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REPORT AND RECOMMENDATION OF THE PRESIDENT

TO THE EXECUTIVE BOARD ON PROPOSED

TECHNICAL ASSISTANCE GRANTS

FOR

AGRICULTURAL RESEARCH AND TRAINING

BY

CGIAR-SUPPORTED INTERNATIONAL CENTRES

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ABBREVIATIONS AND ACRONYMS

BRRI	Bangladesh Rice Research Institute
CC	Consortium Coordinator
CPL	Country Project Leader
FPC	Flood-Prone Consortium
FPCSC	Flood-Prone Consortium Steering Committee
HCARP	Highland and Central Asia Regional Programme
ICARDA	International Centre for Agricultural Research in the Dry Areas
IFPRI	International Food Policy Research Institute
ILRI	International Livestock Research Institute
IRRI	International Rice Research Institute
NARS	National Agricultural Research System
SCIP	Smallholder Crop Improvement Project
TAG	Technical Assistance Grant

REPORT AND RECOMMENDATION OF THE PRESIDENT TO THE EXECUTIVE BOARD ON PROPOSED TECHNICAL ASSISTANCE GRANTS FOR AGRICULTURAL RESEARCH AND TRAINING BY CGIAR-SUPPORTED INTERNATIONAL CENTRES

I submit the following Report and Recommendation on two proposed technical assistance grants (TAGs) for agricultural research and training to CGIAR-supported international centres in the amount of USD 2.5 million.

PART I - INTRODUCTION

1. The present report recommends the provision of IFAD support to the research and training programmes of CGIAR-supported international centres: the International Rice Research Institute (IRRI), and the International Centre for Agricultural Research in the Dry Areas (ICARDA).

2. A description of the TAGs for approval by the Executive Board is contained in the annexes to the report:

I. The International Rice Research Institute (IRRI): Validation and Delivery of New Technologies for Increasing the Productivity of Flood-Prone Rice Lands in South and Southeast Asia

II. The International Centre for Agricultural Research in the Dry Areas (ICARDA): Integrated Feed and Livestock Production in the Steppes of Central Asia

3. The objectives and content of these applied research programmes are in line with the evolving strategic objectives of IFAD and the policy and criteria of its TAG programme for agricultural research and training.

4. The strategic objectives of IFAD's support to technology development relate to: (a) IFAD's target groups and their household food security strategies, specifically in remote and marginalized agro-ecological areas; (b) technologies that build on traditional knowledge systems, are gender-responsive, and enhance and diversify the productive potential of resource-poor farming systems by improving productivity and addressing production bottlenecks; (c) access to productive assets (land and water, financial services, labour and technology, including indigenous technology) and the sustainable and productive management of such resources; (d) a policy framework that provides the rural poor with an incentive to reach higher levels of productivity, thereby reducing their dependence on transfers; and (e) an institutional framework within which formal and informal, public and private-sector, local and national institutions provide services to the economically vulnerable, according to their comparative advantage. Within this framework, IFAD also intends to develop commodity-based approaches to rural poverty alleviation, specifically targeting items produced and consumed by the rural poor. Finally, the establishment of a consolidated network for knowledge-gathering and dissemination will enhance the Fund's capacity to establish long-term strategic linkages with its development partners and multiply the effect of its agricultural research and training programme.

5. The TAGs proposed in this document respond to the foregoing strategic objectives. The IRRI programme specifically seeks to respond to strategic objectives (a) and (b) to the extent that it addresses production constraints of resource-poor farmers in the most marginal rice agro-ecosystems, through the testing and adaptation of economically viable, socially acceptable, and environmentally sustainable technologies that provide stress tolerance in flood-prone rice; it also seeks to enhance the potential of traditional resource-poor cropping systems, such as deep-water rice cultivation. On the other hand, the ICARDA programme seeks to focus on strategic objectives (a), (c) and (e) through supporting the development of integrated range-livestock-crop management and development technologies for smallholders in the transition countries of Central Asia, coupled with the capacity-building of institutions serving this sector.

