

Agrarian Research Institutes and Civil Society in Kazakhstan and Kyrgyzstan

In Search of Linkages

Malcolm D. Childress



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Acronyms

ASSP	Agricultural Services Support Project
CARCS	Centre of Agricultural Research and Consulting Services
CGIAR	Consultative Group on International Agricultural Research
CIMMYT	Centro Internacional de Mejoramiento de Maíz y Trigo (<i>International Maize and Wheat Improvement Center</i>)
CIP	Centro Internacional de la Papa (<i>International Potato Center</i>)
CIS	Commonwealth of Independent States
CSO	civil society organization
DFID	Department for International Development (United Kingdom)
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (<i>German Agency for Technical Cooperation</i>)
ICARDA	International Center for Agricultural Research in the Dry Areas
IFAD	International Fund for Agricultural Development
ISO	International Standardization Organization
JIRCAS	Japan International Research Center for Agricultural Sciences
KSAP	Kyrgyz Swiss Agricultural Programme
KSBA	Kyrgyz Sheep Breeders Association
MASHAV	Center for International Cooperation
NACAR	National Academic Center of Agrarian Research (Kazakhstan)
NGO	non-governmental organization
NIS–IPP	New Independent States–Industrial Partnering Program
RAS	Rural Advisory Service
RSSTP	Republican Special Scientific Technological Programme
UNDCP	United Nations International Drug Control Programme
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
US	United States
USAID	United States Agency for International Development
USSR	Union of Soviet Socialist Republics
WTO	World Trade Organization

Summary/Résumé/Resumen

Summary

The issue of how civil society can work better with research and extension services at the local level is frequently raised in policy debates. Malcolm D. Childress explores this question with respect to the research programmes and agricultural production of Kazakhstan and Kyrgyzstan. The questions and challenges surrounding the linkage between civil society and agricultural research in these two countries are similar to those faced in many parts of the world where agricultural development plays a key role in food security, poverty reduction and growth.

Because of privatization, farm restructuring, the breakdown of Soviet distribution channels and the severe capital constraints on farmers, there is a demand in both Kazakhstan and Kyrgyzstan for research into the development of low-cost technologies that meet local and regional needs. But agricultural research systems still largely reflect the model instituted during the Soviet period. In many cases, on-farm trials, farmer-driven research and adapting technology to cost considerations remain new and foreign concepts to researchers. However, as the country case studies show, these systems are under pressure to change. The imperatives of farmers and the market economy are increasingly being felt in the agricultural research community.

Despite these pressures, and significant contractions in staffing and resources, the agricultural research systems—which still comprise highly trained scientists—are the nuclei of technology and contact with global institutions; but as the country cases demonstrate, the research priorities of these systems continue to reflect national geopolitical and economic interests, in many cases limiting their relevance to the immediate needs of farmers. These research institutions, however, have great potential as mediators between state goals for agricultural and rural development, the new class of family farmers that has emerged since privatization, and the domestic and international markets that structure opportunities for these farmers. This potential will only be fully realized if research systems can shed their inherited institutional approaches to setting priorities and rewarding researchers, and adapt their basic research and diffusion activities to new demands from the farmers. Civil society has a large potential role to play in assisting the agricultural research community to adapt to the needs of the new agricultural sector. International experience with civil society and agricultural research linkages offers compelling suggestions of the shape such a transformation might take.

This paper reaches the above conclusions through a descriptive “tour” of the activities and priorities of the large Kazakh, and smaller Kyrgyz, agricultural research systems looking to work with civil society. The tour reveals that the most important features of the systems are the dramatic decline in funding of the research institutes; the battle for resources engendered by funding cuts; and the persistence of the Soviet-style, sector-specific division of research activities. At the same time, the immense scientific value of the research programmes being undertaken by the state agricultural research systems is revealed. The scientific capacity of these systems thus represents a significant public good in both countries, but this is under attack from both the top (through funding cuts) and from the bottom (through critiques of its relevance). The research systems can be helped to adapt in this difficult period by developing stronger links to the agriculturalist population through connections with civil society. Whether this will happen smoothly or quickly remains to be seen and is difficult to predict. This paper therefore limits itself to suggesting potential areas of linkage, pointing out promising examples in Kyrgyzstan and the possibilities raised by experiences elsewhere for promoting such linkages.

Malcolm D. Childress worked in Kyrgyzstan and Kazakhstan as a research scientist with the University of Wisconsin on a number of projects dealing with agricultural restructuring from 1996 until 2003. He is currently a member of the rural development staff of the World Bank. This paper was prepared under the UNRISD project on Evolving Agricultural Structures and Civil Society in Transitional Countries: The Case of Central Asia, which was carried out between 2002 and 2003. The project was implemented in close collaboration with the Food and

Agriculture Organization of the United Nations (FAO). Santiago Funes, then Director of the Rural Development Division, initially sponsored the project, and David Palmer from the Land Tenure Service helped to ensure liaison. At UNRISD, the project was led by Kléber B. Ghimire, with research assistance from Francesca Bossano, Lucy Earle and Behzod Mingboev, and secretarial assistance from Anita Tombez.

Résumé

Comment faire pour que la société civile puisse mieux fonctionner avec les services de recherche et de vulgarisation existant au niveau local? Cette question est souvent posée dans les débats sur les politiques. Malcolm D. Childress s’y arrête à propos de la recherche agronomique et de la production agricole au Kazakhstan et au Kirghizistan. Les problèmes et difficultés soulevés par les relations entre la société civile et la recherche agronomique dans ces deux pays ne sont pas différents de ceux qui se posent dans de nombreuses régions du monde où la sécurité alimentaire, le recul de la pauvreté et la croissance dépendent essentiellement du développement agricole.

A cause de la privatisation, de la restructuration des exploitations agricoles, de la rupture des circuits de distribution soviétiques et du manque de capitaux des exploitants, les recherches sur la mise au point de technologies peu coûteuses, capables de répondre aux besoins locaux et régionaux, correspondent à une demande au Kazakhstan et au Kirghizistan. Mais les systèmes de recherche agronomique s’inspirent encore largement du modèle institué pendant la période soviétique. Dans bien des cas, les essais dans les fermes, les recherches entreprises sous l’impulsion des agriculteurs et l’adaptation des techniques aux considérations de coûts restent des notions nouvelles et étrangères aux chercheurs. Cependant, comme le montrent les études de cas, ces systèmes subissent des pressions qui les forcent à changer. Les exigences des agriculteurs et les impératifs de l’économie de marché se font de plus en plus sentir dans les milieux de la recherche agronomique.

Malgré ces pressions et des réductions importantes de personnel et de ressources, les systèmes de recherche agronomique—qui comptent encore des scientifiques de haut niveau—sont à l’avant-garde de la technologie et en contact avec des institutions mondiales. Cependant, comme le montrent les études de cas, leurs priorités en matière de recherche sont toujours déterminées par les intérêts géopolitiques et économiques nationaux, ne répondant guère, dans bien des cas, aux besoins immédiats des agriculteurs. Ces instituts de recherche ont cependant un fort potentiel de médiation entre l’Etat, qui a ses propres objectifs pour le développement agricole et rural, la nouvelle classe d’exploitants familiaux qui s’est formée depuis la privatisation et le marché intérieur et international dont dépendent les débouchés des agriculteurs. Ce potentiel ne se réalisera pleinement que si les systèmes de recherche se montrent capables d’abandonner les modes institutionnels d’établissement des priorités et de rétribution des chercheurs dont ils ont hérité et d’adapter leurs activités de recherche fondamentale et de diffusion aux exigences nouvelles des agriculteurs. La société civile a un rôle important à jouer en aidant les milieux de la recherche agronomique à s’adapter aux besoins du nouveau secteur agricole. L’expérience internationale que l’on a des rapports entre la société civile et la recherche agronomique fournit des exemples intéressants, révélateurs de la forme que pourrait prendre une telle transformation.

L’auteur parvient aux conclusions susmentionnées après avoir décrit les diverses activités et priorités du système de recherche agronomique, important au Kazakhstan, et plus modeste au Kirghizistan, qui cherche à travailler avec la société civile. Cet aperçu en dégage les caractéristiques essentielles, à savoir une baisse très sensible du financement des instituts de recherche, qui, voyant leurs fonds baisser, se disputent les ressources, et la persistance de la division sectorielle des activités de recherche, instituée à l’époque soviétique. Il révèle en même temps l’immense valeur scientifique des programmes entrepris par les systèmes de recherche agronomique étatiques. La capacité scientifique de ces systèmes représente ainsi un bien public important dans les deux pays, même s’ils sont attaqués tant par le sommet (par la réduction des crédits)

que par la base (car leur utilité est remise en question). Ce qui aiderait les systèmes de recherche à s'adapter en cette période difficile, ce serait de nouer des liens plus forts avec la population agricole au travers de leurs rapports avec la société civile. Il reste à savoir si cela se produira en douceur ou brutalement, ce qui reste difficilement prédictible. L'auteur se borne donc à suggérer des domaines dans lesquels des relations pourraient s'établir, en mettant en avant des exemples prometteurs au Kirghizistan et en se fondant sur des expériences faites ailleurs pour montrer quelles possibilités il y aurait de resserrer ces liens.

De 1996 à 2003, Malcolm D. Childress a travaillé au Kirghizistan et au Kazakhstan sur un certain nombre de projets touchant à la restructuration agricole en qualité de chercheur pour l'Université du Wisconsin. Il fait actuellement partie des services de la Banque mondiale affectés au développement rural. Ce rapport a été préparé dans le cadre du projet de l'UNRISD sur l'Evolution des structures agricoles et la société civile dans les pays en transition: Le cas de l'Asie centrale. Ce projet, mené entre 2002 et 2003, a été mis en oeuvre en étroite collaboration avec l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO). Lorsque le projet a débuté, il a reçu un soutien financier de Santiago Funes, alors Directeur de la Division du développement rural. David Palmer, du Service des régimes fonciers nous a alors aidé à maintenir la liaison. A l'UNRISD, le projet a été dirigé par Kléber B. Ghimire avec l'aide de Francesca Bossano, Lucy Earle, Behzod Mingboev et Anita Tombez.

Resumen

La cuestión de cómo puede funcionar mejor la sociedad civil con servicios de investigación y de extensión en el plano local se plantea con frecuencia en los debates de política. Malcolm D. Childress examina esta cuestión en relación con los programas de investigación y la producción agrícola de Kazajstán y Kirguistán. Las preguntas y desafíos que surgen en torno al vínculo entre la sociedad civil y la investigación agrícola en estos dos países son similares a los que enfrentan muchas partes del mundo donde el desarrollo agrícola desempeña un papel fundamental en la seguridad alimentaria, la reducción de la pobreza y el crecimiento.

Debido a la privatización, la reestructuración agraria, la desintegración de los canales de distribución soviéticos y las considerables limitaciones de capital impuestas a los agricultores, tanto en Kazajstán como en Kirguistán se exige que se investigue el desarrollo de tecnologías de bajo costo que correspondan a las necesidades locales y regionales. Pero los sistemas de investigación agrícola siguen reflejando en gran medida el modelo establecido durante el período soviético. En muchos casos, la realización de pruebas en las granjas, la investigación impulsada por los agricultores y la adaptación de la tecnología a estimaciones de costo siguen siendo conceptos nuevos y extraños para los investigadores. No obstante, como muestran los estudios de caso del país, se está ejerciendo presión sobre estos sistemas para que cambien. Los imperativos de los agricultores y la economía de mercado están considerándose cada vez más en la comunidad de investigación agrícola.

No obstante estas presiones y las considerables reducciones de personal y recursos, los sistemas de investigación agrícola—que siguen integrados por científicos altamente especializados—constituyen el núcleo de la tecnología y del contacto con instituciones mundiales; pero como demuestran los casos de países, las prioridades en materia de investigación de estos sistemas siguen reflejando los intereses geopolíticos y económicos nacionales, limitando en muchos casos su importancia a las necesidades inmediatas de los agricultores. Sin embargo, estas instituciones de investigación tienen un gran potencial como mediadores entre los objetivos estatales para el desarrollo agrícola y rural, la nueva clase de agricultores familiares que ha surgido desde la privatización, y los mercados nacional e internacional que estructuran las oportunidades para dichos agricultores. Este potencial sólo se explotará al máximo si los sistemas de investigación pueden deshacerse de sus heredadas estrategias institucionales para el establecimiento de prioridades y la remuneración de los investigadores, y adaptar sus actividades de investigación básica y de difusión a las nuevas exigencias de los agricultores. La sociedad civil tiene un importante papel

potencial que desempeñar cuando se trata de ayudar a la comunidad de investigación agrícola a adaptarse a las necesidades del nuevo sector agrícola. La experiencia internacional con respecto a la conexión entre la sociedad civil y la investigación agrícola ofrece teorías convincentes sobre la forma que podría adoptar dicha transformación.

