. In 2003, the Association was reorganized into the Union of Dekhan Farms and Businessmen of the Republic of Tajikistan. (UDFB). A change of legal status again took place in July 2005 when the Union was re-registered as the National Union of Dekhan Farms and Businessmen of the Republic of Tajikistan. Global aims of the UDFB are to support dekhkan farms and businesspersons on implementation and improvement of the market infrastructure based on strengthening and coordinating farms and entrepreneurs, protection of human rights and union of dekhkan farms and businessmen interests, to improve qualifications and establishing links with foreign partners. An EC funded project in support of developing UDFB concluded in 2006 with limited results. The final report raised questions about lack of coordination with NGOs working in common areas. The report states, "A serious detriment to the development of the Association was, and still is, the lack of a functioning Board of Directors. This was not a specific strategy of key decision makers in the management structure of the Association but a consequence of the inability to communicate with the members and have their active involvement in the decision making processes relating to policy and strategy development. There are about 90 initiatives related to AE is currently going in Tajikistan and most of them are separate initiatives by different donors and projects, often small and duplicating each other. There is no unified national level initiative to consolidate all the relevant to extension activities. Thus, in June 2008, key donors active in Tajikistan initiated the development of Joint Country Support Strategy to address the issues mentioned. Particularly their statement says – "Better coordination in farmer services (legal, business and agricultural extension) is critical, since this is the area where there are currently the most gaps and overlaps... Donors such as DFID, USAID, SDC, UNDP, UNFAO etc are strongly encouraged to support a more unified national Legal Aid and Extension Center Network as opposed to continuing support for separate centers. The pooling of donor resources will allow a unified approach for provision of farmer services, create a minimum standard of professional services, provide a single set of information materials for farmers, increase the likelihood of leaving behind a sustainable network and provide a unified approach for monitoring and for advocating farmer's rights with the GoT³. The national network or 'coalition' should build on what has already been developed over the past 5-7 years, not create yet another parallel system...."

³ Government of Tajikistan

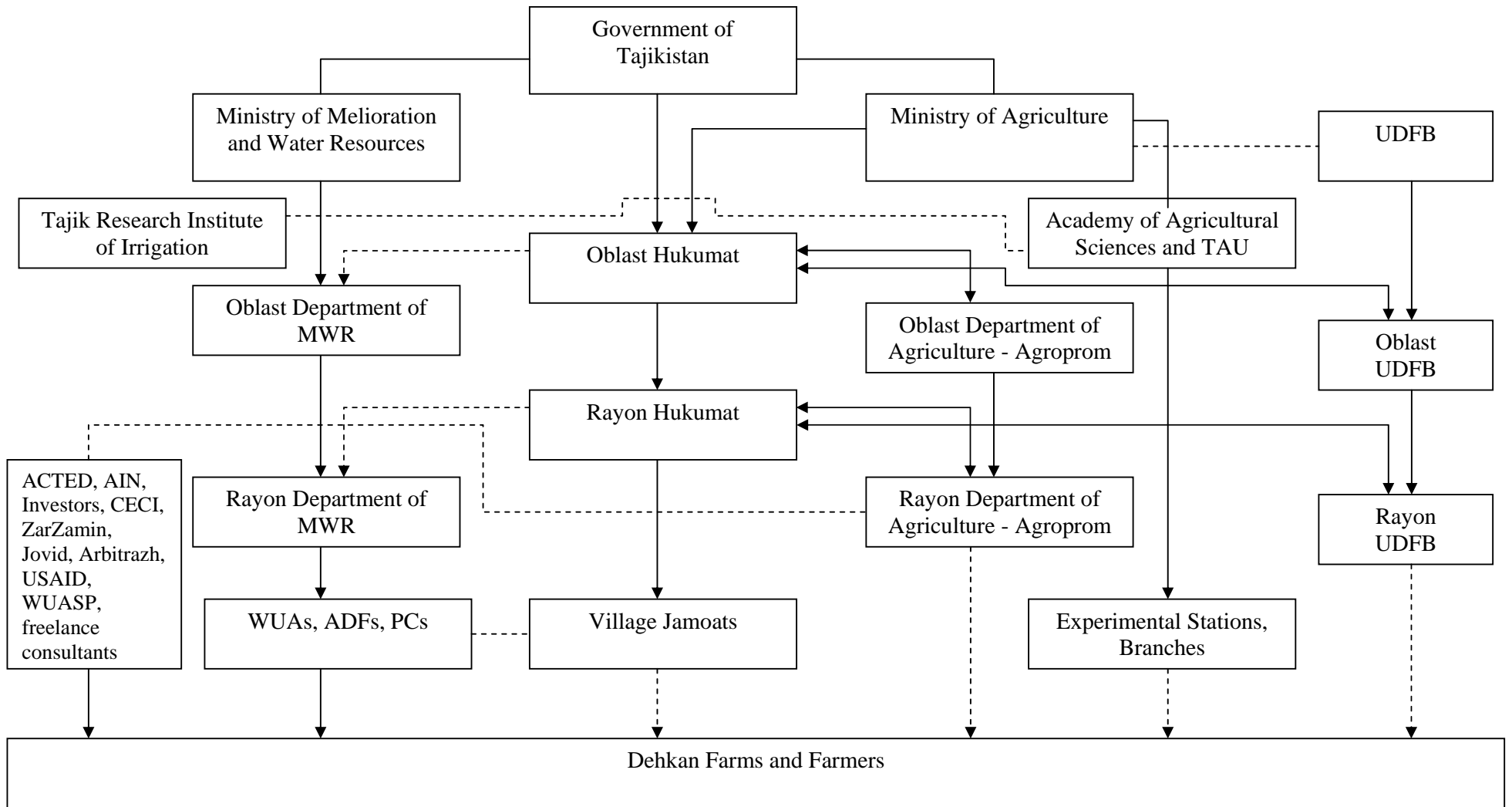


Figure 8. Existing agricultural extension linkages in Sogd Province of Tajikistan

According to SENAS (2008), the top state priorities for Tajikistan's agriculture are continue of land and institutional reforms, resolution of cotton debt issue, focus on better agricultural productivity, improving agricultural infrastructure and addressing food security issues. The role of the state and Ministry of Agriculture will be revitalized.