PART II - RECOMMENDATION

6. I recommend that the Executive Board approve the proposed technical assistance grants in terms of the following resolutions:

RESOLVED: that the Fund, in order to finance, in part, the Validation and Delivery of New Technologies for Increasing the Productivity of Flood-Prone Rice Lands in South and Southeast Asia, shall make a grant not exceeding one million United States dollars (USD 1 000 000) to the International Rice Research Institute (IRRI) upon such terms and conditions as shall be substantially in accordance with the terms and conditions presented to the Executive Board in this Report and Recommendation of the President.

FURTHER RESOLVED: that the Fund, in order to finance, in part, the Integrated Feed and Livestock Production in the Steppes of Central Asia, shall make a grant not exceeding one million five hundred thousand United States dollars (USD l 500 000) to the International Centre for Agricultural Research in the Dry Areas (ICARDA) upon such terms and conditions as shall be substantially in accordance with the terms and conditions presented to the Executive Board in this Report and Recommendation of the President

Fawzi H. Al-Sultan
President

THE INTERNATIONAL RICE RESEARCH INSTITUTE (IRRI): VALIDATION AND DELIVERY OF NEW TECHNOLOGIES FOR INCREASING THE PRODUCTIVITY OF FLOOD-PRONE RICE LANDS IN SOUTH AND SOUTHEAST ASIA

I. BACKGROUND

1. In South and Southeast Asia, over 25% (10 million ha) of the total rice growing area is adversely affected by seasonal floods. The population density in this ecosystem is extremely high, reaching up to about 1000 per km^2 in some parts of Asia and growing at 2% per year. More than 70 million people, characterized by extreme poverty, live in these flood-prone areas. Globally, the ecosystem accounts for about 9% of the total rice lands, but in Bangladesh, Cambodia, Eastern India, Guinea, Nigeria and Sierra Leone, where food insecurity and poverty are widespread, the ecosystem accounts for one quarter to one half of the rice land. In additional to flooding, ecosystem constraints to increased rice production in these areas include salinity, high acidity, Al and Fe toxicity and cold temperatures. Farming systems are characterized by indigenous rice varieties that can adapt to prevailing environmental conditions such as temporary submergence of from one to ten days, long periods (one to five months) of standing water, ranging in depths from 50 to 400 cm or more, and daily tidal fluctuations that sometimes cause complete submergence.

2. In the past, these traditional rice varieties have provided local farmers with a sustainable production system and an assured yield in a very marginal, rice growing environment. However, with increasing population pressure, food supply from these low-yielding traditional varieties (0.5-2.5 t/ha) has not kept pace with demand. It has been estimated that productivity of flood-prone areas must be doubled to meet future rice requirements. To date, the ecosystem has benefited little from 'green revolution' technology because of limited success in the past in developing appropriate high-yielding varieties that can tolerate submergence, salinity and other soil-related problems. Poverty in these areas is increasing, due to the current lack of options for overcoming production problems in socially acceptable, economically feasible and ecologically sound ways.

3. During the past decade, investment in flood-prone rice research at IRRI and at some National Agricultural Research Systems (NARS) has increased considerably. As a result, improved cultivars and resource management practices are now emerging which are capable of increasing flood-prone rice yields. High-yield varieties have been developed which incorporate the traditional submergence tolerances and are now ready for farmer participatory on-farm testing and adaptation. Other improved varieties now ready for on-farm testing include short-season cultivars which are either cold-tolerant, to enable more intensive cropping, or saline-tolerant for cultivation in tidal wetlands. Based on the successful transfer of available and emerging technologies, it is expected that the yield potential of flood-prone rice could be raised by 1-2 t/ha. An increase of 1.0 t/ha in the target areas would provide food security for an additional 30-50 million people.

II. RATIONALE AND RELEVANCE TO IFAD

4. The need for research on flood-prone rice was raised by IFAD in 1994 (country portfolio evaluation, Bangladesh). Since then, such marginal rice-growing environments in Asia have been increasingly associated with poverty and food insecurity. IFAD projects in the pipeline which are to be implemented in areas characterized by flood-prone rice production systems include the Smallholder Crop Improvement Project (SCIP) in Bangladesh; and the Rural Sector Support Programme in Sierra Leone. Of these, 60-70% of the SCIP area is prone to seasonal flooding.