En este documento se llega a las conclusiones arriba mencionadas a través de un análisis descriptivo de las actividades y prioridades del gran sistema de investigación agrícola de Kazajstán y del sistema de investigación agrícola más reducido de Kirguistán, que pretenden colaborar con la sociedad civil. El análisis revela que las características más importantes de los sistemas son el drástico declive de la financiación de los institutos de investigación; la lucha por los recursos como consecuencia de los recortes en los fondos; y la persistencia del estilo soviético en la división de las actividades de investigación específicas del sector. Al mismo tiempo se revela el inmenso valor científico de los programas de investigación emprendidos por los sistemas estatales de investigación agrícola. Así pues, la capacidad científica de estos sistemas representa un bien público importante en ambos países, pero está siendo atacada desde arriba (a través de los recortes en la financiación) y desde abajo (a través de la crítica relativa a su importancia). Puede contribuirse a que los sistemas de investigación se adapten en este difícil periodo al establecer vínculos más fuertes con la población agrícola a través de conexiones con la sociedad civil. Queda por ver y es difícil de predecir si esto sucederá tranquila o rápidamente. Por lo tanto, este documento se limita a proponer posibles ámbitos de conexión, poniendo de relieve ejemplos prometedores en Kirguistán y las posibilidades que brindan las experiencias en otros lugares para promover tales conexiones.

Malcolm D. Childress trabajó en Kirguistán y Kazajstán como científico investigador con la Universidad de Wisconsin en una serie de proyectos relacionados con la reestructuración agrícola, de 1996 a 2003. En la actualidad es miembro del personal del Banco Mundial encargado del desarrollo rural. Este documento se preparó como parte del proyecto de UNRISD sobre Estructuras agrícolas en evolución y la sociedad civil en países en transición: El caso de Asia Central, el cual se llevó a cabo entre 2002 y 2003. El proyecto fue implementado en colaboración cercana con la Organización de las Naciones Unidas para la Agricultura y la Alimentación (FAO). Santiago Funes, el entonces Director de la Dirección de Desarrollo Rural, inicialmente patrocinó el proyecto, y David Palmer del Servicio de Tenencia de la Tierra actuó como enlace entre ambos organismos. El proyecto fue encabezado por Kléber B. Ghimire, con la asistencia de investigación de Francesca Bossano, Lucy Earle y Behzod Mingboev y la asistencia secretarial de Anita Tombez.

Introduction

Theorists and observers of transition economies are increasingly recognizing the role that civil society has to play in providing accountability, information and the transmission of social preferences for state and market institutions (World Bank 2002). The objective of this paper is to consider the agricultural research systems in Kazakhstan and Kyrgyzstan from the perspective of their role in and contribution to the development of civil society.¹ Exploring this question has strong contemporary resonance in Central Asia. Kazakhstan and Kyrgyzstan are largely agricultural societies undergoing a significant restructuring of their agricultural sectors. The outcomes of this restructuring process will make a notable contribution to the economic, social and political landscape of the countries, particularly in rural areas, where the poorest households are concentrated.

The agricultural research systems in both countries represent concentrations of highly trained scientists and are the nuclei of technology and contact with global institutions. As the case studies show, however, the systems still largely reflect Soviet structures and research priorities. There is a gap between state and market at the intersection of farm restructuring and agricultural research, where there is clear potential for civil society formations to take root and grow. In the western United States, for example, sector-specific associations use agricultural research to express themselves—perhaps a fruit-growers association will use research to promote development of new varieties or practices—and in the process they strengthen both the research centres and the associations. In Kazakhstan and Kyrgyzstan, however, the gap at this juncture remains for the most part unfilled, and this raises important policy questions. Without civil society linkages, state agricultural research services risk becoming irrelevant to producers; if this occurs, how will the public good of agricultural knowledge be provided? How will social preferences for agricultural knowledge be determined? And how will competing demands from state and market institutions for agricultural technology development be prioritized and mediated?

The country descriptions show that agricultural research is still largely operating within a scientific paradigm of “pure research”, and continues to be largely based on the Soviet agenda of intensification of production, with little regard for the economics of scarcity that now determines production parameters for farmers. The scientific paradigm referred to in this paper is primarily concerned with investigation into the biophysical and genetic properties of plants and animals produced in the countries, and less focused on the relationship and applicability of these properties to the socioeconomic context of producers, or to the sociopolitical agenda of organized groups within society. The systems appear to be largely disconnected from civil society formations in the rural-agricultural milieu, such as farmer groups or unions, cooperatives, or agribusiness associations and interest groups.

There are currently two possible exceptions to this overall disconnection between research and civil society in the agricultural sector, and both are found in Kyrgyzstan: the Rural Advisory Service (RAS), whose concept of adaptive research and focus on farmer groups is a significant recent development, and the Kyrgyz Sheep Breeders’ Association (KSBA), which actively links village producer cooperatives with agricultural research institutes. The independent (although donor-funded) RAS, which is institutionally separate from the state-operated agricultural research system, operates within a paradigm of client service, and represents a different approach to agricultural research. The RAS is an unusual creation and is something of a hybrid—part parastatal, part civil society, and part private sector organization. The RAS and the formal agricultural research system thus coexist in tension. This tension may be socially useful, however, as it could potentially improve the two-way flow of information between the rural population and scientists. The RAS is an increasingly influential presence, particularly in the *oblasts* (administrative regions) of Issyk-Kul and Osh, and has its own programme of adaptive, on-farm research

¹ The term civil society is necessarily extremely broad, and this paper uses the London School of Economics’ definition that civil society “refers to the set of institutions, organizations and behaviour situated between the state, the business world, and the family”, which is wide enough to encompass everything from farmer unions to football teams (“*Civil Society—An Agreed Definition?*” pages .britishlibrary.net/blwww3/3way/civilsoc.htm, accessed on 19 September 2004).

and promising, if limited, linkages to the state agricultural research system. Whether the RAS will outlive its donor-funded origins is an open question, as the willingness and ability to pay for advisory services in rural Kyrgyzstan remains low. The KSBA is another civil society formation that has succeeded in linking producer groups with the state agricultural research system. Although small and still attempting to outgrow its roots in the donor-funded Sheep Development Project, the KSBA provides another model of the potential of civil society linkage with the agricultural research community.

The agricultural research systems of Kazakhstan and Kyrgyzstan are also partially linked to global research institutes via the Consultative Group on International Agricultural Research (CGIAR) system. These international relationships can be understood to lie within a strongly scientific paradigm, but international institutions display more interest than domestic institutes in linking farmers' perceived problems with the agricultural research system and promoting linkages between the two.

The paper reaches its conclusions through a descriptive "tour" of the activities of the large Kazakh and smaller Kyrgyz agricultural research systems in search of civil society linkages. The most notable features of the current systems discovered by the tour are funding cuts and the persistence of the Soviet-style, sector-specific division of research activities under a scientific paradigm. At the same time, this tour reveals the immense scientific wealth of the research programmes being undertaken in the state agricultural research systems. However, while the scientific capacity of these systems is a significant public resource in both countries, it is under attack from the top (through funding cuts) and from the bottom (through critiques of its relevance). Deepening linkages to the agriculturalist population through connections with civil society is clearly one direction in which the research systems could progress through a difficult period. Whether this will happen smoothly or quickly remains to be seen, and this paper primarily limits itself to pointing out potential and the promising examples of linkage in Kyrgyzstan.

The paper adds to the criticism that the agricultural research systems in Kazakhstan and Kyrgyzstan do not respond to the needs of the new class of farmers, although it modulates this criticism by pointing out the paucity of bottom-up social formations, especially in Kazakhstan, to transmit these needs to the research system and generate a two-way flow of information. The paper tries to make the criticism constructive by pointing out areas where new linkages could create win-win scenarios for both farmers and researchers. Ultimately, the responsiveness of the research systems will hinge on the role of extension services in linking farm-level needs to the research system. While the paper finds the emerging role of the RAS in Kyrgyzstan a promising development in this direction, no equivalent is as yet operational in Kazakhstan.

The issues surrounding these linkages cannot be understood without reference to the cataclysmic changes faced by rural producers during the post-independence period. The repercussions of moving from the state-led administrative systems of the Soviet period to a privately led market-oriented system have been the central focus of rural life since shortly after independence. Output and rural incomes in both countries crashed in the early 1990s as subsidies were withdrawn, input supplies collapsed and output distribution channels disappeared. Output in Kazakhstan fell by about 40 per cent from the 1980s to the late 1990s and has still not recovered. In Kyrgyzstan output dropped sharply after independence but by 1996 had recovered to the levels of the 1980s and has since continued to grow.

Kazakhstan was slower than Kyrgyzstan to begin significant restructuring, but by the late 1990s both countries were implementing large-scale privatization. Each country has followed a different restructuring path. Kazakhstan has practised a form of "bankruptcy" restructuring, in which a stringent bankruptcy law has been used to push insolvent Soviet-legacy enterprises to reorganize as multiple business units, usually three or four for each former Soviet farm. About 80 per cent of arable land in Kazakhstan is now farmed by large-scale enterprises, and small family farms work the remaining 20 per cent. Kyrgyzstan embarked on a path that resulted in a much more rapid creation of small farms than in Kazakhstan. About 60 per cent of arable land in Kyrgyzstan is

worked by small farming units (of less than 100 hectares). The other 40 per cent is now worked by larger enterprises, which are the successors of the Soviet farms. In both countries, most livestock was privatized to individuals and farming is mainly household in scale.

Such restructuring and severe capital constraints on farmers mean that in both countries the thrust of demand on research services is for the development of low-cost technologies (improved varieties and input-saving agronomic practices) that meet local and regional needs. But the supply of research activities for the most part continues to reflect Soviet priorities. On-farm trials, farmer-driven research and the adaptation of technology to cost considerations are new and foreign concepts to researchers. As the country cases show, these systems are under pressure to change. The imperatives of farmers and the market economy are increasingly being felt within the agricultural research community. Civil society has a large potential role to play in enabling the realization of these changes.

Role and Activities of Agrarian Research Institutes in Kazakhstan: Overcoming the Soviet Legacy?

Institutional profile of agricultural research in Kazakhstan

In the 11 years of Kazakhstan's existence since independence in December 1991, significant reforms to the institutional and financial aspects of its agricultural research system have been initiated. In Kazakhstan, as in all countries of the former Union of Soviet Socialist Republics (USSR), the agricultural research organizations are direct heirs of the Soviet system of science. Between 1991 and 1994, the country established three basic structures to manage scientific affairs: the National Academy of Sciences, the Kazakh Academy of Agricultural Sciences, and the Ministry of Science and New Technologies. The Kazakh Academy of Agricultural Sciences included all the scientific organizations and structures that in Soviet times belonged to the eastern regional department of the Soviet Academy of Agricultural Sciences.

In 1996 these three organizations were merged into a new institutional framework called the Ministry of Science/Academy of Sciences of the Republic of Kazakhstan. The Kazakh Academy of Agricultural Sciences was also reorganized into a separate structural division, named the National Academic Center of Agrarian Research (NACAR). Today NACAR integrates 40 agrarian research institutes, 18 agricultural experiment stations and 30 experiment farms, as well as the republic's scientific agricultural library and scientific publishing house, Bastau. NACAR has 3,372 employees, of whom 1,790 are scientific employees, including 134 doctors of science (equivalent to senior professors in the United States) and 545 candidates of science (equivalent to the US PhD). The main purpose of NACAR is the development and implementation of fundamental and applied research in the field of agriculture in Kazakhstan.

In 1999 the Ministry of Science/Academy of Sciences was again reformed. Two ministries—science and higher education—were joined to create the Ministry of Science and Higher Education. The Academy of Sciences was removed from the ministry and reorganized into a set of state associations. NACAR remained an independent structural division within the framework of the new academy.

And the reforms continue. In June 2002, following the Message of President Nazarbaev to the Kazakh People, and an executive order regarding NACAR (No. 704), NACAR was removed from the Academy of Sciences and placed within the Ministry of Agriculture. The main purpose of this change was to improve efficiency in agrarian science by linking research more closely with policy and production. The results of this latest round of reorganization are not yet clear; several initiatives are currently under way to assist the agricultural research system in consolidating its new role.

