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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

AWP/B	Annual Workplan and Budget
CGIAR	Consultative Group on International Agricultural Research
CIMMYT	International Centre for Maize and Wheat Improvement
ICARDA	International Centre for Agricultural Research in the Dry Areas
ICIPE	International Centre of Insect Physiology and Ecology
ILRI	International Livestock Research Institute
KARI	Kenya Agricultural Research Institute
KETRI	Kenyan Trypanosomiasis Research Institute
NARS	National Agricultural Research Systems
NGO	Non-Governmental Organization
PMU	Project Management Unit
TA	Technical Assistance
TAN	Technical Advisory Note
WANA	West Asia and North Africa

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I submit the following Report and Recommendation on two proposed technical assistance (TA) grants for agricultural research and training to CGIAR-supported international centres in the amount of USD 2 358 000.

**PART I - INTRODUCTION**

1. This report recommends the provision of IFAD support to the research and training programmes of CGIAR-supported international centres: the International Centre for Agricultural Research in the Dry Areas (ICARDA) and the International Livestock Research Institute (ILRI)/International Centre of Insect Physiology and Ecology (ICIPE).
2. The documents of the TA grants for approval by the Executive Board are contained in the annexes to this report:
  - I. International Centre for Agricultural Research in the Dry Areas (ICARDA): Programme to Foster Wider Adoption of Low-Cost Durum Technologies
  - II. International Livestock Research Institute (ILRI)/International Centre of Insect Physiology and Ecology (ICIPE): Programme for Enhancing the Diffusion of New Tsetse Control Technologies for Improved Livestock Health and Productivity in Smallholder Indigenous Communities of Sub-Saharan Africa
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 TA grant programme for agricultural research and training.
4. The strategic objectives of IFAD's support for technology development relate to: (i) IFAD's target groups and their household food-security strategies, specifically in remote and marginalized agro-ecological areas; (ii) 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; (iii) access to productive assets (land and water; financial services; labour and technology, including indigenous technology) and sustainable and productive management of such resources; (iv) a policy framework that provides the rural poor with an incentive to reach higher levels of productivity, thereby reducing their dependence on transfers; and (v) 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 those items that are 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 to multiply the effect of its agricultural research and training programme.

5. The TA grants proposed in this document respond to the foregoing strategic objectives. The Programme to Foster Wider Adoption of Low-Cost Durum Technologies will specifically respond to objectives (i), (ii) and (iv) inasmuch as it will help to improve the adoption of elite varieties of rainfed durum wheat tailored to smallholder production and consumption goals, as well as to foster the production and diffusion of good-quality seed and to provide opportunities of broadening the income base of rainfed-farmer households (for women, in particular, through improved on-farm processing technologies). The Programme for Enhancing the Diffusion of New Tsetse Control Technologies for Improved Livestock Health and Productivity in Smallholder Indigenous Communities of Sub-Saharan Africa will address strategic objectives (i), (ii), (iii) and (v) as it will help refine and diffuse innovative tsetse repellent technology, integrated with other conventional control methods, among poor livestock keepers. The emphasis will be on developing and evaluating sustainable delivery systems using community participatory approaches to validate the technology, and strategic partnerships with health service staff and the private sector in production and delivery to small livestock keepers.

## **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 Programme to Foster Wider Adoption of Low-Cost Durum Technologies, shall make a grant not exceeding one million one hundred thousand United States dollars (USD 1 100 000) 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.

FURTHER RESOLVED: that the Fund, in order to finance, in part, the Programme for Enhancing the Diffusion of New Tsetse Control Technologies for Improved Livestock Health and Productivity in Smallholder Indigenous Communities of Sub-Saharan Africa, shall make a grant not exceeding one million two hundred and fifty eight thousand United States dollars (USD 1 258 000) to the International Livestock Research Institute (ILRI) and the International Centre of Insect Physiology and Ecology (ICIPE) 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

Lennart Båge  
President



**INTERNATIONAL CENTRE FOR AGRICULTURAL RESEARCH IN THE DRY AREAS (ICARDA):  
PROGRAMME TO FOSTER WIDER ADOPTION OF  
LOW-COST DURUM TECHNOLOGIES**

**I. BACKGROUND**

1. Durum wheat is an important commodity for the rural economies of West Asia and North Africa (WANA). It is mainly grown under rainfed conditions in lowland environments characterized by relatively low rainfall (250 to 450 mm) usually falling between the months of December and March, and in highland (mountain) areas where cold represents another important abiotic stress. The high variability in rainfall (both within a season and between years) causes large inter-annual fluctuations in production. In these areas, the majority of farmers who cultivate durum wheat are resource-poor smallholders. On average, over 50% of durum production is processed on-farm under the form of raised and flat bread for household consumption. For these smallholders, durum is the main staple food commodity as it accounts for nearly 50% of their calorie and protein daily intake.