Recently-approved IFAD projects located in areas characterized by large extents of flood-prone ecosystems include the Small-scale Water Resources Development Sector Project (391-BD); and the Agricultural Diversification and Intensification Project (ADIP) (443-BD), both in Bangladesh. IFAD target groups in these areas are in urgent need of economically viable and socially acceptable technologies to increase returns from rice production. In order to optimize linkages with IFAD's loan portfolio, the Fund's project operations staff in Bangladesh participated in the programme's stakeholder design workshop held in Dhaka in July 1998. As a result, the programme will be located within IFAD project areas, and will link up with staff and institutions involved in these projects. It is anticipated that this process will bring enormous benefits to IFAD target groups

III. THE PROPOSED PROGRAMME

5. The programme's goal is to enable flood-prone rice farmers in South and Southeast Asia to produce enough rice to meet current and future demands. The central objective is to facilitate transfer, participatory testing, adaptation and subsequent dissemination of improved technologies for sustainable increases in rice yields and riceland productivity in flood-prone areas, and thereby to improve the quality of life of the resource-poor farm families in these marginal agro-ecosystems. The programme will have three major themes: (i) exchange and farmer participatory testing of improved cultivars; (ii) exchange and farmer participatory testing of improved resource management technologies; and (iii) evaluation of the economic viability, environmental sustainability and social acceptability of improved technologies and practices. Research activities are divided into four components, in order to reflect the diverse nature of flood-prone areas. Each component focuses on a major sub-ecosystem within the flood-prone environment. The proposed research components and associated activities are detailed below:

Boro Rice Sub-Ecosystem

6. *Boro* is a dry-season rice crop grown in the flood-prone ecosystem after the recession of the flood water. This rice crop is grown with residual moisture and/or irrigation with shallow tubewells/low-lift pumps. The production potential of *boro* is so high that in deeply-flooded areas of Bangladesh and West Bengal, India, farmers have abandoned the deeply-flooded, deep-water and floating rice to accommodate a *boro*-fallow cropping system. *Boro* now covers nearly 30% of rice lands in Bangladesh, and about 20% in West Bengal. The main problem of *boro* rice is that it suffers from low-temperature conditions during the early stages of plant growth and from exposure to early flash floods during the ripening stage. Incorporation of cold tolerance would significantly increase its yield potential and offer opportunities for area expansion while reducing the growth duration, and permit early establishment of the crop. Consequently, crop losses from flash floods during the mature stage would be avoided. It may also be possible to raise a monsoon season, deep-water rice crop after harvesting the *boro* rice. Lands that are kept fallow in the wet season could thus be brought back into cultivation. This component will focus on evaluating the economic viability and social acceptability of cold-tolerant and short-duration improved germ plasm and improved crop management practices for *boro* rice cultivation. Activities will include farmer participatory testing of varieties and advanced lines of tropical irrigated rice that are cold-tolerant and have early maturity; evaluation of seedbed management technologies to reduce low-temperature damage to *boro* seedlings; evaluation of nutrient management techniques to reduce fertilizer costs in *boro* cultivation using chlorophyll metre and leaf colour chart-based N-application; and the evaluation of alternative techniques for improving water productivity.

Deep-Water Rice Sub-Ecosystem

7. About 6 million ha of rice lands in South and Southeast Asia are subject to deep flooding during the peak of the wet season. In this sub-ecosystem, farmers still grow traditional, long-duration, photoperiod-sensitive varieties with an average yield of 1.5 t/ha. The potential for increased yields is very high, particularly on land which is flooded up to a depth of 100 cm. Breeders in several NARS (particularly in Thailand) have recently developed germ plasm that has a higher yield potential, improved grain quality, resistance to the stemborer and *ufra* nematode, and is appropriate for the deep-water ecosystem. Ultra-short-duration rice varieties have been developed also, suitable for second sowing if the main deep-water rice crop fails due to abnormal floods at its vegetative stage. The major objective of this component will be to test several of these new and emerging technologies with farmers so as to evaluate their economic viability and social acceptability. Activities will include farmer participatory testing of new deep-water rice plant types of good quality grain, developed in Thailand, that mature early, are resistance to major insect pests and disease and are capable of improving yield potential by 40-50%. New varieties will be tested and adapted by farmers in conjunction with the following resource management techniques: behind-the-plough placement of seed and fertilizer; gap filling; and broadcast seeding of deep-water rice in the standing *boro* crop.