Recent development indicates that international organizations and other development projects had several attempt to revitalize the state and initiate the public sector AE. For example,

- in 2004 FAO with MoA established Agricultural Information Center but after funding it ended its operation;
- SITAF established nationwide and umbrella organization for ESP – Agricultural Information and Coordination Center (AICC) and meant for coordination of research and education. The same story – stopped its operation with halting funds.
- ICARDA initiated with Academy of Agricultural Sciences the Inform Center – the same ending;
- TACIS in 2006 initiated Rural Advisory Center with 6 AICs, membership based, registered NGO called ATAC.
- SENAS, a new project supported by EC, TACIS started in October 2007 have taken over to support the establishment of the national advisory service in Tajikistan. Specifically their objectives include: strengthen ATAC, re-initiate AICC, based on Sogd Aproprom + NGOs try to convince MoA establish National Agricultural Advisory Service (NAAS) and support Union of Dehkan Farmers and Rural Business of Tajikistan.

Whilst institutional agricultural extension services in Tajikistan are largely absent, some private organizations have recognized the importance of agricultural extension. Some investors employ agronomists and hydrotechnicians who provide training to farmers focusing on agronomy and productivity. At this stage, those services are basic and specialists often lack the foundation of a strong theoretic agronomy and irrigation background. According to SDC report (2008), some farmers consider agronomists from investors as controllers rather than partners. However, a comprehensive extension service that incorporates technical, financial and agronomic aspects of crop farming is needed.

European Bank of Reconstruction and Development (EBRD, 2008) reports that there are 29 extension service providers (ESPs) in Tajikistan currently active but only 11 are institutionally capable of doing extension and training to the farmers; it is indicated that half of the 11 ESPs reviewed have some previous work experience in farm management and many of them still dependent of donors with secured funds for few upcoming years; the weaknesses include limited geographical coverage and duplicating roles of some ESP services in 21 districts; and all 11 ESPs have the necessary means (staff and resources) to implement the training activities for farmers. Only two of the ESP has cotton growing experience: CECI (in Khodjent and has good ties with IWRM project) and "Znanie" (based in Dushanbe).

The existing extension initiatives are donor driven and tied to the specific project and remains within the project periods. Many local NGOs are supported through this funding. There is no single wider initiative to integrate and coordinate all. Some NGOs include some research activities in their work and some development projects have organized local NGOs focusing on extension (ATAC, AIN/ACTED, etc.). Dialogue and cooperation between these organizations and projects occurring to a very limited extent. Efforts and activities are often duplicated.

According to the SENAS report (2008), there are 4 organizations that currently their developing extension systems:

- ACTED established Advisory Information Network: 1 in Dushanbe with 2 sub-offices in Kurgan Tapa and Khodjent. They support 16 Rural Advisory Information Centers (AIC);

- JOVID supported by the German AgroAction (GAA) and German Development Service and based in Chkalovsk – the focus is foothill, mountainous;
- Association of Professional Agrobusiness Consultants – ZarZamin (Golden Earth) initiated by Mennonite Economic Development Associates (MEDA) supported by the CIDA, they have Oblast office in Khodjent, in some districts – Agro Business Innovation Centers (AgBIC);
- ATAC of Kulyab established by previous project called SITAF, with Rural Advisory Center (RAC) in Kulyab and 6 AICs.

More detailed information about extension services available in Sogd Province is presented in Table 1. ATAC is not mentioned in the Table 1 because it is not located in Sogd Province but it does not mean that there will be no cooperation between the projects. While

7.1.2 Gaps, needs

The following gaps were identified throughout the review:

- The concept of public extension, provision of continues advice to farmers is not widely understood. There is no institutional extension exist in Tajikistan. The state organizations practice top down and order approaches when working with farmers.
- Research, education and agricultural policies are isolated from each other. The state funding is being decreased. The management of all three aspects are highly centralized and strictly controlled.
- The bulk extension now is provided by a number of projects, NGOs. They are geographically, subject wise focused and has limited reach. There are some signs of cooperation but occurring at limited extent. Many overlapping and duplications exist.

There is contrast of agricultural extension service providers – two extremes exist: from one side strong administrative state organizational structure but with weakened capacities and mislead staff with overlapping tasks and from other side good skilled and active numerous NGOs supported by donor specific projects, very scattered and duplicated with less communication with each other and questioned sustainability.

KasWag AgriConsulting (SDC Report, 2008) identified the following needs at the Dekhan farm level:

Governance:

- Farm financial management (book keeping, accountability, finance procurement, reporting)
- Farm business management (budgeting, cropping activities, input procurement, share holder participation)
- Extension services

Agronomy:

- Crop management (irrigation, pest control, weed control, nutrition)
- Water management (cropping practices, irrigation scheduling/allocation)
- Soil fertility (crop rotations, organic matter, green manure, mineral fertilizers)
- Genetic characteristics of cotton (varieties, seed quality, seed increase) Extension services

Resources: (Infrastructure/equipment/finance)

- Input supply (fertilizers, fuel, pest control agents, etc.)
- Water supply and distribution (Water user associations, maintenance, rehabilitation, gates, regulators, irrigation scheduling)
- Machinery and equipment (improvements, efficiency, new technology)
- Finance (access to cropping and capital investment finance)

Table 1. List of selected extension service providers active in Sogd Province of Tajikistan

#	ESP	Type	Fee/ source	Activities	Outreach mechanisms	Materials	Strength	Threats
1.	Agroprom, Ministry of Agriculture	State		Ag policy, land reforms, agricultural production	Top down, order	Normative materials	strong hierarchical structure in oblasts, rayons, financially and technically supported by the state, research and education wings	Under the local authorities, has no decision making role, only collection data
2.	Advisory Information Network	NGO initiated by ACTED	Fee basis	Legal, agricultural advice, land reform awareness	Group and individual trainings, individual consultations, field demonstrations of best agricultural practices	Agronomy, Livestock, production Technology, Economic and legal advice, information on land reforms	Has experience of working in 5 districts, has ties with other 2 NGOs – Arbitrazh and JOVID, has necessary staff and skills	Low payment rates
3.	JOVID	International Charity Public Organization - NGO	EC funded project Land Reform – Wealth for All and supported by German Agro Action	Rendering humanitarian aid, social and economical rehabilitation, consulting to farmers on land reforms, establish 6 RCC in Sogd	Meetings with farmers, open door days, demo sites, mass media campaign, educational trips to neighboring countries	Agronomy, veterinary, economy and legal aspects	Good skills, local experience	Sustainability issues
4.	CECI – Center for International Studies and Cooperation	Canadian NGO	Funded under FARM project	Farmer extension and agronomy for cotton growers,	General awareness, field visits, accountability, bottom up, participatory	Dehkan farm management, agronomy, on farm water management, legal advice, advocacy skills, gender awareness	Is working experience and demonstration sites in 5 districts, has good ties with local agroproms, has necessary skills, working relation with IWRM	What will happen after funding stops?
5.	USAID	US state	Grant	2 projects: 1. Land reform and market development; 2. WUA Support Program	Financial support to local NGOs and WUAs, Media campaigns, TV and radio, community appraisal	Legal advice, setting up WUAs, technical support to WUAs, improving water management, planning skills		Sustainability issues