2. The five major durum-producing countries of the region (Algeria, Morocco, Syria, Tunisia and Turkey) participated in the WANA Dryland Durum Improvement Network, a three-year IFAD-funded programme completed in 1999. A Completion Evaluation Workshop commended the programme in developing options for resource-poor smallholders in less-favoured areas to improve both their nutrition and incomes by means of productive, low-cost (pro-poor) and sustainable durum wheat production and post-harvest technologies. The latter included technologies for income-generating activities (on-farm processing), especially for women.

**II. RATIONALE / RELEVANCE TO IFAD**

3. Over the past 10-15 years, the national agricultural research systems (NARS) of the region, in collaboration with the joint International Centre for Maize and Wheat Improvement (CIMMYT)/ICARDA Durum Wheat Improvement Programme, have developed a considerable stock of technologies, that could enable smallholders in less-favoured areas to improve the productivity of their limited resources significantly. Such technologies include adapted durum wheat varieties combining better drought tolerance and better grain quality as well as appropriate crop management practices enabling a more efficient utilization of the most binding abiotic constraint: lack of moisture. The generation of technology innovations is, however, just half the battle; the other half consists in making these innovations accessible to, and ensuring their adoption by, smallholders. The challenge thus consists in devising means to facilitate farmers' access to, and adoption of, these technology innovations.

4. The strategic importance of durum wheat for the well-being of resource-poor smallholder households provides ample justification for supporting efforts to strengthen the research capacity of the five participating NARS (Algeria, Morocco, Syria, Tunisia and Turkey) in making technology innovations accessible to smallholder farmers in less-favoured areas, and to address their research and development needs more effectively.

5. The overall goal of the programme is to increase the income and improve the household food security of resource-poor smallholders in less-favoured areas. The immediate objective is to achieve improvement and stabilization of durum productivity and increase economic returns of smallholders, especially women, by means of a better understanding of their specific circumstances and needs in order to foster adoption of adapted and low-cost technologies options. The latter include high and stable-yielding durum varieties with improved grain quality, sound crop management practices and



the development of post-harvest (on-farm processing) activities that provide value-added opportunities.

### III. THE PROPOSED PROGRAMME/OUTPUTS AND BENEFITS

6. To achieve its stated objectives, the programme is conceptually structured around four complementary components and a farmers/women-centred approach, which strongly builds on local capacity for self-reliance.

#### **Consolidating adaptive research on drought tolerance and grain quality**

7. **The specific objective** will be to identify sources for resistance to drought and to other stresses (biotic and abiotic) and improved grain quality. The **output** will consist in the development and evaluation of modern durum varieties with combined resistance/tolerance to drought and to the above stresses and improved grain quality traits. The **key activities** will be to (i) continue research on identification of sources of drought and heat/cold resistance/tolerance and grain quality using research capacity, including biotechnology tools, and facilities; (ii) distribute the elite durum material across the five participating NARS for evaluation and selection under their specific production conditions; (iii) establish, with smallholders' active participation, on-farm research sites for evaluation of promising durum material; and (iv) strengthen, by means of training, human resources of NARS in drought and durum wheat grain quality research.

#### **Strengthening NARS' technology transfer programmes**

8. **The specific objective** will be to develop participatory and community-based methods and tools required for the validation and transfer of socially and economically viable options for assisting target smallholder communities in less-favoured areas to adopt performing and sustainable (pro-poor and resource base-preserving) durum production systems. A participatory framework involving researchers, extensionists, policy-makers and farmers is crucial for a better understanding of smallholders' constraints and needs, which in turn is a prerequisite for transferring technology innovations tailored to smallholders' dual production and consumption goals. An innovative feature of this component will be the adoption of a gender and/or asset-base disaggregated approach to enable a more appropriate analysis of the socio-economic implications of the recommended technologies. The **output** will be efficient participatory technology transfer methods to foster widespread dissemination and adoption of durum technology innovations. The **key activities** will be to (i) investigate and analyse factors (policy, economic incentives, lack of seed, lack of credit, farmers' needs, etc.) influencing farmers' adoption of technological innovations through household and community surveys; (ii) develop and test participatory and community-based approaches, involving all stakeholders, for on-farm evaluation; (iii) select communities and sites, in close collaboration with farmers, and conduct on-farm demonstration of promising technologies and assess their potential productivity and economic impact at the farm and community level; (iv) enhance communication flow among research, extension, non-governmental organizations (NGOs), local government and farming community groups and foster adoption of adapted and profitable technology innovations through organization of field days, travelling workshops and periodic meetings; and (v) elaborate and disseminate relevant technical advisory notes (TANs).