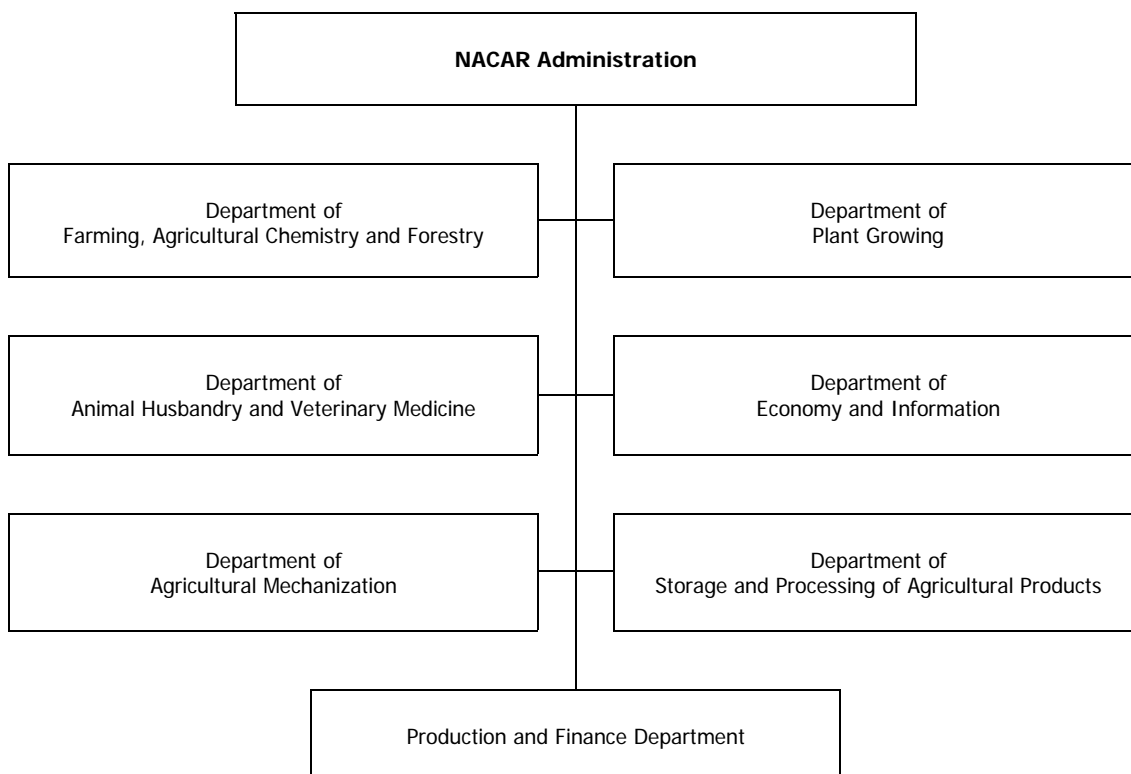
Outside of NACAR, the country has two large agricultural universities, the Kazakh National Agrarian University (Almaty) and the S. Seifullin Kazakh Agrarian University (Astana). In addition to teaching, these universities also conduct scientific activities under the supervision of NACAR's research institutes. However, most scientific activities are carried out by the institutes and organizations within the NACAR structure, to which we now turn.

Organizational structure and principal activities of the National Academic Center of Agrarian Research

Six departments supervise the activities of the institutes, stations and farms according to their thematic field. In addition, each department coordinates research in agrarian universities, Ministry of Agriculture organizations, and other official bodies involved in carrying out agricultural research.

During 1996–2000 the basic research work at NACAR was conducted within the framework of a project entitled Scientific Maintenance of the Agricultural Complex, which was itself within the Republican Special Scientific Technological Programme (RSSTP). The government designed and adopted this programme in 1993–1994. The primary goals for the NACAR system were determined under the RSSTP, and have been followed until very recently. Priority goals included the maintenance of scientific developments, the realization of research and its implementation in agricultural practice. Financing requirements were also determined by the RSSTP (NACAR 2001a).

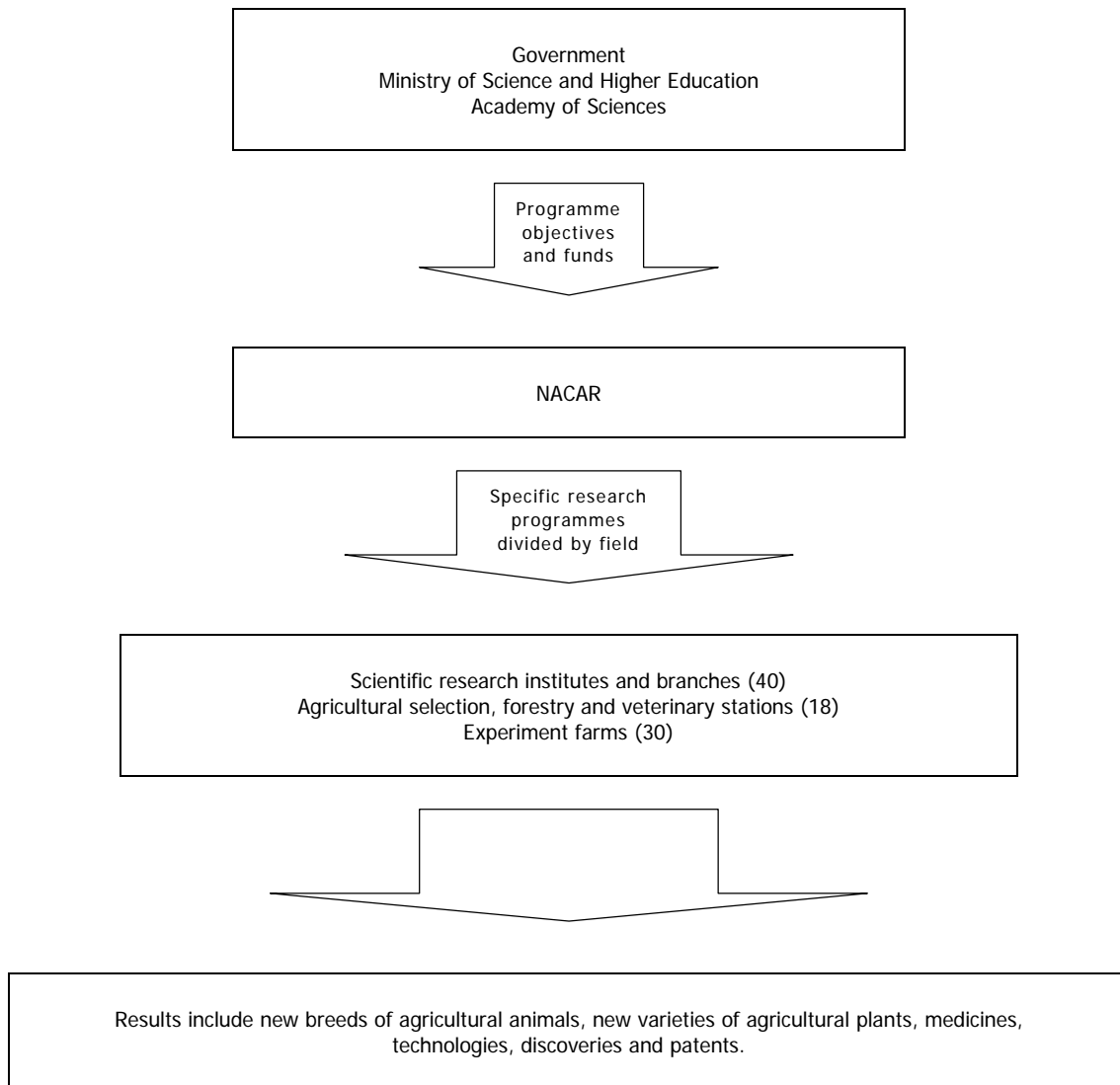
Figure 1: NACAR's organizational structure



In 2000 NACAR elaborated two new programmes, which were approved by the government and which are direct outgrowths of the 1996–2000 five-year plans. These five-year programmes are entitled Preservation, Development and Usage of the Gene Pool of Agricultural Plants, Animals and Micro-Organisms During the Period 2001–2005; and the Scientific Maintenance of Production, Processing and Storage of Agricultural Production by the Regions of Kazakhstan During the Period 2001–2005. These programmes, which provide the work plan for the entire system of research institutes, are to be performed almost entirely within the laboratories and

experiment farms of the research system and are designed by the executive management of NACAR and the Ministry of Agriculture. Figure 2 describes the scheme of management of the agricultural research system. As can be seen, there is little input from farmer organizations or associations, and there are few linkages with these organizations in either the trials or the dissemination of results.

Figure 2: Institutional structure and process of the agricultural research system in Kazakhstan



This scheme is very similar to the management system of scientific research in the former Soviet Union, where research initiatives were determined in a top-down fashion. Only research approved and included in the five-year research programmes is financed. This creates conditions for internal bureaucratic struggles over research priorities and funding, and allows for few sources of outside accountability or review. Changing an approved programme is practically impossible. Different institutes and scientists lobby for “priority” scientific directions, and some scientists become influential bureaucrats because of their ability to arrange transfers of budgetary funds.

While the factors that are beginning to bring about limited changes in the conditions of agricultural science in Kazakhstan are discussed in more detail later, it is fair to say in summary that (not

unlike other former Soviet countries) the current institutional structure of agricultural science in Kazakhstan continues to reflect most of the characteristics of the Soviet system, which include:

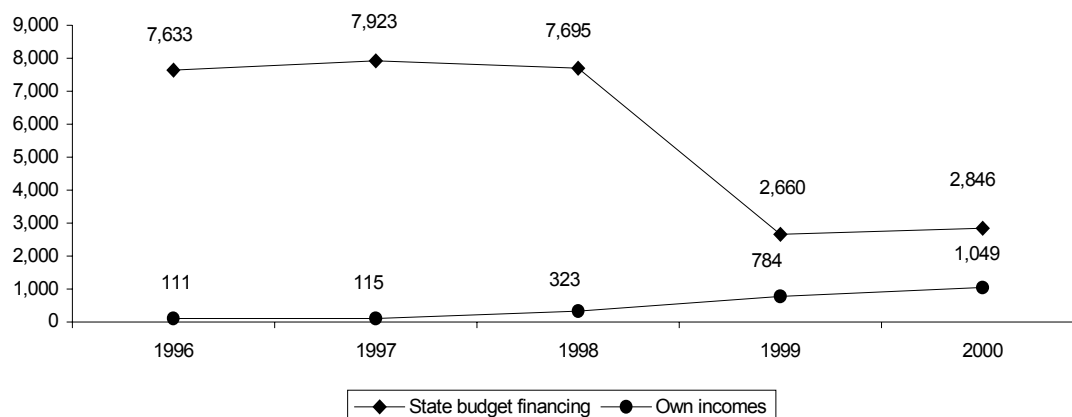
- low levels of financing;
- the preservation of a hierarchical, centralized structure of administration;
- absolute subordination to the state/government in both financial and ideological terms;
- the persistence of Soviet scientific approaches, which revolve around the influential personal role of ex-Soviet scientists;
- the isolation of scientific activity from societal and economic trends; and
- a low level of adaptation to market conditions.

Financing of agrarian research in Kazakhstan, 1996–2000

The agricultural research system in Kazakhstan has seen its funding plummet. The state budget is the main source of financing of agrarian research. During 1996–2000 the state spent \$28.7 million on agricultural research. As shown in figure 3, however, the level of state support for the system was drastically cut back in 1998–1999, to less than half of its level in 1996 (in real terms). It is also interesting to note that a part of the money given by the state to agrarian research is returned to the budget in the form of taxes and duties paid by the institutes. During 1996–2000, \$6.9 million (or 24 per cent of total financing) was paid back to the state budget.

The agrarian institutes also finance their research through independent sources of funding (see figure 3); however, it is not clear whether this creates conflicting priorities.

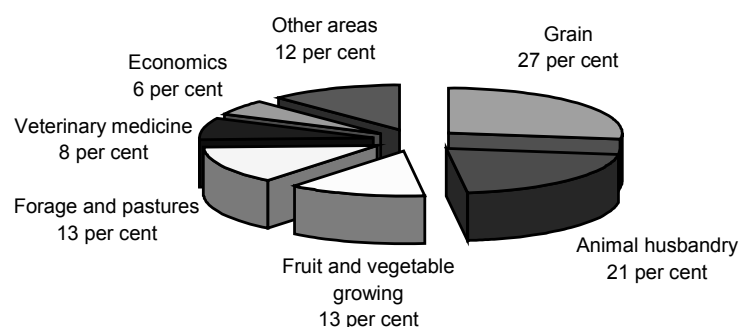
Figure 3: Financing scientific agrarian research, 1996–2000
 (thousands of US dollars)



Source: NACAR 2001a.

The share of independent financing has increased in response to cuts by the state.

Figure 4: Structure of distribution of financing by area, 1996–2000



Source: NACAR 2001a.

In general, the distribution of financing according to scientific direction corresponds closely to the relative importance of each area of agriculture in Kazakhstan. With over 3,000 people on the system's payroll, staff salaries constitute most of the expenditure (NACAR 2001a).

Agrarian research institutes, branches and experiment stations in Kazakhstan

NACAR administers a large network of research institutes, branches and scientific stations, which specialize according to type of crop or livestock activity. Table 1 lists all agrarian research institutes and their branches, divided according to their specialization.