#	ESP	Type	Fee/ source	Activities	Outreach mechanisms	Materials	Strength	Threats
6.	UDFB – Union of Dehkan Farms and Businessmen	NGO	Membership	Support to dehkan farms develop and modify market infrastructure, defend rights, build qualifications and find international partners Now collecting statistical information for Dushanbe office.	Top down, controlling farmers rather than advising		Has marketing centers in 16 rayons and 7 legal advice centers supported until 2007 by CIDA USAID and FAO has supported in the past but funds stopped due to inadequate results by it.	Top down system, leader is appointed by the President, HQ is located within MoA, not payment, farmers not participate in
7.	Zar-Zamin Association of Professional Agrobusiness Consultants – (Golden Earth)	NGO	Initiated by Mennonite Economic Development Associates (MEDA) and supported by CIDA	The same as CECI	5 demo sites from CECI	The same as CECI	They have Oblast office in Khodjent, in some districts – Agro Business Innovation Centers (AgBIC)working relation with IWRM	Governance
8.	Arbitrazh	NGO funded by DFID and EC	Fee based	Provision of legal advice on land reforms, mediation, arbitration, field and camps, business plans	Field visits, meetings, roundtables with local authorities and farmers	Business plan to receive credit in banks, legal issues of farmers, third party arbitration courts	Has 1 central office in Dushanbe and 12 in other districts – structure exists	Staffing constraints exist. Not clear of status after funding stops.
9.	Irrigation Service	LLC	Fee based	Water accounting, construction hydroposts, irrigation management, consultations of WUA specialists	Group trainings, consulting WUA specialists	Mostly project materials from IWRM project: WUA formation, water accounting, field passports, water use plans, how to install water measuring devices etc.	New and water equipped materials, high willingness – only available in region water training	Needs capacity building

7.2 Kyrgyzstan

7.2.1 Existing AE systems

Ministry of Agriculture, Water Resources and Processing Industry (MAWRPI)

The key functions of MAWRPI with regard to the extension service includes policy, technical and financial support for rendering extension services to farmers to increase agricultural production by means of delivering research results, preparing professional staff through education and development of new technologies. Particularly it integrates the development of relevant information and methodical guidelines on innovative methods of crop rotation, irrigation and tillage in close cooperation with existent extension services and research institutes to farmers and agricultural producers; and provides assistance in extension service to water users associations on legal, accounting and technical issues.

The Ministry has three wings – agriculture, water and processing industry. The Water Resources Department (WRD) has strong organizational and hierarchical structure (Basin Water Management Organizations and Rayon WMOs serving WUAs) and its key and specific task is to organization of water use in national economy on the research, equity and rational base. It has 7 (Oblasts) BWMOs, 40 RWMOs.

Agriculture Department (AD) has oblast and rayon structures but given higher role in regional and local governance. It deals with wide range of agricultural issues compare to water department – such as livestock, crop production, fertilizers, machinery, pest management etc. For example, the deputy governor of oblast and deputy hakim of rayons is the head of ADs. This wing has also Research and Agricultural Development Department, which includes 2-3 research institutes: irrigation, land management and plant. It has indirect links with RAS system and provides occasional trainings for ATC staff through associated research institutes.

There is the Kyrgyz Agrarian University after Skryabin's name and the Osh Agricultural Institute. They are mostly responsible for education and preparation of professionals to serve water and agricultural sectors (engineers, researchers etc.). But the reforms in political structure of the state made these organizations fall under the Ministry of Education, while previously the educational and research institutes were part of the sectoral agency – the MAWRPI. However, the informal and methodological links still exist between the ministry and education.

WUA Support Units under the MAWRPI

After the collapse of the Soviet Union and the disbanding of state farms, on-farm irrigation was problem. Many republics replaced their production brigades with water user associations (WUAs). In the Kyrgyz Republic, with World Bank support, the WRD established WUAs to take over on-farm irrigation operation and maintenance (O&M). To ensure these were participatory, in 2002 the Republic passed a WUA Law. To date 451 WUAs have been legally registered under this law. As farmers had no experience with participatory associations, an intensive capacity development program was critical for success. Within the WRD of the Ministry of AWRPI the WUA Support Units (SUs) at the central (1), provincial (7) and district (40) level were formed. International consultants and Central SU staff members provided more than 3000 days of training for staff members of SUs. In turn, SUs have provided more than 47 000 days of training for WUAs. Interactions with SUs and intensive training have strengthened WUA boards and encouraged member participation. Monitoring

data documents increased the efficiency of water delivery, while fees paid by WUA members have increased annually in every province. WUAs have now formed 14 WUA federations responsible for off-farm O&M (Johnson III and Stoutjesdijk, 2008).

WB's On-Farm Irrigation Project supports the WUA SUs since 1999 with \$29 million project with two main components: (1) rehabilitation of on-farm irrigation infrastructure serving a minimum of 170,000 ha and (2) development and strengthening of the associated WUAs to ensure the on-farm system is operated properly and maintained. In order to ensure WUAs accept responsibility for the on-farm irrigation system they are expected to repay 25% of the rehabilitation costs, spread over 7 years with interest not to exceed inflation as well as a four-year grace period. In addition to collecting service fees from their members to cover the costs of O&M of the on-farm irrigation infrastructure and the WUAs share of repayment for rehabilitation, WUAs are expected to collect the ISF that is to be paid to the water service provider.

The team of WUA Support Units include expertise in WUA Development, Training and Promotion, Water and WUA Legislation, Financial Management, and Monitoring and Evaluation. The following training materials are developed:

- WUA formation;
- WUA governance;
- WUA leadership;
- Irrigation Service Fee establishment;
- WUA financial management;
- Irrigation water allocation principles;
- Irrigation system management; and
- Irrigation infrastructure maintenance planning;

Donors

Many donors are active in Kyrgyzstan, and a number of donor-supported initiatives and projects are related to agricultural extension. Several pilot activities, covering a few rayons/oblasts of the country, have been carried out in support of family farmers, with emphasis on provision of technical and business advice, group organization and credit. These include projects by EU/TACIS⁴, Agricultural Training and Advisory Services (ATAS) in 1994 (sort of T&V system) and the Agri-Business Centers (ABC) projects, SDC aid (provided through Helvetas and Caritas) and GTZ⁵ started its advisory project in Osh Oblast in spring 1997. The basic approach to the advisory services has been the same, in that the farm extension advisors visit the villagers by rotation four to five times a week and make themselves available for advice. Advisory services and farmer organizations are provided also under the ongoing IFAD/World Bank-financed Sheep Development Project which commenced implementation in late 1996. Experience so far under this project (20% of the IFAD loan disbursed) has been positive. The project has had enthusiastic response from the farmers, group formation is progressing, and farmers visit successful groups in order to learn from their experience.