#### **Devising innovative mechanisms to speed up seed production and distribution of newly released durum varieties**

9. **The specific objective** will be to foster the production and diffusion of good-quality seed of newly released varieties targeting smallholders in less-favoured areas by developing methods and guidelines to encourage and enhance the organizational capacity of the private sector (farmers) to produce and distribute local seed. This implies the promotion of small-scale enterprises (private



entrepreneurs, NGOs and grass-roots organizations) in seed multiplication and distribution, targeting smallholders in less-favoured areas, through contracting arrangements with and support from established parastatal seed operators. The **output** will be methods, guidelines and incentives to encourage and enhance local organizational capacity (farmers' groups, private sector, NGOs) to efficiently engage in seed multiplication, processing, storage and distribution. The **key activities** will be to (i) study bottlenecks of seed production and distribution systems and their effect on the adoption and diffusion of improved varieties; (ii) evaluate the ability of the private sector, targeted farmers and farmers' groups to provide quality seed to neighbours in a sustainable manner, and the potential associated profits; (iii) develop and establish participatory and community-based seed production and distribution systems managed by farmers' groups; and (iv) elaborate and disseminate relevant TANs.

### **Promoting value-added opportunities from durum end-products**

10. The **specific objective** will be to develop new skills to (i) improve the performance and profitability of current on-farm women-managed small-scale processing enterprises; (ii) reduce the workload of rural women, hence releasing the labour constraint; and (iii) improve rural household food security and dietary needs. The **output** will be a better understanding of prevailing indigenous processing systems and development of appropriate skills and techniques to improve their performance and economic profitability and lessen women's physical workload. The **key activities** will be to (i) inventory (through household and community surveys) existing indigenous processing systems and evaluate their technical potential and economic viability; (ii) assess the relative effect of on-farm processing on rural women's employment, household food security, dietary status and economic returns to rural households; (iii) develop, in collaboration with NGOs, community-based microcredit schemes to support and stimulate small-scale women-managed processing enterprises; and (iv) elaborate and disseminate relevant TANs.

11. The four components outlined above reflect a clear shift towards a development-led mode of the research agenda set forth in this programme, which emphasizes a participatory and inclusive approach that crosses disciplinary and institutional barriers and builds on contributions from all stakeholders (scientists, farmers, private sector, NGOs, donors, etc.).

12. As an example of the new generation of IFAD-funded TA grants, the assessment of the programme-induced benefits (impact) to the IFAD target group represents an explicit **output** to be delivered (under the form of thematic publications) with the completion/evaluation report of the programme. The **activities** to be undertaken will be to (i) conduct baseline surveys to determine the initial state of development of communities in programme sites; (ii) monitor changes throughout the programme life (impact mapping); and (iii) assess the programme's impact on communities' livelihoods.

13. Another important **output** of the programme will be the enhanced capacity of participating NARS for working in multidisciplinary and multi-institutional teams with farmer communities and local groups. The **activities** will be to (i) offer on-the-job training on participatory research to scientists and farmers of participating NARS; (ii) offer on-the-job training to farmers engaging in seed production, processing and distribution (seed growers); and (iii) conduct regional training on themes such as: (a) design, conduct, analysis and interpretation of data from household and community surveys; and (b) micro (household level) and macro-level (local, regional and national levels) economic analysis of durum production in the participating countries.

14. By design, the programme promotes local, regional and international cooperation and knowledge exchange to the mutual benefit of scientists, policy-makers, and farmer communities, including women. As its underlying concept is not commodity-bound, this programme could reveal a useful model for scaling up. Clearly, institutional and policy support is a prerequisite to create appropriate incentives that will enable smallholders in less-favoured areas to exploit technology





innovations fully and reap the embodied economic gains. Therefore, more emphasis needs to be put on **policy dialogue for enabling environments** (input/output prices, market and credit access, etc.) that will facilitate and encourage both resource-poor smallholders to gain access to, and capitalize on, available pro-poor technologies and small entrepreneurs to engage in seed production and distribution.