Tidal Non-Saline Sub-Ecosystem

8. About 2 million ha of tidal areas in South and Southeast Asia are unaffected by salinity. The potential for expanding rice cultivation in these areas is very high. Indonesia has begun to develop 1 million ha of non-saline tidal lands for food production, mainly rice. At present, the use of modern varieties in these lands is very limited and covers only 4-20% of the area. In some areas, non-rice crops are grown after the monsoon season rice crop, but with very low inputs. Rice scientists have incorporated the following characteristics into improved germ plasm: submergence tolerance; fast seedling growth and height (> 30 cm); tall plant stature (about 120 cm) with strong stems; strong photoperiod-sensitivity; and resistance to major pests and disease. Germ plasm with tolerance for soil acidity has been developed also. Improved resource management systems with optimal combinations of tillage, crop establishment, soil fertility, water regime, and weed control are also available for testing in non-saline tidal areas. These emerging technologies, suitable for non-saline tidal rice, could raise the yield from the present level of 2.5 t/ha to approximately 4.0 t/ha. The objective of this component is to evaluate the performance and acceptability to farmers of improved germ plasm and associated improved resource management systems for tidal non-saline areas. Activities will include farmer participatory testing of: photoperiod-sensitive, high-yielding varieties; submergence-tolerant improved breeding lines; and, acidity-tolerant improved lines. Improved varieties will be tested and adapted by farmers in conjunction with the following resource management techniques: supplementary irrigation through small farm reservoirs; use of leaf colour charts; deep placement of urea briquettes; and nursery fertilization for transplanted rice

Tidal Saline Sub-Ecosystem

9. This sub-ecosystem accounts for 2 million ha of rice land. Rainfall is highly variable in these areas and soils have nutrient deficiencies and some mineral toxicity. Levels of soil salinity vary significantly between the wet and dry seasons, with peak electrical conductivity reaching above 8 dS/m in vast areas where rice yields are significantly affected. Moderate-to-highly-saline soils (with EC > 8 dS/m) are found on about 500 000 ha. About 1 500 000 ha have soils that are slightly saline (EC: 2-4 dS/.m). Local rice varieties are the only crops grown in most of the severely salt-affected areas. In order to increase the productivity of tidal rice areas, high-yielding varieties with salt tolerance are needed, together with high-value, more salt-tolerant crops for the dry season. The physiological mechanism of salt tolerance in rice is now fairly well understood, and good donors have been identified. As a consequence, improved salt-tolerant rice varieties are now emerging from breeding programmes, particularly from those in India. The objective of this component is to study

the resource constraints to adopting improved technologies and practices, evaluate the emerging salt-tolerant improved rice germ plasm, and test the incorporation of salt-tolerant non-rice crops in rice-based farming systems. Activities will include: farmer participatory evaluation of submergence- and salt-tolerant rice varieties in coastal areas; exploring the feasibility of a rice-rice cropping pattern on the saline coast with short-duration and salinity-resistant rice cultivars for both the wet and dry seasons; exploring the feasibility of rice-pulse-oilseed cropping patterns for the saline coast; and evaluation of the social acceptability of a salt-tolerant *sesbania* variety as a pre-rice green manure crop that could reduce salinity over a period of time.

IV. EXPECTED OUTPUTS

10. The major outputs of the programme will be validated improved rice varieties and management practices for extension to rice farmers in marginal flood-prone areas. Programme outputs will include, in particular**:** cold-tolerant and short-duration *boro* rice varieties and associated management practices for extension in Bangladesh and India; improved deep-water rice varieties with early maturity and resistance to major insect pests and disease, and associated management practices for extension in the deep-water sub-ecosystem, on a regional basis; high-yielding submergence-tolerant rice varieties and associated management practices validated for extension in the coastal non-saline sub-ecosystem; and, salinity-tolerant short-maturity rice varieties and associated soil and water management practices validated for extension to farmers in the coastal saline sub-ecosystem. Detailed reports on the economic viability, environmental sensitivity and social acceptability of improved technologies and their extrapolation domains and *ex ante* impact on income distribution and poverty will be made available to extension systems and policy-makers, on a regional basis. The direct beneficiaries of the programme outputs will be the millions of small farmers from areas situated in unfavourable production environments in Bangladesh, India, Sri Lanka and Viet Nam, who struggle all year-round in an effort to produce enough food for their families. Given the long-term nature of research, provision has been made for an independent evaluation of the programme to ascertain the need for a follow-up phase.