Two other donor initiatives, also closely related to the Agricultural Support Services Project (ASSP), are UNDP's field program of lending to joint-liability groups through its Poverty Alleviation Pilot Project, and the World Bank's Rural Finance Project which provides agricultural credit to agribusinesses and smaller farms through the KAFC. However, farmers below the poverty line who normally cannot afford collateral need additional support.

KSAP and Helvetas

⁴ Technical Assistance to CIS Countries

⁵ German Agency for Technical Cooperation

In 1994, the Kyrgyz Swiss Agricultural Project (KSAP) of Helvetas started establishing a rural advisory service in two mountainous rayons of Kyrgyzstan. In this “field laboratory”, solutions to urgent problems were developed in a participatory way, such as the home production of cheese as described in this paper. Another project of the first hour was the Business Promotion Project that supports women in generating income with small-scale enterprises. The rayons of Kochkor-Jungal in Naryn Oblast. In the same year, Caritas started the Kyrgyz Swiss Agricultural Project in Suzak, Bazar Korgon and Nookan Rayons of JA Oblast. At first, each project had its own or an associated credit component, and advisory topics were linked to credit in most cases. In 1998, the approach was revised in all projects, when Caritas ceased advisory activities and went for an independent credit line, Helvetas discontinued credit and focused on technical assistance, and GTZ institutionalized the link with the American-funded ACDI/VOCA (Agricultural Cooperatives Development International / Volunteers in Overseas Cooperation Assistance). In 1997, with the support of Helvetas, participatory advisory approaches were started in Kochkor-Jungal.

Helvetas (Swiss Association for International Cooperation) has been active for 45 years as development partner of governmental and non-governmental organizations in 20 countries and working in areas of infrastructure in rural areas, sustainable use of natural resources, and education and culture.

The working approaches of Helvetas are “searching together for solutions”, “striving for equality between men and women” and “acting with economic and social responsibility” while “taking care of the environment”. Today, Helvetas is a partner in the transition process in rural areas, working against poverty and with a view to contribute to improving the living conditions of economically and socially disadvantaged people. By the beginning of 2001, Helvetas was supporting rural people of Kyrgyzstan with:

- the Rural Advisory and Development Service Foundation (RADSF) through KSAP in the three oblasts Naryn, Issyk Kul, Jalal Abad, and with specific activities on national level in the fields of cattle breeding, support to agro-entrepreneurs and an agricultural coordination unit;
- LARC (Legal Assistance to Rural Citizens) in eight rayons of Jalal Abad and Osh Oblasts bordering on Uzbekistan;
- AVEP (Agricultural Vocational Education Project) in Naryn, reforming the vocational education of young farmers (women and men);
- BPP (Business Promotion Project), providing entrepreneurs with marketing support and training through the start-up and growth phases of their business development, especially community-based tourism in Naryn and Jalal Abad Oblasts.

KSAP and LARC are implemented on behalf of the Swiss Agency for Development and Cooperation (SDC), which is also the funding agency for both projects.

ASSP-RAS

RAS is NGO initiated by IFAD/WB/SDC to deliver advisory and development services to farmers, which has following objectives: (a) prepare and implement technical programs in advisory services; (b) carry out on-farm demonstrations and field trials on farmers’ fields at farmers’ request; (c) commission local adaptive research contracts; (d) manage oblast and rayon level staff and maintain accounts; (e) liaise with local governments; and (g) disseminate information. RAS is decentralized organization with branches in Oblast and rayons. So RAS managers are responsible for the development of annual work plans for their respective oblasts, under the overall guidance of local Oblast Steering Councils (OSCs). The OSCs

which comprised of representatives of farmers, NGOs, and government agencies from within the oblast, play the same pivotal role as national RAS.

There is variation in how much these services have professional interaction with local research, NGOs and other producer organizations. In general there are only very few such links, but with notable exceptions: where they concern the design and conducting of staff training courses (for example, RAS uses staff of Kyrgyz Irrigation Research Institute for its trainings). The connection of the advisory services with the research establishment is informal or nonexistent. This too is partly due to historic reasons: the type of research recommendations did not apply to small farms (to which most collectives had disintegrated) and there was too large a distance of communication or status between researchers and farmers (there are anecdotes of farmers accused of “violating science”, when they refused to follow a recommendation by a researcher).

A national, autonomous coordination office receives all donor and government funds and contracts regional advisory services on an annual basis. No system is in place for licensing these regional services; they have grown out of units earlier established by projects of the donors involved. Neither is there an intention to contract additional service providers beyond the present ones and thereby introduce an element of competition. The annual contracts are based on concrete annual work plans. An elaborate mechanism has been introduced to measure achievement compared to plans.

Management Boards have been set up to oversee the performance and plans of the regional and sub-regional advisory units and to develop a longer term vision. Farmer representatives form a majority on these regional boards. Other organizations involved in advisory services (NGOs, RPOs) are represented incidentally only. Nevertheless, board members on some occasions have proven to be nepotistic rather than representing farmers’ interests. The advisory service has at times demonstrated stark differences between the approach it advocates (participatory development) and the one it applies in its own structures. A strict hierarchical and top-down management style has, at times, proven to be difficult to change.

The Rural Advisory Services has 41 rayon and 7 oblast offices; the Advisory Training Centre office operated on the national level. In each rayon office there are 2 to 4 rayon advisors, and various subject matter specialists are working in each oblast office. RAS staff, normally, selected on a competitive and contract basis. In order to meet the rural people’s needs in information and knowledge RAS strives to render good quality services, oriented to a number of advisory topics. They are crop production, livestock issues, mechanization, marketing, farm economy, developing and spreading of innovative know-how, farm management, income generating activity, rural and jailoo tourism, handicrafts, business planning, leading the gender issues, small business projects and group development.

Rural Advisory Services has introduced the planning process based on the bottom-up principle. RAS regularly upgrades its field staff qualification. RAS keeps up experience exchange and dissemination of useful innovations alongside with provided training and consultations. Knowledge transfer is mostly done through the demonstration process.