#### IV. IMPLEMENTATION ARRANGEMENTS

15. ICARDA, jointly with CIMMYT, will provide the necessary research backstopping for drought and heat/cold tolerance/resistance and grain quality. ICARDA will be responsible for managing and coordinating the programme (including technical and financial reporting) to be implemented based on a partnership arrangement involving the donor(s), ICARDA, CIMMYT and lead national research/development institutions of participating NARS. A regional workshop will be held, preceded by two sub-regional preparatory workshops with the participation of scientists from ICARDA, CIMMYT and NARS; policy-makers; concerned project management units (PMUs); and farmers' representatives.

16. A steering committee will be formed, composed of representatives from each of the participating NARS and from ICARDA, CIMMYT and the donor(s). It will be responsible for preparing the initial thrust of the programme and will meet once a year in November to review, amend and approve annual workplans and budgets (AWP/Bs).

17. A technical coordination committee will be formed, composed of the five national coordinators, the programme regional coordinator, ICARDA regional coordinators for WANA, one representative from CIMMYT, representatives from PMUs of ongoing IFAD investment programmes, and one representative from the community of civil-society organizations. The committee will be responsible for: (i) preparing and finalizing AWP/Bs to be submitted to the steering committee; (ii) reviewing and discussing annual results; (iii) developing methods and approaches to strengthen linkages within and among NARS; and (iv) exchanging information and experience among programme participants and across the region. A technical coordination and planning meeting will be held annually in September/October to enable collaborating scientists to review the results of the work carried out and finalize workplans for the following season. A programme start-up workshop will be held to present and discuss the proposed activities with donor(s) and develop a detailed workplan. A second regional workshop will be held towards the end of the programme to present programme results and achievements to the donor(s), key research officials, policy-makers and farmers' representatives, and review the impact of the programme on smallholders' welfare.

18. To ensure the timely implementation of programme activities and the achievement of stated outputs and impact, a **participatory dynamic monitoring process** will be adopted at both regional and local levels. At impact level, by means of on-farm and community surveys, the process will enable monitoring of: (i) adoption rates among poor farmer households; (ii) programme-induced improvements in household food security through changes in durum productivity; and (iii) changes in income, disaggregated by gender, type of farmer and/or asset base. Moreover, a travelling regional workshop involving all stakeholders, to be held each year at alternating country locations, will enable a systematic and critical follow-up of programme implementation and scope and, if needed, identify corrective measures to be taken. IFAD, through the Near East and North Africa Division, will be in charge of programme supervision.

**V. INDICATIVE PROGRAMME COSTS AND FINANCING**

19. The total cost of this four-year programme is estimated at USD 4.4 million. IFAD will contribute USD 1.1 million. In-kind participation from ICARDA and CIMMYT is estimated at USD 0.5 million. Discussions are under way with cofinanciers to contribute USD 0.8 million. The five participating NARS agree to provide a substantial contribution, in kind and in local currencies, totalling USD 2.0 million. The contribution of NARS, representing 45% of the total programme costs, is to be considered as a sign of their strong commitment and a guaranty of the institutional sustainability of programme activities beyond the initial four-year period. The Table below shows the total programme cost and financing.

**Total Programme Cost and Financing  
(USD)**

<b>ITEM</b>	<b>IFAD</b>	<b>ICARDA/ CIMMYT</b>	<b>NARS</b>	<b>Other Cofinancier</b>	<b>Total</b>
Personnel and Project Coordination	299 000	150 000	500 000	25 000	974 000
Research Programme Costs	288 000	200 000	500 000	288 000	1 276 000
Capacity-Building/Training	109 000	50 000	250 000	151 000	560 000
Workshops and Meetings	110 000	50 000	200 000	170 000	530 000
Reporting/Publications	20 000	20 000	50 000	30 000	120 000
Capital Equipment	155 000	-----	300 000	50 000	505 000
Logistic and Administrative Support	119 000	30 000	200 000	85 000	434 000
<b>Total</b>	<b>1 100 000</b>	<b>500 000</b>	<b>2 000 000</b>	<b>799 000</b>	<b>4 399 000</b>



**INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE (ILRI)/INTERNATIONAL CENTRE OF  
INSECT PHYSIOLOGY AND ECOLOGY (ICIPE): PROGRAMME FOR ENHANCING THE  
DIFFUSION OF NEW TSETSE CONTROL TECHNOLOGIES FOR IMPROVED LIVESTOCK  
HEALTH AND PRODUCTIVITY IN SMALLHOLDER INDIGENOUS COMMUNITIES OF  
SUB-SAHARAN AFRICA**

**I. BACKGROUND**

1. Tsetse-transmitted trypanosomiasis remains one of the major disease constraints to improved livestock production in sub-Saharan Africa. It directly reduces productivity in cattle, contributes to mortality, and discourages the use of more-productive, improved breeds in infested areas. Particularly affected are pastoral and agropastoral communities, comprising a population of approximately 260 million, among the poorest in Africa.