V. IMPLEMENTATION ARRANGEMENTS

11. The institution responsible for overall programme coordination will be IRRI. Management of the programme will be through a flood-prone consortium (FPC) in accordance with the structure of the research consortia that IRRI and NARS are using to good effect for other rice ecosystems (e.g., Irrigated Rice Research Consortium, Rainfed Lowland Rice Consortium and the Upland Rice Consortium). Members of the FPC will include the NARS in participating countries, namely, Bangladesh, India, Sri Lanka and Viet Nam. Thailand will participate through the sharing of technologies and experiences related to flood-prone rice development. The FPC will be guided by a flood-prone consortium steering committee (FPCSC), the members of which will include: the director general of the Bangladesh Rice Research Institute (BRRI) (Chairperson); the coordinator, East India Flood-Prone Rice Network; the director, Rice Research Institute, Thailand; the director, Rice Research and Development Institute (RRDI), Sri Lanka; and the Flood-Prone Programme leader, IRRI. The FPCSC will regularly monitor and review the progress of the programme through planning meetings and workshops. The leader of the IRRI flood-prone research programme will act as the consortium coordinator (CC). In Bangladesh, where the majority of programme activities will be focused, a country project committee will be set up to provide direction and guidance for effective implementation. A country project leader (CPL) will coordinate and supervise the work in all components and on all sites and will report directly to the CC. The CPL will be assisted by Research Area Leaders (RALs), each of whom will supervise a particular programme component. In other countries, RALs will be chosen to coordinate and supervise project activities and will report directly to the CC. Through the FPC, the programme will link with IFAD projects in Bangladesh, especially the ongoing Agricultural Diversification and Intensification Project and the proposed SCIP. Adaptive

research will be undertaken in IFAD project areas, optimizing existing project infrastructure, with the full understanding of involved project staff.

VI. PROGRAMME COSTS AND FINANCING

12. The total cost of the programme over the three-year implementation period is estimated at USD 1 806 000 (table below). This includes financial support of USD 1 000 000 requested from IFAD and cofinancing of USD 806 000 from IRRI, BRRI and other participating NARS. Most of the local contributions will be made in-kind in the form of covering salaries and expenses of collaborating scientists. Costs will be defined in greater detail at a participatory workshop during which a refined work programme will be prepared for each participating country and agreed upon by the respective parties.

PROGRAMME COSTS AND FINANCING
(USD)

Expenditure Item	IFAD	BRRI	Other NARS	IRRI	TOTAL
1. Personnel	338 800	100 000	86 000	250 000	774 800
2. Research expenses	373 700	30 000	110 000	38 000	551 700
3. Equipment/facilities	92 000	52 000	30 000	110 000	284 000
4. Workshops/meetings	95 500				95 500
5. Logistic/management backstopping	100 000				100 000
TOTAL	**1 000 000**	**182 000**	**226 000**	**398 000**	**1 806 000**

ANNEX II

THE INTERNATIONAL CENTRE FOR AGRICULTURAL RESEARCH IN THE DRY AREAS (ICARDA): INTEGRATED FEED AND LIVESTOCK PRODUCTION IN THE STEPPES OF CENTRAL ASIA

I. BACKGROUND

1. Following independence from the former Soviet Union, the Central Asian republics of Kazakstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan are struggling to develop their national economies. The Central Asian republics are primarily agricultural-based economies, and it is agriculture that must provide the basis for economic growth. These countries combined represent a total land area of 400 million ha, but the percentage area of arable land is small and vast areas are under semi-arid steppe rangelands or mountain pastures, supporting an extensive livestock industry. These common lands were previously controlled by state-run agricultural enterprises, and their redistribution is leading to problems of open access and overgrazing/degradation in some areas. Furthermore, the cutting down of trees and removal of woody species for fuel is exacerbating the problem. The traditional arrangements that controlled access and grazing prior to collectivization have long since disappeared. Opportunities exist for improving rangeland productivity, but these depend on the implementation of suitable access and appropriate grazing systems.