At present one of main reasons behind the low living conditions of people in regions are poor soil fertility, lack of good quality seed, lack of agricultural outputs, storage, lack of know-how, poor breeds, insufficient forage, feeding, crops and animals diseases, low volumes of processing, marketing issues, insufficient knowledge, etc. In this situation, the RAS services are still necessary for the rural people and farmers to meet their needs.

Challenges of RAS

The RAS annual reports indicate for some challenges and difficulties in implementing the tasks such as low salaries of staff comparatively with other projects which affects the motivation of advisers; outdated office equipment; ever changing concepts of the RAS with its each new phase, indifferent attitude of some RAS staff to their work; increased fuel price, office rent fee; outdated devices and vehicle entailed additional expenditures; many obstacles are to realize its mandate (wrong selection of farmers on some advisory topics, sharp decrease of budget; uncertainty about the ways of RAS future activity; political situation with weak support; unchanged level of staff salaries, whereas the living costs and inflation are increasing from year to year, which effects in losing of well qualified advisers).

ATC of KSAP

The Advisory Training Centre (ATC) is initiated under the KSAP due to non-satisfactory development of internal potential within the RAS system. The ATC objective is “The overall capacity of the Extension staff is improved through a well performing of the Advisory Training Centre (ATC report, 2007). With the purpose of strengthening RAS (extension) with knowledge management and capacity building the autonomous ATC unit was formed within the RAS system like any Regional RAS. The ATC specialists and contract trainers are working on farm development, business planning, proper use of plant and livestock production technologies, home scale processing, marketing by improving the publication quality devoted to farmers and advisers. Besides, they are involved in implementation of the integrated pest management projects.

Roles of ATC

- **Resources Center.** ATC collects information, prepares, publishes and holds dissemination materials such as pocket leaflets, handbooks, books, electronic information, newspapers, journals on various aspects of agriculture on pest management, crop development, agrotechnical measures and other subjects.
- **Methodological and Training Center.** It provides quality management and extension activity trainings to the RAS staff in oblasts and rayons where successful participants are issued with certificates. It develops training curriculum and modules for the village advisers on demand based. For example in 2007, it trained 20 specialists from the Regional RAS on potato pests and diseases. In total ATC conducted 64 training activities for 755 participants. It contracts some of the assignments to the local specialists (for instance, Kyrgyz Irrigation Research Institute or Kyrgyz Agrarian University).
- **Provides Marketing Skills to RAS.** ATC provides trainings and required capacities on marketing issues to the oblast RAS, so that the branch organizations are self sufficient and sustainable in future when the funding stops.

TES Center

TES is a Kyrgyz NGO specialized in rural advisory services. GTZ and the Osh State University founded TES in 1997. Their goal is to increase people's income from farming with the help of qualitative training and advisory work. It is based on private consultation with freelance field advisers and trainers served by the TES Centre.

The focus of TES is on small farms with little to average resource endowment. TES assist farmers in forming interest groups. At the same time, these groups represent a starting point for self-help organization with different ends such as common marketing and qualification for

seasonal loans. TES supports and gives contracts to freelance trainers and field advisors to train and advise farmer groups throughout the year. Training in extension methods and agricultural technologies mostly takes place in off-season. During the cropping season, TES coaches these freelance advisors to better fulfill their roles of supporting farmers. This way every year TES supports more than 50 agricultural advisors, more than 100 farmer groups and between 1000 and 1500 farmers. In return, trainers and advisors pay an annual service fee to TES. Farmers pay fee for each training.

TES has four departments: Organizational Development, Farmer School, Technical Advisory Services, and Publications bringing in external specialists, trainers and field advisors wherever possible. TES Centre is headed by a management board of three senior staff. The Supervisory Board comprises the founder (Osh State University), a major client (USAID), two TES staff and three freelance trainers and advisors.

From each group (consisting of 5 to 15 members) a leader is elected who receives a contract from TES to act as field advisor during the entire cropping season. He/she receives additional training at TES Centre every month or more often (technology and methodology) and is expected to carry out practical demonstrations at the group's learning field as well as to monitor the crop of each group member, to organize joint input purchases, work out the delivery schedule with the processor, and organize collection or delivery of the group's produce.

The practical demonstrations are about operations which have been discussed at the Centre, for example (in the case of tomatoes): Seedling production, field establishment, scouting for pests, predator release, working out fertilizer and chemical amounts, anti-erosion measures in irrigation. The field advisor signs the responsibility for all farmers to apply the agreed fertilizing and spraying program. TES agronomists assess all farmer fields three times during the growing season, and according to these results, a gratuity payment to the field advisor is computed.

Recent developments to consolidate extension

Policy Support Project (PSP) funded by the SDC was set up in 2007 with the aim of strengthening capacity of the Ministry of Agriculture, Water Resources and Processing Industry (MAWRPI) through the Directorate for Agrarian Policy and Investments (DAPI) in formulating and implementing agricultural policy by learning experiences and moderating processes. PSP has 2 key objectives: i) Development of rural extension policy jointly with the Rural Advisory Services (RAS) and Kyrgyz Swiss Agricultural Program (KSAP) and ii) PSP assist the MAWRPI in co-ordination of agricultural projects. There are 61 donor driven activities related to agriculture exist in Kyrgyzstan: 46 projects, 11 programs, 3 funds and 1 center, total 61. The donors are Asian Development Bank, World Bank, USAID, GTZ, European Commission, United Nations Development Program, Swiss Government, Turkish International Co-operation Administration, Sweden International Development Agency, and Japan International Co-operation Agency. Figure 9 presents the current organizational structure of main actors involved in agricultural extension in Kyrgyzstan.