Table 1: Agrarian scientific research institutes, branches and stations in Kazakhstan

No.	Agrarian research institutes	Field
1	Kazakh Research Institute of Agricultural Economics and Organization	Economics
2	A.I. Baraev Kazakh Research Institute of Grain Production	Farming and crop production
3	Kazakh Research Institute of Fruits and Grapes	
4	Kazakh Research Institute of Forage and Pastures	
5	Kazakh Research Institute of Potatoes and Vegetables	
6	Kazakh Research Institutes of Plant Protection	
7	V.R. Williams Kazakh Research Institute of Farming	
8	Uspanov Kazakh Research Institute of Soil Science	
9	Kazakh Research Institute of Forestry and Forest Melioration	
10	Kazakh Research Institute of Fish Breeding	Animal husbandry and veterinary medicine
11	Kazakh Research Institute of Karakul Sheep Breeding	
12	Kazakh Research Institute of Poultry Farming	
13	Kazakh Research Institute of Veterinary Medicine	
14	Kazakh Technological Research Institute of Animal Husbandry	
15	Kazakh Technological Research Institute of Sheep Breeding	
16	Northern Research Institute of Animal Husbandry and Veterinary Medicine	
17	Celinnyi Research Institute of Agricultural Mechanization and Electrification	Agricultural mechanization
18	Kazakh Research Institute of Agricultural Mechanization and Electrification	
19	Kazakh Technological Research Institute of Maintenance of Agricultural Machines	

(continued)

20	Kazakh Research Institute of Water Resources	Water management and melioration
21	Kazakh Research and Design Institute of the Meat and Milk-Processing Industry	Food industry
22	Kazakh Research Institute of the Food Industry	
23	Kazakh Research Institute of Grain and Grain Products	
24	Agricultural Research Institute (Jambul <i>oblast</i>)	
25	Atyrauski Agricultural Research Institute	Regional agriculture
26	Central Kazakhstan Agricultural Research Institute	
27	East Kazakhstan Agricultural Research Institute	
28	Kostanaiski Agricultural Research Institute	
29	Pavlodar Agricultural Research Institute	
30	Priaralski Research Institutes of Agricultural Ecology and Agriculture	
31	South Kazakhstan Agricultural Research Institute	

No. Branches of research institutes

Field

1	Celinyi branch of the Kazakh Research Institute of Agricultural Economics and Organization	Economics
2	Kokshetauski branch of the A.I. Baraev Kazakh Research Institute of Grain Production	Farming and crop production
3	Taldykorganski branch of the V.R. Williams Kazakh Research Institute of Farming	
4	Altai branch of the Kazakh Research Institute of Fish Breeding	Animal husbandry and veterinary medicine
5	Aral branch of the Kazakh Research Institute of Fish Breeding	
6	Atarau branch of the Kazakh Research Institute of Fish Breeding	
7	Balkhash branch of the Kazakh Research Institute of Fish Breeding	
8	Karaganda branch of the Central Kazakhstan Agricultural Research Institute	Regional agriculture
9	Shardarinski branch of the South Kazakhstan Agricultural Research Institute	

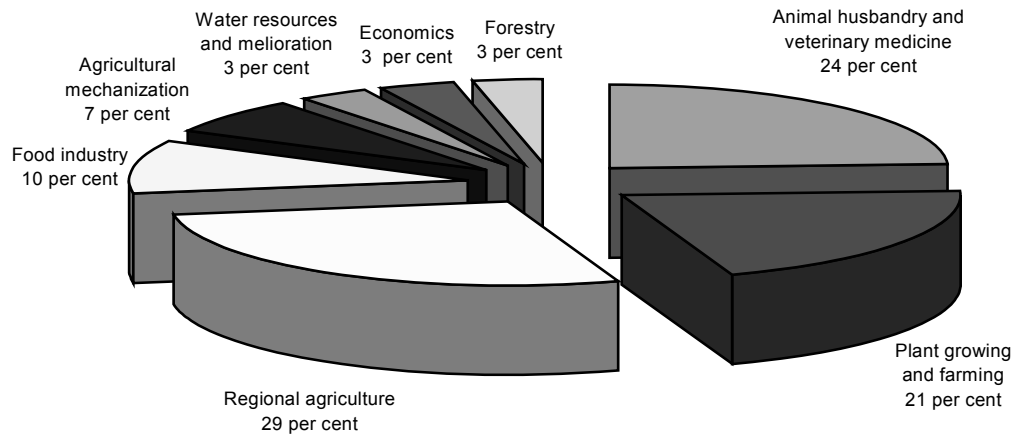
No. Agricultural experiment stations

1	Aktubinsk Experiment Station
2	Arkalyk Agricultural Experiment Station
3	Jambul Agricultural Experiment Station
4	Karabalyk Agricultural Experiment Station
5	Krasnovodopadsky Selection Experiment Station
6	Lvovski Agricultural Experiment Station
7	Makhtaaralski Experiment Station
8	Northern Kazakhstan Agricultural Experiment Station
9	Stepnoishimskaya Agricultural Experiment Station
10	Torgaiskaya Agricultural Experiment Station
11	Uralskay Agricultural Experiment Station
12	N.I. Vavilov Priaralski Experiment Station for Gene Resources
13	Almaty Forestry Experiment Station
14	Alatay Forestry Experiment Station
15	Kostanai Veterinary Research Station
16	K.I. Skryabin Jambyl Veterinary Research Station
17	West Kazakhstan Veterinary Research Station
18	South Kazakhstan Veterinary Research Station

Source: KazGosINTI 2001, 2002; NACAR 2001a.

As shown in table 1, the potential of the agrarian research institutes is vast, as they cover virtually every agricultural product and every area of the country. The number of organizations in the NACAR structure comes to a total of 58 separate entities. All the institutes within the NACAR structure can be divided into a few main scientific fields, as shown in figure 5.

Figure 5: Agrarian research institutes – distribution by specialization



Source: NACAR 2001a.

The experiment stations are farms specializing in the propagation of different types of agricultural plants and new breeds of agricultural animals created as a result of genetic selection. The experiment stations also carry out large-scale trials of veterinary medicines, new technologies and systems of agriculture. In short, experiment farms are the exclusive testing sites of research institutes. At the same time, they are also engaged in commercial agricultural production, and their continuing existence depends largely on the self-financing obtained from these commercial activities.

The Institute of Physiology, Genetics and Bioengineering is engaged in fundamental biological research of plants. It is funded through the Academy of Sciences but falls outside the structure of the research institutes and NACAR.

The distribution of institutes by specialization does not show the priority given to each type of research area in terms of financing, but it does clearly depict the general division between the three central activities of the institutes – animal industries and veterinary medicine, plant growing and farming, and regional agriculture. These are followed by the food industry (10 per cent), agricultural mechanization (7 per cent), and water resources, economics and forestry (one institute for each specialization, representing 3 per cent each).

Main directions of research work in Kazakhstan's agrarian research institutes

The research programmes for 2001–2005 are similar to undertaken by their predecessor, the Scientific Maintenance of the Agricultural Complex in 1996–2000. During this latter period, research organizations and the entities in the NACAR structure undertook research in the following fields: agricultural economics; grain; fruit and vegetable growing; industrial crops; forage crops; water management and melioration; forestry; animal husbandry; veterinary medicine; food-processing industry; medicinal plants; and agrarian ecology. The main research activities are described below, accompanied by comments on either existing or potential civil society linkages.

The economics research programme generally works from the perspectives of macroeconomics, government revenue, and the production and organizational optimization of theoretical firms. There is little connection to civil society, and with the exception of one investigation into the social sphere, research bears little relation to actual farm operations and farmers' concerns about reorganization, bankruptcy and the creation of new semi-corporate farms. Indeed, there is a disconnection between the reality of Kazakh farm restructuring and the academic search for "optimal" organizational models, such as the creation of a mathematical model for the optimum production structure of an enterprise.

Grain research is highly theoretical and reflects the "pure research" paradigm in its emphasis on agroclimatological zoning for different farming domains. A survey by the International Maize and Wheat Improvement Center (Centro Internacional de Mejoramiento de Maíz y Trigo/CIMMYT) found that the main requirement of Kazakh grain farmers is for low-cost varieties requiring few purchased inputs (CIMMYT 2001). But the priorities of farmers are not yet reflected in the grain research programme. In 1996–2000, 90 varieties and hybrids were created, including 56 varieties of winter and spring wheat. This is an impressive accomplishment. However, few varieties have progressed to field trials in real conditions (chiefly in collaboration with CIMMYT researchers), and there is no systematic feedback mechanism for farmers and dealers to make their opinions about new varieties known to the research system. Without explicitly responding to the expressed need for low-cost, low-input grain varieties, it is not clear how economically useful many of the new grain varieties will be to Kazakh farmers. The absence of civil society linkages to agricultural research is thus acutely felt in this area.

Grain-processing research provides a better platform for linkages with civil society. The most productive areas of northern Kazakhstan have seen the arrival of large multinational and Russian agribusinesses. These enterprises produce wheat on massive scales, but suffer from post-harvest losses. Kazakhstan does not yet have sufficient certification standards to export its grain to world markets (it only exports to markets in the Commonwealth of Independent States/CIS). The introduction of international World Trade Organization (WTO) standards requires the certification of a central laboratory for standards, which would then be able to accredit other laboratories. It appears that the grain processing research programme has begun to move in this direction. The World Bank-funded Agricultural Services Support Project (ASSP) will include financing to establish or re-equip a national laboratory so the wheat and other grain industries can certify grain under the international quality standard ISO [International Standardization Organization] 9002. It is likely that commodity associations would play a significant role in the operation of such a facility because of the potential for increasing exports to non-CIS countries.

The institutes are researching a number of areas with respect to forage crops, including genetics and selection, plant protection, and mechanization. Pasture management is a controversial social and political topic in rural Kazakhstan, largely because of the limited access to water. The scientific/technical approach to pasture management, forage production and pest control adopted by the agricultural research system is one important way in which the constraints of livestock producers could be eased. However, there is as yet little integration of the programme with producers' interests. This is partly a reflection of the approach of the research system, but also of producers' lack of organization and their geographic dispersal. The programme of the International Center for Agricultural Research in the Dry Areas (ICARDA) suggests that a reorientation of research directions for pasture management may be under way. To the extent that this reorientation fosters linkages with communities of pastoralists, the potential impact on civil society development could be significant.

The development of integrated pest management systems by researchers is likely to be welcomed by farmers whose abilities to make cash payments for pesticides are limited. However, integrated pest management is highly localized and adaptive. World experience has shown that it works best where farmers are organized, can learn from each other and adapt rapidly to changing pest conditions. Therefore, the absence of a farmer-led adaptive diffusion programme for plant protection raises concerns about the long-term effectiveness of the research.

In agricultural machinery research, the source material does not clearly indicate the extent to which farmer input is included in the research programme, or even whether the programme is taking into account farmers' desires for low-cost production techniques, for example, in developing fuel-saving machinery options. This question would need to be explored in more detail in order to understand how civil society actors could link up with agricultural machinery research.

Water research, focusing on water availability, control of water usage, irrigation technology and intrasystem reallocation of underground water, low-pressure drip irrigation and group water lines, is tackling some of the most difficult problems in water-scarce Kazakhstan, but is approaching these problems largely from an engineering standpoint. There is, nevertheless, great potential for civil society linkages around irrigation zone management, water supply for pasture and water-sharing agreements.

Animal husbandry is one of the main focal points of the agricultural research system. The direction of research corresponds to the types of livestock primarily produced in the country (cattle, pigs, sheep and goats, horses, camels and poultry), as well as animal processing, pisciculture, bee keeping and the mechanization of animal husbandry. Animal husbandry research is dominated by geneticists and breeders, with an emphasis on the development of new breeds of animals. While these programmes are successfully creating animals with desirable characteristics (such as cashmere goats with fibre in the sought-after 13–15 micron fibre diameter range), they are not always well integrated with markets. For example, there is no facility for the certification of Kazakh cashmere. It is precisely at this interface between scientific research and the market that civil society and the research system could most effectively reinforce one another. Livestock research in this sector is full of potential linkages with civil society in areas such as sheep breeding, wool marketing and dairy cooperatives, with associations for all the main areas of production. In some areas, such as the breeding of sheep for wool and meat, agricultural researchers have reached out to organize farmers for on-farm trials when financing from donors has been available (in this case, through the Global Livestock Collaborative Research Support Project of the United States Agency for International Development/USAID). There is no producers' association in Kazakhstan analogous to the KSBA for any type of livestock (see below).

Veterinary research focuses on the prevention of brucellosis, tuberculosis and other diseases; the epizootology of infectious and parasitogenic illnesses; the development of vaccines against tuberculosis, pasteurellosis, campylobacteriosis and salmonellosis for different kinds of agricultural animals; the development of medicines for the treatment of gastrointestinal diseases in calves; and the detection of fish parasites in the Caspian Sea. Veterinary prevention programmes are another area in which there is potential for win-win civil society linkages with agricultural research through producer and community associations.