II. RATIONALE AND RELEVANCE TO IFAD

2. Following independence, livestock numbers have fallen drastically in all countries of Central Asia. Reduced shipments of imported feed concentrates to supplement limited winter grazing led to a general reduction in herd size. Prices for livestock products (milk, meat and wool) have plummeted; markets have shrunk together with a reduction in consumers' incomes and a decline in processing facilities; and feed costs have risen. With the redistribution of state-owned farms, there has been an increasing transfer of livestock to the private sector. Livestock is of growing importance within the agricultural sector since the transition. In the past, feed was produced by specialized state farms under large-scale production, and little attention was paid to the nutritional composition of the feed. A decline in the supply of feed concentrates and crop residues is putting greater pressure on communal grazing lands, thus threatening further degradation of plant resources.

3. Given the growing demand for livestock products and the pressure on feed resources, there is a need for an adaptive research initiative with a strong application orientation, which can assist livestock production systems in improving their productivity through the efficient integration of feed and livestock production into smallholder cropping systems. The experience and knowledge gained from such a research initiative will be of direct benefit to IFAD's growing investment portfolio in Central Asia. ICARDA is in a strong position to build both on its extensive experience in this area and on the technologies it has helped develop within the regional programme for the Development of Sustainable Crop/Livestock Production Technologies in the Low Rainfall Areas, cofinanced by IFAD. The proposed programme will be focused on the whole-farm and community level, with the full participation of livestock producers, land users and national programme scientists. It will assess the adoption of potential technologies currently being tested and their impact on farm income and family welfare. In addition, it will consider the implications that policy and property rights issues (including those building on traditional community-based arrangements) have on the adoption potential of these technologies.

III. THE PROPOSED PROGRAMME

4. The programme has been conceived as a regional collaborative effort in adaptive research that will incrementally develop, adapt and accelerate the dissemination of improved arable and range-based feed and livestock production technologies. It will also have an important institutional strengthening role. This will be achieved through the following two components: (i) adaptive research on the development of sustainable rangelands management technologies; and (ii) training, capacity building and information exchange.

Adaptive Research on the Development of Integrated Range-Livestock-Crop Management and Development Technologies:

5. Under this component, the programme will promote the development of sustainable and effective livestock production systems through the integration of livestock production with feed resources produced both on farms and from rangelands. The programme will build on other applied research projects operating in the region, located in the transitional areas of Kazakstan, Turkmenistan and Uzbekistan, where the rangelands merge into the arable regions.

6. The programme will also build on the existing knowledge base accumulated over the years during the command economy, as well as on the complementary ongoing projects in the region, such as the United States Agency for International Development (USAID)-supported Global Livestock Collaboration Research Support Programme, ICARDA's joint project with the United States Department of Agriculture (USDA), and a United Kingdom Department for International Development-supported Overseas Development Institute project. It will use proven methodologies built on the experience of these projects in the analysis and quantification of natural resources, description of existing farming and rangeland systems, constraint diagnosis and methods of alleviation, and analysis of the institutional reform, policy and marketing environment. It will focus on adaptive research and on improving the transfer prospects of available technologies and methodologies already developed in similar agro-ecological environments, with a view to having a rapid impact on the livelihoods of the local communities.

7. A participatory research approach will be applied to integrate the various technologies being tested and to assess the economic, social, institutional and environmental sustainability of different development paths. To this end, efforts will be made to strengthen and enable communities and local organizations to validate the improved technologies and management options. Technology options will thus be evaluated by the potential beneficiaries themselves in terms of their income-earning and income-stabilizing potential at the whole-farm level and their potential for adoption. Alternative income-generating opportunities will be explored also, including the possibility of on-farm value-adding activities, particularly in relation to livestock products.

8. The research activities and outputs will include, in particular: development of management options for rangeland/livestock/cropping systems in the study areas; identification and successful testing of alternative native annual and perennial fodder species adapted to the local conditions, grown in rotation with wheat or barley crops; determination of appropriate stocking rates and seasons for using alternative fodder crops defined, and the off-take of animal products; and development of low-cost techniques for the rehabilitation of rangelands and of marginal arable lands - including the re-establishment of woody species suitable for fuel wood - as well as appropriate grazing management systems.