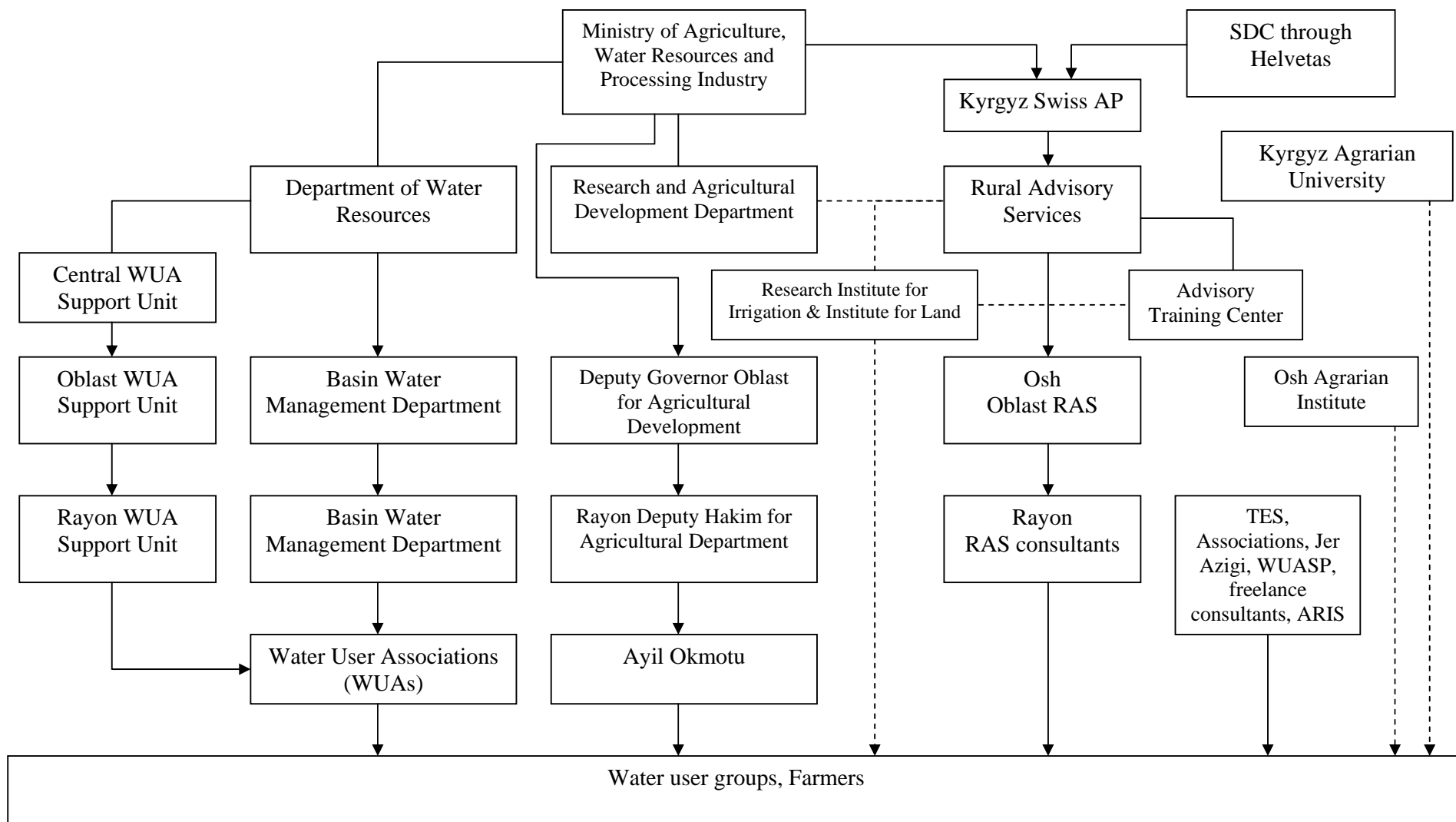


Figure 9. Existing agricultural extension systems in Kyrgyzstan

7.2.2 Issues and gaps

KSAP report (2007) indicates following issues with existing rural extension services in Kyrgyzstan:

- Insufficient financing of agricultural extension services by the Government of the Kyrgyz Republic. At present extension services are mainly funded by donor organizations. This can not last for ever and by 2011 the funding can be terminated;
- Weak co-ordination of agricultural extension services' activities by the MAWRPI. Actually no one subdivision of the MAWRPI work in this area;
- Inadequate level of knowledge in application of new agricultural technologies, economic issues and marketing;
- Weak interrelation between extension services themselves and with scientific-research and educational institutions, and also with production and processing organizations;
- Insufficient number of trained extension staff.
- The MAWRPI vision of further development of rural extension services does not coincide with that of the RAS.
- The MAWRPI attitude towards state allocation of funds for financing rural extension services is not clear.
- National authorities are not ready to consider extension services as a priority of the agrarian policy.
- High turnover of the Ministry senior management constrains promotion of the extension policy.

The survey that conducted by the Kyrgyz Irrigation Research Institute (2008) indicates following needs in knowledge by farmers:

- Agrotechnical measures (tillage, planting time, crop cultivation, inter-row cultivation, lay-out and crop rotation);
- Irrigation techniques (irrigation terms and irrigation depths, how to receive water, where, when and how to apply, farmer rights and relation with WUA, how much to pay for water, how received water volume may be determined, measurement of water flow in aryk, measuring devices, water losses, how to determine water flow in a furrow and how to identify furrow length, determination of dependence between water penetration of soil, slope, and types of crops);
- Marketing service (what crop is profitable for planting in the current year, what seeds are fruitful, where and how much seeds may be bought);
- Application of fertilizers and chemical protection of plants;
- Introduction of new irrigation technology (sprinkling irrigation, drop irrigation, etc.);
- Basic economic knowledge on drawing up of business-plans, marketing, estimation of capital investments efficiency, estimation of actual first cost of output, its price, estimation of efficiency and choice of the optimal development directions of agricultural production;
- Legal regulations of land and water use, organization of farms, acquaintance of farmers with their rights and obligations to the state, taxation rules and payments of taxes;
- Opportunities and rules of attraction of investors, drawing up of credits and mortgages, establishment of the credit unions.

7.3 Uzbekistan

7.3.1 Existing AE systems

Last several years the Government is trying to find the ways for sustainable development of agricultural sector. In this regard, the MAWR is responsible organization for coordination of all agricultural activities including extension service to the farmers in Uzbekistan.

As a part of this, MAWR initiated several reforms in agricultural sector including (i) creation of private farms in the territory of old shirkats; (ii) establishment of Association of Private Farmers (APF) with offices in each oblast and rayon; (iii) introduction Basin Irrigation System Authorities (BISAs) within inter-farm systems and Water Users Associations for on-farm systems (WUA); (iv) creation of Alternative Machine Tractor Pools (AMTP); (v) formation of agrofirms to assist the dehkhan and private farmers involved in fruits and vegetable production.

There are several organizations that provide some elements of agricultural extension services in Uzbekistan. Some of these organizations are government funded, some NGOs, universities, farmers' associations, research institutes, and others. These organizations are:

1. Association of Private Farmers (APF)
2. Rural Business Advisory Services (RBAS)
3. Agricultural Service Center
4. Agrofirms
5. Basin Irrigation System Authorities (BISA)
6. Rayon Agriculture and Water Resources Authorities (Rayselvodkhoz)
7. District Polygons initiated by MAWR
8. Water Users Association (WUA)
9. Alternative Machine Tractor Pools (AMTP)
10. Academic and Research Institutes: Uzbeks Agriculture and Production Center, SANIIRI, TIIM, Tashkent State Agrarian University

Despite of all efforts, current structural frameworks does not completely meet the needs of farmers. Not defined structural and organizational parameters, lack of stimulation gear and remuneration of labor, and lack of integration of interests of producers and service providers are the part of the problems. In addition to above mentioned, dominating administrative methods of work are not letting the world experienced technologies and progress in agricultural research to make its ways to the farmers fields.