Research into food standards and pesticide residues provides an entry point for civil society representatives from the food industry (for example, the Union of Food Products Producers of Kazakhstan) and for environmental non-governmental organizations (NGOs) to interact with the agricultural research community.

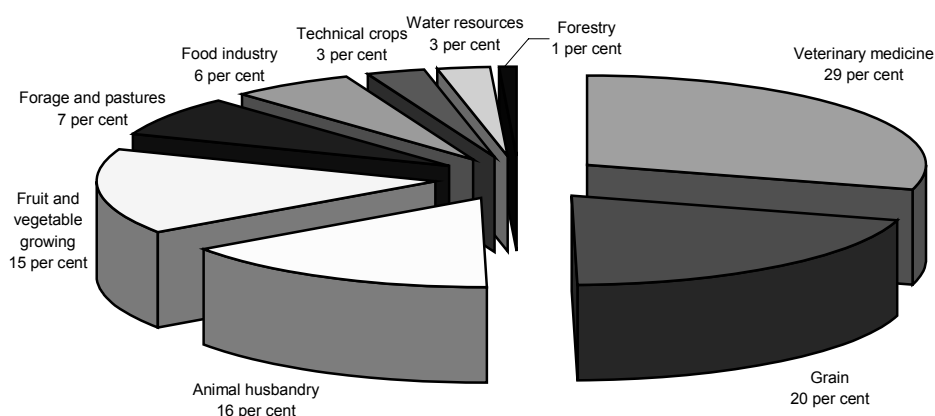
The area of medicinal plants is another specialism where there is great potential for linkages between civil society formations, such as women's groups, and agricultural research. Agricultural institutes are focusing on the compilation of a catalogue of wild medicinal plants; phytochemical analysis; the examination of vegetative ecosystems; seed collection; the creation of a seed stock and a nursery of medicinal plants; the development of industrial techniques for the cultivation of medicinal plants; the development of a system of crop rotation for the cultivation of medicinal plants; research cultivation of absinthe (wormwood) and spices; and the development of large-scale production of the big bee moth and its processing for the treatment of tuberculosis. In neighbouring Kyrgyzstan, medicinal plants and herbs are being promoted by the German-Kyrgyz Export Promotion project as a high-value export to Europe. The project encourages the formation of village groups to gather or produce and package plants and herbs.

This experience also shows that there is potential for state–civil society–private sector partnerships in this niche area of agriculture.

There are already a number of connections between international organizations and the Kazakh research system with regard to ecology, and there is significant potential for increased involvement of local and international NGOs in a number of fields, including the Aral Sea area and radiation monitoring; soil erosion mitigation measures; the ecological effects of fertilizers; the restoration of degrading lands; forage production in ecologically unfavourable zones; plant metabolism in ecologically unfavourable zones of the Aral Sea; ecological monitoring of water resources and water distribution objects; and radiation monitoring in the ecosystem of the Semipalatinsk region.

Despite the problems and unfulfilled potential, it is important to note the output of Kazakhstan’s agricultural research community. It is beyond the scope of this review to list all the results of Kazakhstan’s massive 1996–2000 research programme, so a summary will have to suffice. During 1996–2000, the Kazakh agricultural research system received 384 patents for inventions and copyrights and 12 trade mark certificates. The patents for the inventions and certificates on intellectual property fall into thematic areas, as shown in figure 6.

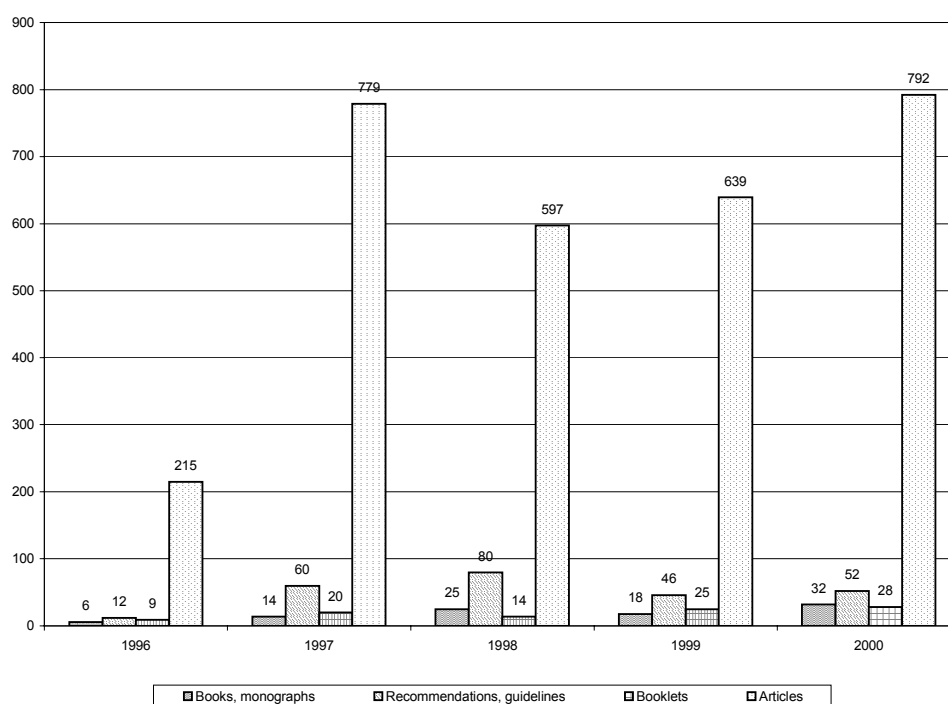
Figure 6: Distribution of inventions and certificates by thematic area, 1996–2000



Source: NACAR 2001a.

Although this summary cannot depict the specific impact and importance of each area of research, it does demonstrate the productivity of the system in terms of scientific output, which include new inventions and discoveries, and the creation of new breeds of animals and varieties of plants. This information is regularly published in the specialized scientific literature and disseminated through conferences and workshops. Between 1996 and 2000, agrarian scientists published 95 books and monographs, 250 guidelines and methodological recommendations, 96 booklets and 3,022 articles. They participated in 294 international workshops and conferences, and in 395 national and regional events (NACAR 2001b).

Figure 7: Published output of agricultural research in Kazakhstan, 1996–2000



Source: NACAR 2001b.

As mentioned above, NACAR possesses its own publishing house, Bastau, which is the main publisher of the research system's output. It regularly publishes two journals—the *Bulletin of Agricultural Science of Kazakhstan* and *Jarshy*—and booklets, guidelines and methodological recommendations. Articles are also published in other journals of the Academy of Sciences, as well as in international journals. The channels for dissemination of information are limited, however, and do not reach many of the potential customers of scientific research. The publication runs of scientific magazines and books do not usually exceed several hundred copies.

It seems fair to conclude that there is often a “missing link” between the output of the agricultural research system and the farming/agribusiness population, as the extension services provided by the research institutes, universities and experiment stations are limited.

Foreign scientific support for Kazakh agrarian science

The level of cooperation between Kazakh agrarian scientists and international networks is fairly high. This is confirmed by the large number of contacts and programmes established with foreign centres and universities, including the following:

- CIMMYT, Mexico
- ICARDA, Syria
- International Potato Center (Centro Internacional de la Papa/CIP), Peru
- Japan International Research Center for Agricultural Sciences (JIRCAS)
- Centre for International Cooperation (MASHAV), Israel
- New Independent States–Industrial Partnering Program (NIS-IPP), the Department of Energy, United States
- University of California and University of Washington, United States

- Overseas Development Institute, United Kingdom
- Massey University, New Zealand

Besides the institutional programmes mentioned above, there are individual collaborations with agrarian scientists from China, Denmark, Germany, India, Pakistan, the Republic of Korea and the Russian Federation. Foreign support is provided in various forms, including joint financing of research, information exchanges, foreign trips, consulting, and the organization of short courses.

CIMMYT has organized training courses in computer skills and the English language. It has also helped to carry out joint research on the selection of wheat and corn in Central Asia. CIMMYT was also responsible for the farmer surveys that demonstrate the desire for low-cost maize and wheat varieties and technologies.

ICARDA has organized joint research on a number of projects, including:

- the integration of forage production and animal husbandry in the steppes of Central Asia;
- the usage of purified sewage water from Almaty for cultivation of forage crops; and
- spraying and desalination technology for irrigated lands in the zone of the Arys-Turkistan channel.

MASHAV organizes annual training for five to six scientists on special educational courses in Israel. It has also conducted joint research on plant protection with scientists from Israel.

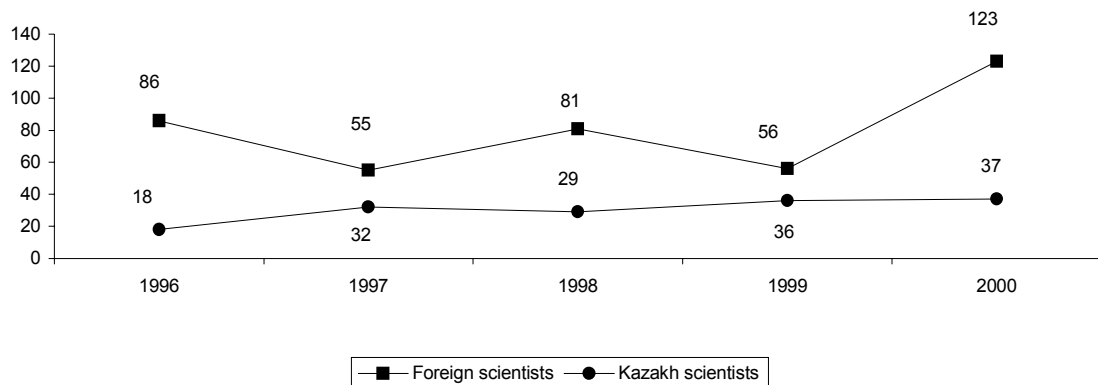
With the University of California and the University of Washington, the Overseas Development Institute and the United Nations International Drug Control Programme (UNDCP), the Kazakh Research Institute of Forage and Pastures has conducted research on problems of pasture ecosystems and wild hemp.

Within the framework of an agreement called the Initiative on the Avoidance of Distribution of Weapons of Mass Extermination for the Newly Independent States, the NIS-IPP of the US Department of Energy has carried out joint research on the creation of new "probiotics". The purpose of this activity is to create microbiological products that can counteract the poisoning of food by radiological or biological agents. The research was conducted jointly by the Kazakh Research Institute of the Food Industry's laboratory of microbiology and biotechnology, the Kazakh Veterinary Institute, and the Oak Ridge National Laboratory, and Food and Animal Protection Research Laboratory, both based in the United States.

The biggest single grant received by the Kazakh agricultural research system (\$400,000) was awarded by the International Bank for Reconstruction and Development (IDF 27224-KZ) within the framework of the project titled Increases of Productivity, Stability and Profitability of Grain Production of Kazakhstan.

Overall, during the five-year period 1996–2000, researchers were financed by 41 international grants. Kazakhstan was visited by 401 foreign scientists, and 152 Kazakh scientists visited abroad under various programmes of international cooperation (NACAR 2001a).

Figure 8: Foreign scientists visiting Kazakhstan, and Kazakh scientists visiting abroad, 1996–2000



Source: NACAR 2001a.

International support has enabled the research system to attract additional financing during a period of sharply declining state budget transfers. Although mostly in the public sector, international cooperation has nevertheless improved the conditions for linkages between the agricultural research system and civil society. A “pro-poor, pro-environment” agenda is implicit in most of the work underwritten by international institutions. CIMMYT and ICARDA, in particular, demonstrate a clear intention to link agricultural research efforts more closely to the organized association of farmers and agribusiness.

The World Bank Agricultural Services Support Project

In late 2002, the World Bank approved the Agricultural Services Support Project. This project, which began in early 2003, targets several activities of the agricultural research system and could have significant impact on the linkages between the system and elements of civil society. The ASSP aims to provide support for the provision of quality seeds to farms; improved phytosanitary services, veterinary inspection and quarantine services; and livestock breeding centres. The veterinary inspection programme will also develop appropriate public-private partnerships for vaccine delivery, which would be a new point of contact between the private sector, civil society actors and the veterinary research and inspection system. The ASSP also seeks to work with commodity associations and research centres in the development of a market information system.

Perhaps most significantly for civil society linkages, the project will provide funding for a competitive grants programme explicitly designed to reorient the agricultural research system toward becoming more responsive to farmers’ requirements in the context of a market economy, and providing appropriate technologies to improve their competitiveness and sustainability. The competitive grants programme envisages setting up an independent board with representatives from the Ministry of Agriculture, NACAR, the Ministry of Finance, the Ministry of Education and Science, commodity associations and NGOs. This board and grant programme would be one of the first direct linkages between civil society and agricultural research in Kazakhstan.

Conclusions on the role of agrarian research institutes in Kazakhstan

This section dwells in detail on the activities of Kazakh agrarian science over the period 1995–2002 and raises questions regarding the system’s connection to farmers’ needs. It shows that there is great potential for linkage with new civil society actors, but that this potential remains largely unrealized.