Training, Capacity-Building and Information Exchange

9. Under this component, ICARDA will generate information on the use of forage crops in combination with other feed resources for small ruminants in the different physiological and management conditions available; and (eight) NARS scientists will be trained in the use of appropriate socio-economic analysis and modelling tools, methods of feed production and use, range rehabilitation, and range and small ruminant management.

IV. IMPLEMENTATION ARRANGEMENTS

10. The following three levels of institutions will be involved through a collaborative research network arrangement:

- NARS: **in Kyrgyztan**: the Kygyz Agricultural Agrarian Academy; **in Kazakstan**: the Karakul Sheep Research Institute, Chimkent; the Livestock Research Centre, Almaty; and the Kazak Research Institute of Forage and Rangelands, Almaty; **in Turkmenistan:** the Institute of Animal Industry, Veterinary and Pasture, **in Ashgabat**; the Statistics and Policy Unit, Ashgabat; and the Desert Institute, Ashgabat; **in Uzbekistan**: the Karakul Sheep Research Institute, Samarkand, and the Institute of Market Reform, Tashkent.

- International centres: ICARDA and the International Food Policy Research Institute (IFPRI), with specific research support from the International Livestock Research Institute (ILRI), and the USAID-funded Global Livestock Collaborative Research Support Programme (GL-CRSP). IFPRI will participate through two jointly-appointed ICARDA/IFPRI senior staff members located at ICARDA headquarters and through research support from IFPRI headquarters, provided on a sub-contractual basis. ILRI can provide technical assistance in livestock management and health, again on a sub-contractual basis.

- ICARDA will be responsible for managing and coordinating the programme, including financial management and donor reporting, through the Centre's Highland and Central Asia Regional Programme (HCARP) office in Ankara and its Central Asia subregional office in Tashkent. Oversight of the programme will be through a steering committee which will comprise the national coordinators representing each of the countries involved in the project, ICARDA's regional coordinator, HCARP, their Director of International Cooperation, and representatives of IFAD and any other donor supporting the project. Annual technical and planning meetings will be held to review the progress made during the year and to propose a work plan for the following year. The proposed work plan and budget would be approved at the annual meeting of the steering committee, following any necessary amendments.

V. INDICATIVE PROGRAMME COSTS AND FINANCING

11. The estimated total cost of the programme for the first three-year phase will be USD 3 250 120, apportioned in accordance with the following financing plan. The proposed IFAD grant of USD 1.5 million is for partial support to the costs of technology transfer and institutional strengthening activities, above and beyond that provided through the complementary programmes listed above, and the in-kind contributions from the national programmes and participating institutes, ICARDA, IFPRI, ILRI, GL-CRSP and USDA. ICARDA will also mobilize other financial resources to cover the cost of the capital equipment essential for the national programmes' operations (computers, sowing/harvesting machinery, livestock equipment, etc.), and will enter into an appropriate form of legal agreement with all entities with which it intends to work under the programme, as listed above.

ANNEX II

PROGRAMME COST AND FINANCING : CASH AND IN-KIND[1]

(USD)

Expenditure Item	IFAD (cash)	ICARDA (in-kind)	NARS (in-kind)	USAID-GL-CRSP (in-kind)	USDA (in-kind)	TOTAL
1. Personnel	503 000	221 600	85 000	250 000	185 000	1 244 600
2. Travel	190 500	81 000	0	180 000	0	451 500
3. Operational	257 500	0	0	50 000	0	307 500
4. Publications/communications	35 000	33 000	0	80 000	0	148 000
5. Capital equipment	141 000	90 000	0	110 000	0	341 000
6. Training costs	322 000	50 700	0	130 000	0	502 700
7. Contingencies	51 000	23 820	0	180 000	0	254 820
TOTAL	**1 500 000**	**500 120**	**85 000**	**980 000**	**185 000**	**3 250 120**

[1] Including direct in-kind contribution from ICARDA and the NARS, and complementary programmes with which ICARDA is actively associated.