Development of agricultural extension service in Uzbekistan is becoming a matter of national importance. However, there is no national policy framework on extension service development, which could ensure political and financial commitment of the government and other stakeholders.

In the development of effective extension service national policy framework is a basic concern, since it should indicate national agricultural development priorities, outline the organizational structures necessary to implement these priorities and the corresponding institutional linkages, and the extent and nature of the commitment to encouraging farmers to act in a manner supportive of national policy.

In addition, there is little incentive among farmers involved in production of state ordered crops, cotton and wheat. This is different among the farmers involved in fruits and vegetables production, where use of informal extension services is in practice and in high demand.

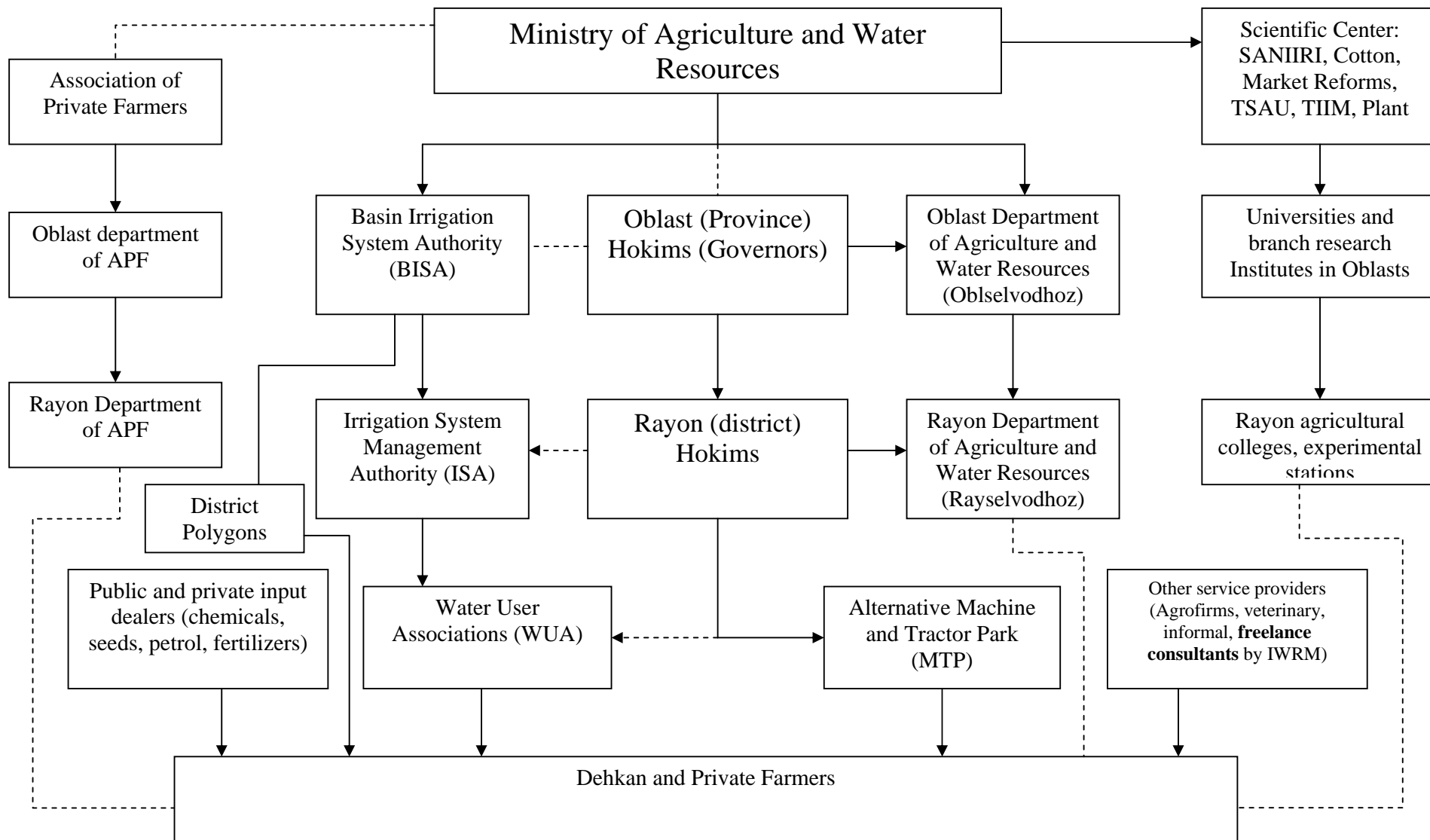


Figure 10. Existing Agricultural Extension in Uzbekistan

7.3.2 The Gaps

The report of the IWMI consultant (2008) concludes following gaps and issues:

The Consultant came into conclusion that in Uzbekistan there is no organization that could fulfill functions of agricultural extension system, but there are organizations providing elements of extension services.

In addition, the Consultant identified the major gaps in infrastructure, institutional arrangement, and availability of extension materials.

Major gaps in infrastructure that need to be addressed by WPI project are as follows:

- Lack of financial resources
- Lack of physical facilities (transportation, office equipment, communication facilities, audio-visual aids)
- Lack of technical specialists
- Inappropriate management structure
- Influence of local authorities
- Lack of farmers' knowledge and incentive for extension service

Major gaps in institutional arrangements are as follows:

- Lack of government commitment
- Lack of correspondence between Statue functions and routine activities
- Lack of coordination among extension organizations that causing service duplications
- Low capacity

And finally, major gaps in availability of extension materials include the followings:

- Too technical
- Not farmer friendly
- Inappropriate languages
- Not location specific

Conclusions and recommendations

There is no single blue print recommendation exist that can be blindly adopted to any region's case. The Central Asia case is unique and has contrasting changes since its independence from the Soviets. Each has selected and is experiencing its own way of transition. Therefore, this section is attempt to generalize and recommend some general concepts but with more careful consideration of local conditions and after cautious review of existing extension systems with detailed analysis.