The main user, sponsor and regulator of agricultural research in Kazakhstan is the state, through the Ministry of Agriculture. It is exclusively the state that determines the focus of the activities of agrarian scientific organizations, approves research programmes and evaluates

results. The review of research activities shows that linkages between agricultural science and civil society are largely indirect. The agricultural research agenda is topical and extremely impressive in its breadth and depth, but weakly articulated with the needs expressed by farmers. The scarcity of points of direct connection with the private sector or civil society leads to concerns about the capacity of the research sector to respond to the immediate needs of the farming and agribusiness populations or to anticipate how these needs are changing.

The structure of the agricultural research system raises doubts about the social efficiency of bureaucratic incentives in providing agricultural research as a public good. Because scientists are accountable only to authorities vertically above them in the state hierarchy and they also obtain their financing directly through these channels, there is a structural incentive to work only within the parameters of approved programmes established by the hierarchy. Upon expiration of the funding year, the scientists report on the programme activities and show the results of their research. The cycle is then repeated. Accountability to the end users of agricultural research is only indirect, through the political system. The results of research work (new varieties, new breeds, medicines) may, or may not, be relevant to the changing needs of the farming population, processing industry and business. It is only through the narrow, highly discretionary window of the Ministry of Agriculture and the NACAR research programme that this relevance is evaluated and new research directions can be instituted. As we have seen, external funding agencies such as the World Bank and international research institutes such as CIMMYT and ICARDA are attempting to open up this system, making it more accountable and responsive to the end users. The Ministry of Agriculture and NACAR seem willing to move in this direction, at least to a certain extent. For example, it appears that civil society will be welcomed as a player in the planned competitive grants programme. By representing the needs of the end user, civil society thus has a major role to play in this process of reorientation of the research system.

The diffusion of agricultural research is also problematic. The Kazakh agricultural research system has been criticized on the grounds that its scientists' practice of financing research without applying it to commercial production leads to the obsolescence or irrelevance of discoveries (NACAR 2001a). Without full opportunities for adaptive application, the social benefits of research developments may never be known. As shown in the description of the system's activity, extension and training are low priorities for research institutes; Kazakhstan still lacks any system of extension. There is scant mention of education or training for farmers in the agricultural research system's activity plans. Scientists usually publish only a few recommendations, guidelines and manuals, and the number of those circulated usually does not exceed several hundred. This scarcity of outreach and education is felt all the more acutely as many farmers are new to the business, having only recently obtained animals and land through the mass privatization process.

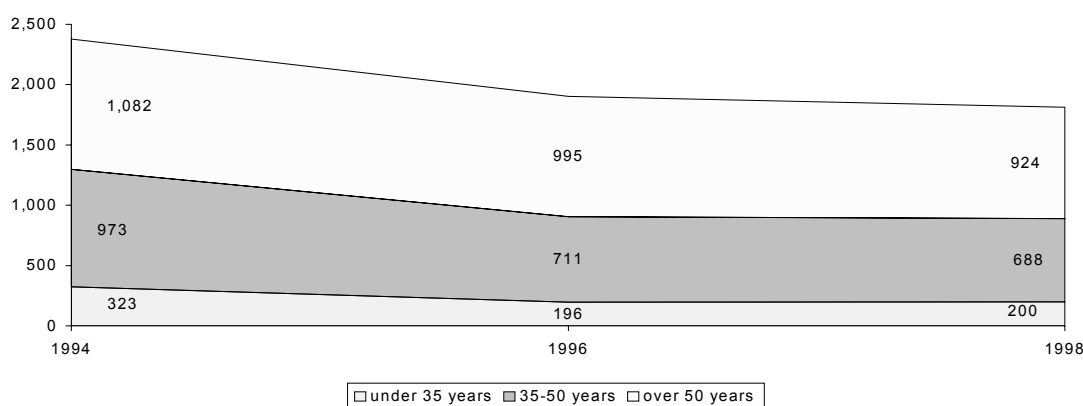
In short, the main gaps between agricultural research organizations and the rural population that civil society formations could help to bridge are the following:

- There are few linkages between research projects and the actual requirements of agricultural operators. Agrarian research programmes are still being created in the Soviet style for Soviet needs. They are too centrally directed for market-based agriculture. Typically, there is little implementation of research achievements in practice. Although financing is scarce, there have been only limited attempts to increase financing from private business (although this situation appears to be gradually changing).
- The new class of private farmers receives little support from the state in the provision of technical information as a public good. To a certain extent, dissemination difficulties are connected to problems of privatization and atomization in agriculture and to the huge geographical size of the country, but this is compounded by the fact that few agricultural scientists work in close contact with either small or large private sector producers.
- Agrarian science is stagnating in part because of the age profile of its personnel: the scientists are getting older. As shown in figure 9, the proportion of scientists over 50 grew between 1994 and 1998, with a corresponding decline in other two

age groups, under 35 years and between 35 to 50. Research institutes are being abandoned by young scientists because of low incomes and the absence of favourable long-term career prospects in comparison with other sectors.

- There are only limited indications of any trend toward reforming the research system from within. Rather, one is left with the impression that the state is not interested in increasing the efficiency of agricultural research. This reflects larger problems of public administration and democratic accountability in Kazakhstan. Nevertheless, as this review has shown, there are ample points of contact where civil society representatives, perhaps acting in coordination with international organizations, could provide a context for an evolution of the agricultural research system that would be capable of generating benefits for both the institutional structures of the research system and for the new private agriculturalist clientele.

Figure 9: Age and number of Kazakh agrarian scientists, 1994–1998



Source: KazGosINTI 1999; NACAR 2001a.

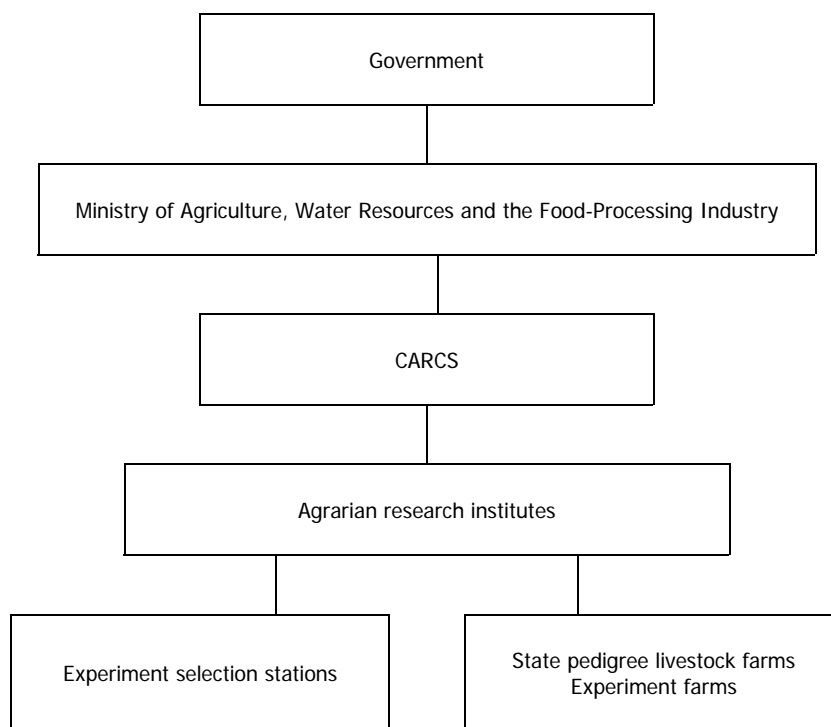
Agricultural Research Institutes in Kyrgyzstan: Restructuring for What?

Development of Kyrgyz agricultural research, 1996–2002

In the 1990s Kyrgyzstan experienced drastic social and economic reforms that significantly affected the development and conditions of agricultural research. In 1995 all agricultural institutes were transferred to the Ministry of Agriculture and Water Management. One year later, in 1996, all agricultural research institutes were again moved, this time into a new organization, the Kyrgyz Agrarian Academy. All agrarian educational and research organizations in the country came under the remit of this single organization, made up of the Kyrgyz Agricultural Institute (which is the equivalent of an agricultural university), five agricultural research institutes (of soil science and agrochemistry, farming, forage and pastures, animal husbandry and veterinary medicine), and the agricultural colleges, stations and experiment farms. In addition to the five agricultural research institutes, there is also a research institute of irrigation, administered by the Department of Water Resources of the Ministry of Agriculture, Water Resources and the Food-Processing Industry (Kyrgyz Agrarian Academy 2001). According to data for 2001, the research institutes of the Kyrgyz Agrarian Academy employed 422 research scientists. Of these, one is a senior academician, one a corresponding member, 19 are doctors and 66 are candidates of science.

In February 2002, after six years in operation, the Kyrgyz Agrarian Academy was reorganized again. The educational side of the academy was transferred to a new entity, the Kyrgyz Agrarian University, and to individual agricultural colleges. All of these educational entities were moved to the Ministry of Education, Science and Culture. A new division within the Ministry of Agriculture, Water Resources and the Food-Processing Industry was created, called the Centre of Agricultural Research and Consulting Services (CARCS), which incorporated all the research institutes, stations and farms. The institutes within the CARCS work exclusively on research (their scientists had previously also held teaching responsibilities, but this practice has been discontinued). The current scheme of management of agricultural research is shown in figure 10.

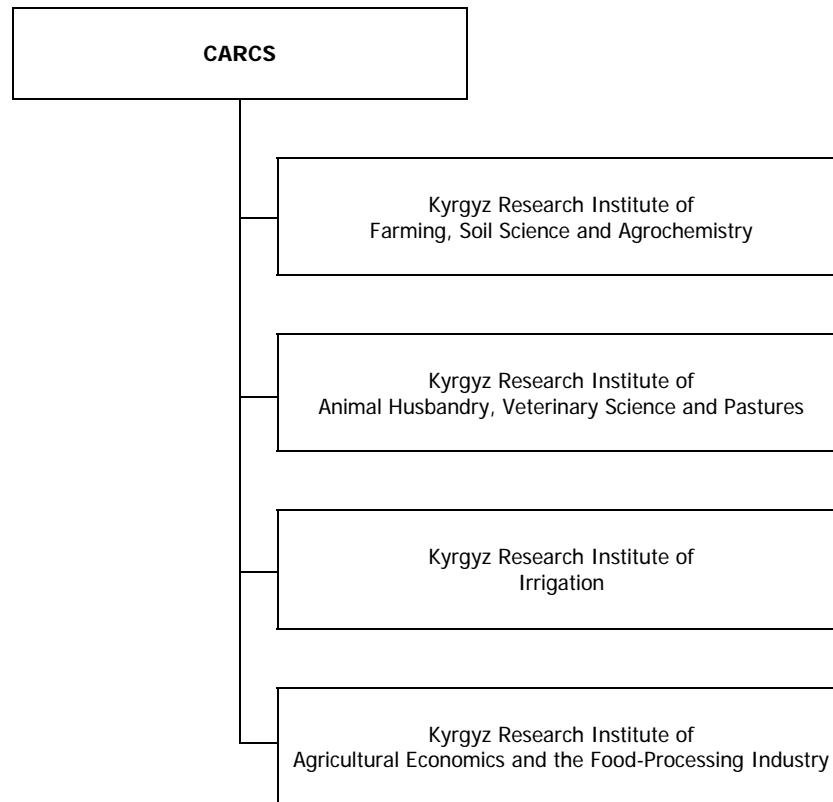
Figure 10: Structure of the agricultural research system in Kyrgyzstan



Source: Kyrgyz Agrarian Academy 2001.

The reorganization of the research institutes, unification of scientific organizations and consolidation of researchers' activities are ongoing tasks. There are, at the present time, four research institutes (figure 11).

Figure 11: Structure of agricultural research institutes in Kyrgyzstan



The five institutes that previously operated within the structure of the Kyrgyz Agrarian Academy have been combined into two institutes: Kyrgyz Research Institute of Farming, Soil Science and Agrochemistry, and the Kyrgyz Research Institute of Animal Husbandry, Veterinary Science and Pastures. Also within the structure of the CARCS is the Institute of Irrigation, which was transferred from the Department of Water Resources. This change however, remains purely formal because the institute is still financed, as it was previously, by Kyrgyzpatent, the State Agency of Science and Intellectual Property, with which the institute has an agreement for patenting scientific discoveries. The institute also receives revenue from a repair station and a shipping service, which it owns, and these commercial activities assist the institute's economic survival.

The Kyrgyz Research Institute of Agricultural Economics and the Food-Processing Industry is a new institute. It recreates the Soviet Institute of Economics of Agriculture, which was closed at the beginning of the 1990s. In order to finance the new institute, 2 million som² (\$40,000) have been secured annually by order of the government of the Kyrgyz Republic. But since the stipulated funds have not yet arrived, the agricultural economics institute continues to exist only on paper. The basic directions of research of this institute have not yet been clearly defined either.

The CARCS also operates five selection stations, one experiment farm and four seed-growing farms, as well as 13 state pedigree livestock farms, including six farms for sheep-breeding, four for cattle-breeding and three for horse-breeding.

As mentioned above, this latest reorganization is still incomplete. Duplicate job titles exist within merged institutes, while many administrative workers have been dismissed. The mergers are fraught with problems; for example, the components of the new institutes are at separate locations. The volume of financing of agricultural research as a whole has remained at its pre-reor-

² The som is the currency unit of Kyrgyzstan.

ganization level, and savings have been achieved only through staff reductions. While these changes have supposedly only touched the organizational and staffing dimensions of the system, and have not affected scientific activity, the research programme has in fact been interrupted by the upheaval.

This paper describes the activity of the institutes between 1996 and 2001, when they were still grouped within the Kyrgyz Agrarian Academy. (At the time of writing, the results of the changes that occurred during 2002 were not yet clearly discernible.) In contrast to research in Kazakhstan, the agricultural research programme in Kyrgyzstan does not have established fixed research plans approved by the government. Instead, the State Committee on Science and New Technologies provides a budget outlay for the system and, in coordination with the Kyrgyz Agrarian Academy, decides on the distribution of funds among research institutes. The concrete schedules of scientific activity at each institute were determined at an annual general scientific meeting of the academy, when the results of the previous year's research projects were also presented. The scheme of management of agricultural research under the new organizational structure has not yet been determined. Most likely, research programmes will be approved by vice-ministers in the Ministry of Agriculture, Water Resources and the Food-Processing Industry.

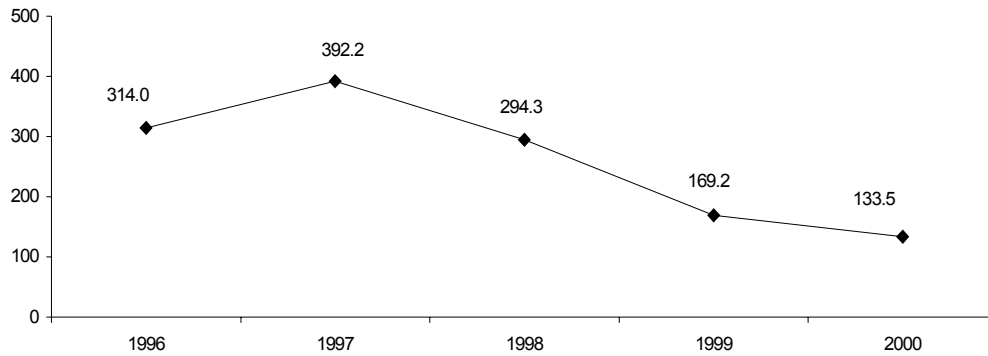
In general, expenditure on agricultural research will continue to decrease. The state has been slow to institute projects that utilize agricultural research outputs: the Agrarian Academy was frequently criticized for not linking the role of science in agriculture with the demands of society as a whole. Simply transferring the institutes to the administration of the Ministry of Agriculture, Water Resources and the Food-Processing Industry, without any plan for the effective reorganization of agricultural research or for changing relationships with the end users, raises doubts about the value of these changes in making the public good of agricultural research available to the new classes of small private farmers now dominating Kyrgyz agricultural production.

Agricultural research in Kyrgyzstan (like other scientific sectors in all countries of the CIS) suffers from inadequate financing (including salaries that staff cannot live on), lack of prospects for professional development, isolation from society, slow adaptation to market conditions and the perpetuation of scientific directions instituted during the Soviet era.

Financing of agricultural research in Kyrgyzstan, 1996–2000

The primary source of finance for agricultural research in Kyrgyzstan is the state. During 1996–2000, the state budget assigned \$1.3 million to research in agriculture. Research institutes and experiment and breeding farms also earn funds from their commercial activities, which help to solve internal financing problems. Because of devaluation, the nominal quantity of money available for agricultural research has remained fairly steady in the national currency, but has progressively declined in real terms (see figure 12).

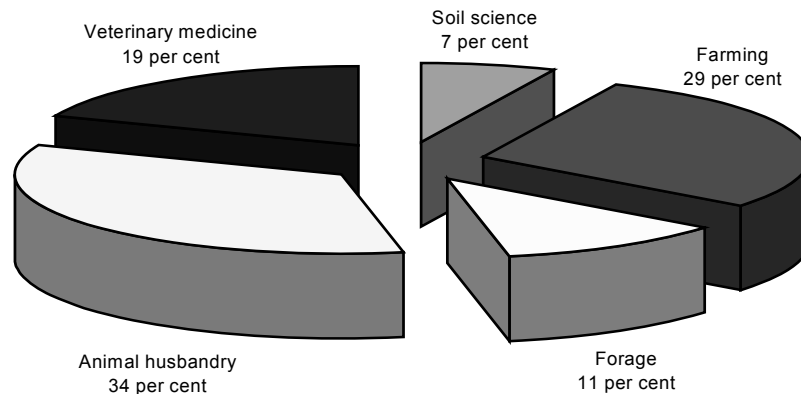
Figure 12: Financing scientific agrarian research, 1996–2000
(thousands of US dollars)



Source: Kyrgyz Agrarian Academy 2001.

Figure 13 describes the distribution of financing by activity and shows that the largest share goes to animal husbandry (34 per cent), followed by farming (29 per cent) and veterinary medicine (19 per cent). The smallest allocations are made to forage (11 per cent) and soil science (7 per cent). The major portion of the budget is spent on salaries.

Figure 13: Distribution of research financing by field, 1996–2000



Source: Kyrgyz Agrarian Academy 2001.

While exact information about the financing of the Institute of Irrigation is difficult to come by, it is estimated at around \$10,000 annually. As mentioned above, state plans have assigned 2 million som annually (\$40,000) to the new Research Institute of Agricultural Economics and the Food-Processing Industry. In short, financing of agricultural research is minimal, with an annual allocation of about \$150,000–\$200,000. Salaries of scientists are approximately \$50–\$100 per month, forcing many of them to engage in secondary employment. Agricultural scientists estimate that current financing is only 25–30 per cent of what is considered necessary for a well-functioning system.

As in Kazakhstan, Kyrgyzstan's agricultural research system continues to operate along the Soviet model, which emphasizes production increases, with little attention to the social feasibility and replicability of research outcomes.

During 1996–2000, soil science research at the research institutes of the Kyrgyz Agrarian Academy focused on helping prepare new land taxation coefficients; drawing up soil maps of Talas and Chui oblasts; forecasting erosion; and elaborating measures to prevent salinization, salinity, swamping, erosion and compression of soils. Information booklets were prepared to make this work available to farmers, demonstrating a possible point of linkage with civil society in the diffusion of results. But little else was done to translate this research into new farming practices.

The Institute of Farming emphasized the establishment of new varieties of wheat – some of which are in fact very promising low-input varieties – corn and cotton for different regions.

The Institute of Forage and Pastures shared few linkages with civil society formations, although its research programme, focusing on weed control and pasture improvement, represented a natural complement to the formation of local sheep producer groups.

The Institute of Animal Husbandry tended to focus on cattle and sheep breeding, but suffered from disarticulation between its programme and farmers' needs (for example, for a sturdy dual-purpose meat-wool breed). Existing fat-tail breeds, prized for their meat, and Merinos used primarily for wool, need to be complemented by a dual-purpose animal. Dairy cattle development is more relevant. However, without close ties to civil society, it is difficult for the research institutes to complete the cycle of communication with producers and understand the circumstances of the average farmer.

The same is true of water systems research, where there is a need to make the new on-farm Water Users' Associations viable by developing measuring and flow control technologies that they can use.

Foreign support for Kyrgyz agricultural research

The activity of Kyrgyz agricultural scientists in the sphere of international cooperation is relatively well developed, as it is in Kazakhstan. Kyrgyz scientists have worked with a number of foreign organizations and programmes led by CIMMYT, ICARDA and the World Bank research programme. Information about these joint programmes is given in table 2.

Table 2: International collaboration in agricultural research in Kyrgyzstan

Institute	Organization / programme	Project	Content
Kyrgyz Research Institute of Soil Science and Agrochemistry	ICARDA	Control of soil and water resources in arid areas of Central Asia	Research on condition of soils • participation in workshops and training
Kyrgyz Research Institute of Farming	ICARDA	Control of soil and water resources in production conditions for creation of stable agricultural systems	Diversification and intensification of crop rotations in ways to cultivate soils and use fertilizers in irrigated and non-irrigated conditions of Chui Oblast • training at ICARDA centres • English language courses • participation in expeditions to collect local and wild grain crops
	CIMMYT	Potato seed collection	Collection of seeds for selection work • training at CIMMYT centres
	World Bank	ASSP (with the RAS)	Supply of field equipment, computers, communication facilities and transport
	World Bank	Integrated forage production and animal husbandry in the steppes of Central Asia (with the KSBA)	Creation of a food base and selection of breeds of sheep in farms in Kochkor and Kemin <i>raions</i> (administrative subregions)
Kyrgyz Research Institute of Forage and Pastures	ICARDA	Genetic resources	Collection of wild forage plants
		ASSP	Seed for perennial fodder grass
		Sheep Breeding Development (with the KSBA)	Improvement of pastures and forages
		Integrated forage production and animal husbandry in the steppes of Central Asia	Practical seminars on sheep breeding and forage production in farms in Kochkor and Kemin <i>raions</i>
Kyrgyz Research Institute of Animal Husbandry	ICARDA	Integrated forage production and animal husbandry in the steppes of Central Asia	Research on improving systems of animal husbandry
Kyrgyz State Research Control Institute of Veterinary Medicine	ICARDA	Integrated forage production and animal husbandry in the steppes of Central Asia	Research on improving the system of veterinary medicine • adaptive research on animal health on farms • implementation of effective measures to treat illnesses of agricultural animals
Kyrgyz Research Institute of Irrigation	USAID	Grants for irrigation research	
	World Bank	Programme on the problems of the Aral Sea and ecology in Central Asia	
	United Nations Educational, Scientific and Cultural Organization (UNESCO)	Programme on hydrology	

Source: Author's compilation 2002.

Foreign assistance is provided in the form of financing joint research, information exchanges, trips abroad, consultation by foreign scientists, organization of study tours and courses to improve professional skills.

In addition to the collaborative projects described above, activities are being conducted with the following organizations:

- Global Consortium of Higher Education and Scientific Research in Agriculture;

- World-Wide Company of Soils, France; and
- New Jersey Agricultural Experiment Station, United States.

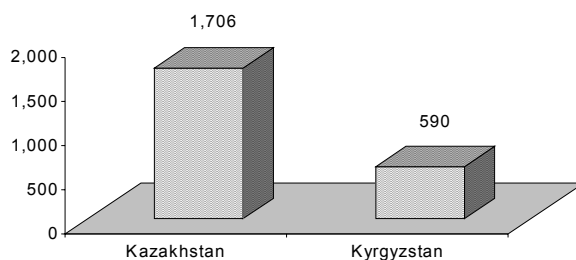
International assistance has led to increased information exchange, greater proficiency of agrarian scientists and additional financing for the development of science.

New civil society linkages with agricultural research: The RAS and KSBA

Based on this description of the current conditions of agricultural research in Kyrgyzstan, it is possible to make a few general comments about the system from the standpoint of the development of civil society.

As in Kazakhstan, the main financial source for, and user of, agricultural research in Kyrgyzstan is the state. However, in Kazakhstan, financing per scientist is about three times higher than in Kyrgyzstan, as figure 14 shows (although the level is quite low in both countries).

Figure 14: Financing per agricultural scientist in Kazakhstan and Kyrgyzstan, 1996–2000 (US dollars)



Source: Author's calculations 2002.

During 1994–1995 there were major debates concerning the necessity of creating the Kyrgyz Agrarian Academy. Even at its creation, there was a not-so-hidden conflict between the officials of the Ministry of Agriculture, Water Resources and the Food-Processing Industry and the President of the Kyrgyz Agrarian Academy. Consequently, the results of scientific research often did not reach the ministry, and there was wilful ignorance on the part of the ministry regarding the activities of the academy. This breakdown in communication led to a wide range of problems. Moreover, as the debates went on, the entire structure of Kyrgyz agriculture was being transformed into an atomized, small-farmer profile requiring a model of research and dissemination very different from the one on which the country's research system was based.

For its part, the Ministry of Agriculture, Water Resources and the Food-Processing Industry has often failed to make full use of the scientific and productive potential of agricultural research. The latent conflict between high-level officials has negatively affected the conditions of agricultural research in Kyrgyzstan and in fact, has helped to prevent wider linkages with civil society representatives through extension services, producer associations and NGOs. (However, following the 2002 restructuring, this situation may now be changing.) Nevertheless, two particularly interesting developments have emerged in the last five years which suggest that new linkages between society and the agricultural research community are being formed, despite the challenges: the creation of the Rural Advisory Service and the Kyrgyz Sheep Breeders Association.