Farrington (1994) suggested following functions for extension:

- Diagnosis of farmers' socio-economic and agro-ecological conditions and of their opportunities and constraints.
- Message transfer through direct contact between extension agent and farmer or indirect contact involving intermediaries such as 'contact farmers' or voluntary organizations through training courses and through mass media. Messages may comprise advice, awareness creation, skill development and education.
- Feedback to researchers on farmers' reactions to new technology to refine future research agenda.
- Development of linkages with researchers, government planners, NGOs, farmers' organizations, banks, and the private commercial sector. In remote areas, extension agents have taken on a number of these functions directly.
- Monitoring of the extension system, and evaluation of its performance at farm level.

Six principles suggested by Neuchatel Group (2007) form the common framework for agricultural extension:

1. A sound agricultural policy is indispensable
2. Extension consists of “facilitation” as much if not more than “technology transfer”
3. Producers are clients, sponsors and stakeholders, rather than beneficiaries of agricultural extension
4. Market demands create an impetus for a new relationship between farmers and private suppliers of goods and services
5. New perspectives are needed regarding public funding and private actors
6. Pluralism and decentralized activities require coordination and dialogue between actors

With regard to agricultural research and its link to extension, the recommendations are as follows: extension messages should be based on research conducted in the agroclimatic zone for which they are intended. This obviously implies location of research stations in all agroclimatic zones. Even recommendations emerging from such research stations and meant for the specific agroclimatic zone will require further adaptation to suit varying local field conditions. This is particularly true of recommendations for improved soil management, watershed management, fertilizer application, and the like. Research trials near farmers' fields should simulate what takes place on the fields. This entails more emphasis on factors other than technological ones, such as farmers' resource endowments, risk situations, sociological realities, and the combined effect of these on farmers' adoption of recommended practices. It calls for increased awareness of the importance of the farming systems approach, particularly at the zonal level and below. But even changing the current emphasis on single crops toward more attention to research on growing a combination of crops is not easily achieved and requires a number of organizational changes. Farming systems research is even more difficult to make operational and calls for a high degree of expertise at local research stations. Above all, an effective extension system is needed that is capable of diagnosing field problems and transmitting them to the research establishment. Cernea et. al. (World Bank, 19985) recommends following:

1. Agricultural extension requires effective organization and management tailored to suit specific situations;
2. Agricultural extension requires site-specific methodologies and suitable technologies;
3. Agricultural extension must be relevant and responsive; and
4. Farmer participation is fundamental to sustainable extension.

It is easy to define the broad recommendations for institutional change needed to reform agricultural extension to meet the changing demands. From this review it is obvious that current prescriptions include: decentralization, pluralism, privatization, cost recovery and involvement of farmers as key player. The history and recent developments around the World illustrates that it must be driven by learning about what works and what doesn't and by the nature of local circumstances and context. An analogous approach proposed by CGIAR is known as the institutional learning and change initiative which is trying to do adopt agricultural research to address recent challenges and improve its effectiveness (CGIAR, 2008). These type of approaches stems from the realization that improving the performance and capacity of a system concerns reflection, learning and incremental change. If extension policy is to pursue such an approach what practical steps could Central Asian republics take? A first step would be to undertake a deep institutional analysis of historical and current experiences of implementing different extension approaches. This should focus on successes and failure and should be undertaken in a constructive manner to devise ways by which these approaches could be modified, bottlenecks removed and institutional arrangements amended. It was obvious during this study that there are very limited studies and analysis of the

extension sector, and these are usually not used in extension policy development and planning. This approach, of course, will require a capacity development of local expertise for analyzing complex systems such as extension is lacking at the country and sub-country level. Without this capacity countries will remain dependent on international experts to suggest country strategies, models and blue prints. The next step is to set up pilot projects as experiments in agricultural extension (which already started in Tajikistan and Kyrgyzstan, in some extent in Uzbekistan with donor assistance). While this is not new, such experiments should be coupled to local capacities and institutions (research, state, education, farmers organizations and local NGOs), and they should be involved from the beginning to draw principles of promoting innovation in rural areas. Then the initiative can be replicated with some location specific modifications. While all these in process the wider discussion of policy framework and strategies (a few recommendations and examples of which is stated above) can be initiated at parallel but what is most important in this is the interest from the state because government should be the initiator of these reforms.

Realizing the fact that government technical and financial support is a key for the sustainability of agricultural extension services, it is recommended that associated provincial (oblast) and district (rayon) departments of Ministry of Agriculture or other relevant state agencies should be the main partner of the project to play role of agricultural extension service provider in the project zone, e.g. the Ferghana Valley.

Project should strengthen its institutional capacity by assisting in developing working relations with all the relevant state organizations (state water departments, in our case they are oblvodkhozes, BISAs, BWMOs with its coupled district level sub-ordination units), development projects (funded through EC, WB, ADB, SDC, UNDP), NGOs that are supported by the agricultural projects and have relevant advisory experience (UDFB, Zar-Zamin, CECI and ACTED in Tajikistan; RAS, ATC, Jer-Azigi in Kyrgyzstan and Association of Private Farms in Uzbekistan), producers and private companies that are involved in the agricultural extension. The project should facilitate the cooperation between the organizations mentioned through consensus building, bridging and dialogue roundtables to develop single strategy on agricultural extension while the major, leading and coordinating role should be given to the Oblast and Rayon Agroproms.

The project should continue its assistance and cooperation established with Water Departments through capacity building, training and mobilization processes and should facilitate the effective dialogue and working relations with the Extension Departments (Agroproms) in a sustainable manner. The project should transfer its water related materials (on-farm water management, WUA and canal distribution) from previous phases of IWRM project and in-phase materials (water conservation, water saving and increased productivity technologies) of current project to the AgDeps and should improve its training and methodological capacity.

The project should facilitate and assist Agricultural Departments to establish working and effective linkages with local National Research and Education Systems for long term and sustainable cooperation. The project should develop and transfer recommendations on better ways, approaches and methodology (specifics) of provision of extension services to farmers with regard to the on-farm water management through adult training, PRA methods, needs assessment and how to monitor and evaluate extension activities.

The project should facilitate the good working relations and policy uptake of results at higher level – MoA through the AgDep for wider dissemination of positive experience of comprehensive and sustainable system of agricultural extension in Sogd province.

The project should assist and call other players active in developing and supporting Agricultural Extension to provide innovative capacity and approaches, which should lead opening floor for farmer participation in diagnosis, testing and dissemination of new knowledge and technologies.

The project should participate in other larger initiatives to establish national level umbrella institution or system (SENAS in Tajikistan and Policy Support Project by KSAP in Kyrgyzstan) with appropriate policy framework, sustainability issues (cost recovery) and the possible (new) roles of state Agroprom systems (coordination) should be discussed with the appropriate Ministries (or relevant departments) and initiating parties based on project experience.

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