Rural Advisory Service

Since 1999, with support from the Swiss Association for International Cooperation, Helvetas (through its Kyrgyz Swiss Agricultural Programme/KSAP), and loans from the World Bank, Kyrgyzstan has created a new, semi-autonomous Rural Advisory Service, operating in all seven *oblasts*, locally organized and controlled by farmers through an advisory board. The RAS is one of five components of the ASSP, which is funded by a loan obtained by the Kyrgyz government from the International Fund for Agricultural Development (IFAD). In Bishkek, a joint RAS-KSAP Coordination Unit is responsible for the coordination and monitoring of RAS activities. An Advisory Training Centre is active in improving the overall capacity of the extension staff within the RAS. The RAS slogan is “our advice is your success”.

There are 35 RAS *raion* offices operating in Kyrgyzstan. On average, the RAS covers 54 per cent of all villages in the country. Coverage rate in the Naryn *oblast* is 88 per cent of 134 villages; in Issyk Kul, 59 per cent of 200; in Jalal Abad, 79 per cent of 421; in Chui, 44 per cent of 349; in Batken and Osh, 22 per cent of 468; and in Talas, 86 per cent of 91 villages.

RAS activities are organized around five broad branches of agriculture: crop production, live-stock production, income generation and processing, marketing and farm economics. Each *oblast* identifies its activities on the basis of demand, and according to agricultural production peculiarities and climatic conditions. The RAS offers farmers activities such as training in topics of interest, assistance in problem solving, information and knowledge dissemination, adaptive research, animation, group formation, individual and group consultations and campaigns. RAS advisors, together with interested farmers or groups of farmers and involved experts, search for practical, effective solutions that overcome the key constraints in crop production, including soil fertility, animal breeding, marketing, processing and specific problems experienced by the rural poor. In 2001 the RAS organized 5,234 training courses for farmers (including 2,256 farmer’s groups), 456 of which dealt directly with income-generating projects. A total of 46,541 people were trained, and 66,786 rural residents received individual and group counselling. More than 300 information leaflets were prepared and 189 brochures were issued.

Examples of advisory topics in crop production include seed potatoes, wheat, cotton, tobacco, sugar beet, beans, oil crops, soil fertility improvement, crop rotation, weed control and pest management. In livestock production, topics include raising sheep for meat, private milk farms, the establishment of bio-incubators, poultry production, breeding goats for milk and cashmere, and a private veterinary service. Income-generating and processing activities have focused on profitable types of vegetables and their processing and selling, mountain ecotourism, women’s credit groups, felt carpet sales exhibitions, and milk processing. Marketing activities emphasize market information distribution; the marketing of milk products, seed potatoes, *kumis* (fermented horses’ milk), goat hair and sea buckthorn; and support for private marketing companies. Farm economy activities concentrate on business plans, economic analyses of farms, farm inventory, cash flow, gross margin calculation and so on.

From a civil society perspective, it is important to note that the RAS typically works with village producer groups, which may be established by several neighbours or producers cultivating the same crop. The setting-up of women’s groups has been especially popular in the south, where the groups combine savings operations with agricultural and other income-generating activities such as handicrafts or small businesses like hairdressing. In Osh *oblast* alone there are 24 such groups.

For some of the reasons noted above, the articulation of RAS activities with the formal agricultural research system is mostly patchwork. Most RAS advisors are graduates of the Agrarian Academy, and scientists from research institutes are increasingly involved in RAS on-farm trials. Institutionally, however, the linkages are not direct and there is no staff or budget overlap.

Questions about financial sustainability hover over the RAS. For the time being, donor financing has permitted the service to achieve broad coverage. However, this financing is temporary. Project designs call for self-financing—for farmers to pay for services—but indications in the

field are that while farmers recognize the economic benefits of the services and are willing to pay for them, the level of payment currently possible from farmers is unlikely to be sufficient to fund the service at the same level at which it is now financed.

Kyrgyz Sheep Breeders Association

The KSBA was originally created in accordance with the framework of the Sheep Development Project (a project of the Ministry of Agriculture, Water Resources and the Food-Processing Industry, financed by a loan from the World Bank) of 9 October 1998 and was registered with the Ministry of Justice as a legal entity on 26 March 1999. The KSBA was reorganized in accordance with the Law on Cooperation of 10 May 1999 as the Agricultural Cooperative of Sheep and Goat Producers on 8 April 2000. The KSBA unites 105 sheep cooperatives across the country, comprising 1,138 producer families.

The purpose of the KSBA is to create favourable conditions for the development of local sheep and goat breeders' cooperatives through the concentration of the labour and assets of its members, in order to provide farmers with improved access to markets, credit and technical resources. The KSBA's mission is, therefore, to coordinate and represent the interests of sheep and goat producers both at the national and international levels. It also cooperates with governmental and private organizations, including the Institute of Forage and Pastures, the Institute of Animal Husbandry, Kyrgyz Prozem (with regard to land management), the RAS, Mashav (with regard to small- and medium-sized enterprise development), the German Agency for Technical Cooperation (GTZ), Winrock International and others.

Managed by a General Council of Members, a Board of Directors and an Executive Organ, the creation and registration of local producers groups is the first step being taken by the KSBA. The KSBA's future intentions are to manage a bigger network of local cooperatives; to promote the development of small and medium-sized businesses; to respond to members' legal questions; to lobby for sheep producers in the regulatory transition to a market economy; to advocate for its members on the juridical aspects of land and agrarian reform; and to assist with procedures for credit provision.

The current focus of the KSBA is the marketing of sheep and wool products, as well as other agricultural products produced by member cooperatives. During the last two years, the KSBA has bought wool, meat, goat down and goat cheese from its member-farmers at market prices, and it is envisaged that the association will increase its purchases of wool, goat down and other products. The KSBA has excellent contacts with processing businesses in the country. It possesses a warehouse, wool storage facilities and equipment, five light trucks and two Kamaz trucks, and maintains regional service centres in each of the country's seven *oblasts*. International market analysis is not a current focus for the KSBA because it cannot consistently meet the standards for delivery. If it could (through improved quality and handling), research hypothesizes that the penetration of international markets by the KSBA could be deepened.

For the KSBA to be successful over the long term, its member-farmers need to continue to adapt their sheep and goat products for sustainable, profitable production. The KSBA is literally *the* link between producers and markets for a significant fraction of the country's sheep producers, and it is the clearest example of a producer organization acting as a linkage between society and the agricultural research institutes.

Comparative Assessment and Concluding Remarks

Returning to the beginning of this paper, civil society formations are increasingly seen to play a critical role in providing accountability, information and the transmission of social preferences to state and market institutions. The rapid and drastic restructuring of rural life in Central Asia and its reorientation from a supply-focused command system to a demand-oriented market

system places remarkable demands on farmers and rural households to adapt to the new conditions. Information about crops, livestock and farm technology, useful for new farmers, is a public good unlikely to be supplied by private actors at the outset of agricultural restructuring. The state will have to continue to provide this public good in the medium to long term, although it may be supplanted by private sector actors, such as input and equipment dealers, as the transition matures. Setting directions for agricultural research and adapting research efforts to immediate and emerging needs, however, is never an obvious or uncontested process. Agriculture is geographically dispersed, dependent on unpredictable climatic variables, economically volatile, and includes the interests of widely different producer constituencies. It requires continual two-way communication between the farming population and the scientific community to prioritize research programmes and adapt them to field conditions. Civil society has a potential role in this communication, linking the needs and desires of farm households and businesses with the laboratory and experimental programmes of scientists, and mediating between competing social demands on scientific resources (Lightfoot 2003).

This “tour” in search of linkages between civil society organizations (CSOs) and agricultural research in Kazakhstan and Kyrgyzstan has largely focused on the agricultural research systems themselves. The paper argues that in both countries these systems represent a unique public asset with a critical mandate. They embody the accumulated scientific expertise of the Soviet research and educational system, but also retain many of the structural characteristics of the Soviet system. It is argued that this mode of organization of agricultural research—state-directed, top-down, sector-specific and underfunded—is often inappropriately oriented to the demands of a rural sector in transition and puts the entire system at risk of becoming irrelevant. This would be a terrible—and potentially irrevocable—loss for the region.

Agricultural enterprises and households are now facing economic constraints that did not apply in the USSR. They are seeking mainly low-cost and low-input production technologies that generate increases in productivity or cost savings in traditional crops and livestock activities. The agricultural research system is only partially responding to these needs because a response to these new types of cost and technological constraints is not a component of the Soviet system, and because the command economy’s research agenda did not emphasize economic scarcity. Both countries recognize the changing context and have been almost continuously reorganizing and downsizing their research systems through the post-independence period. This reorganization appears to have gone further in Kyrgyzstan’s much smaller system. In Kazakhstan, funding cuts are apparently being used to shrink the system into a new profile. This analysis is too superficial, however, to understand all the implications of the reductions in funding.

Civil society formations, such as industry and producer associations, village groups and service cooperatives, constitute an important but underdeveloped institutional channel through which the link between agricultural research and the rural population could be forged. This review finds three paths for potential, expanded engagement of civil society with the agricultural research system that could strengthen both CSOs and the research institutes. It also describes two examples from Kyrgyzstan where this potential is being partially realized. The first path concerns thematic areas of research: coordinated social behaviour among producers will enable both farmers and researchers to realize short-term benefits. In the grain sector in Kazakhstan, for example, collaboration with producer associations and private businesses regarding the certification of grain under WTO standards is one area of potential collaboration. Producers need certified laboratories and testing facilities, and the laboratories and facilities require an informed and committed set of producers to utilize them. The same applies to the food industry, where standards and certification are also required. Areas such as integrated pest management and pasture management are other sectors where the social behaviour of producers should be an integral part of any research programme, and therefore offer points of linkage. Following this path, the agriculture research institutes would offer a linkage to CSOs as an integral part of their research package. The placement of the Kyrgyz agricultural research system within the Ministry of Agriculture, Water Resources and the Food-Processing Industry suggests that the Kyrgyz state authorities are seeking just such a greater integration of policy making, production

monitoring, and research and extension activities, which could be translated into steps along this path.

International collaboration offers a second path of articulation between rural society and the agricultural research systems. CIMMYT and ICARDA are leading the way in this regard by including producers' opinions in the formulation of research strategies and fostering research programmes that have closer working relationships with the farming community. Donor-funded projects go furthest in this direction, as the experiences of the RAS and KSBA demonstrate. Funding incentives and the preferences of international partners provide the impetus for linkage on this path. However, this incurs the risk that these programmes will not be sustained without international financial support.

The third path is one of increased advocacy from civil society actors for linkage with, and service delivery from, the state agricultural research system. However, this analysis has not approached the issue from the side of civil society and its ability to lobby and advocate for reforms to the agricultural research system. Most rural households in Kazakhstan and Kyrgyzstan are not affiliated with CSOs, such as farmer unions, cooperatives, producer associations or self-help groups. They tend first and foremost to identify with their immediate and extended family, and the agricultural enterprise that employs them. This state of affairs, however, is partially changing particularly in RAS and KSBA villages in Kyrgyzstan. Changes can also be observed in varying degrees in the microcredit sector and the work of other donor projects, such as those of the United Nations Development Programme (UNDP), the Department for International Development (DFID), GTZ and the Dutch seed-potato producer groups in Osh, and in the rapid formation of Water Users' Associations in Kyrgyzstan. CSOs themselves may be expected to advocate more strongly for improved service delivery from the agricultural research system in the future, as they grow and define their interests more explicitly and visibly. The development of agricultural technology may be a less "natural" focus for rural organization than that around community-wide issues such as water, energy, health and education, but in communities where most households are agricultural, it is a focus with a solid constituency.

These are general paths of institutional and social development that appear desirable and plausible given current conditions. Their description leaves many questions unanswered: what kind of rural-agricultural society should be envisaged in Central Asia? How can research contribute to new experimentation and to the debate on socioeconomic and environmental values? Who are the principal actors in agricultural research? What are the thematic areas in which new rural civil society actors are most active and concerned, and how do they influence state authorities in charge of agricultural research? Can less formal networks, such as extended families, play the same role as more "traditional" CSOs in rural development? What are the implications of these paths of linkage for funding (from government, international research and donors) and do they assume unrealistic commitments from rural households? What are the costs and benefits of establishing these linkages, and is it worth the effort, given the low profitability of agriculture? What are the politics of reorganization within the agricultural research systems with respect to power bases, generational change and budget authority?

These questions deserve more attention at local, national and international levels for as long as poverty, insecurity, weak governance and ecological deterioration continue to accompany the establishment of new social and institutional realities in the steppes, mountains and villages of Kazakhstan and Kyrgyzstan.

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