2. Current control relies on three principal strategies: trypanocidal drugs, trypanotolerant cattle, and tsetse control or eradication. Each has advantages and disadvantages, but generally none has proven to be fully satisfactory as a viable, sustainable solution. Although trypanocidal drugs are the most common method of trypanosomiasis control, their adoption as a sustainable method to prevent or treat disease is limited by cost, availability and – particularly threatening to future control – growing drug resistance. At present, trypanotolerant livestock are only found in certain areas of Western and Central Africa, and although they retain a certain level of productivity under tsetse challenge conditions, they are considered less productive in terms of meat and milk produced. Tsetse vector control methods relying on large-scale bush clearing and aerial-spraying methods have largely been discontinued due to environmental concerns. Tsetse traps and insecticide-impregnated targets are currently the most common methods of tsetse control, but require initiating and sustaining the necessary collective action at the community level to achieve full impact.

**II. RATIONALE / RELEVANCE TO IFAD**

3. Much of primary cultivation in sub-Saharan Africa is carried out by women, who continue using their bare hands, with limited opportunities for production expansion and incomes. Among the impediments to agricultural growth that are relatively easier to overcome are constraints placed on the use of draught animals in agriculture. Throughout Eastern and Southern Africa, women undertake many livestock-related activities, and milk can be a major source of income. The major challenge to the livestock component of livelihood systems is one of addressing the problem of tsetse and trypanosomiasis. If draught animals are relieved, their wide use will greatly enhance agricultural production and minimize land-use imbalances. A recent study carried out by the Department for International Development, United Kingdom, points out that "the opportunity to use draught animals alone has the potential to move families ... from a subsistence existence into the cash economy". Tsetse control would not only increase animal productivity, in terms of meat and milk production; it could also make animals available for draught, while reducing the cost of inputs through cheaper animal health maintenance.

4. Other target groups that stand to benefit from such an initiative are marginalized people, particularly pastoralist and agropastoralist livestock farmers in marginal areas. The livelihood and survival of farmers and pastoralists depend much on the health and productivity of their livestock – which can help not only to feed people but also to feed soils. For smallholders with just one head of cattle or possibly two, these animals can serve as a store of wealth (and often the only form of capital that can help generate income or help survival in times of stress).



5. Efforts to make a visible impact on rural poverty reduction in the region cannot be realized without a bold approach “to modernizing of means and techniques of production among the poor” (Eastern and Southern Africa Division – Regional Assessment and Strategy 24/5/2001). Conventional tsetse control techniques are difficult to deliver and are rarely adopted by these farmers. However, the approach in the proposed programme is to engage communities in validating new repellent technology, helping in its adaptation and delivery as a low-cost control option. It is specifically designed for ‘sustainable’ improvement in livestock health and productivity for the agropastoralist and mobile pastoralist communities who are expected to gain access to a modern technology on a fully commercial basis, in terms of willingness and capacity to pay.

6. As international public-goods research institutions, ICIPE and ILRI both focus their research on rural poverty alleviation. Livestock improvement can play a central role. Recent research at ICIPE offers a promising alternative technology for tsetse control that would expand the arsenal of techniques for trypanosomiasis control, potentially reducing dependency on trypanocides (thereby conserving this control technique through lower risk of resistance) as well as environmentally hazardous acaricides. A prototype of the technology has been developed. It is now ready for field-testing to adapt it properly to the needs and circumstances of the targeted livestock keepers and to formulate appropriate strategies for its use in the integrated control of trypanosomiasis. At the same time, since the technology lends itself to market-based approaches to provision, it is critical to develop a viable plan for its eventual manufacture by commercial partners and delivery through the market place, and to identify the appropriate pathways for its delivery to the intended users. This programme proposes an action research plan to accelerate the final steps required to prepare its transition to a commercial product and its effective and rapid diffusion among smallholders.

7. The technology is based on a mild, natural repellent of Savannah tsetse species shown to substantially reduce the tsetse challenge (>80%) and feeding efficiency on cattle (>90%). A number of other candidate repellents have also been identified. IFAD-financed research in the past helped develop a prototype dispenser for on-host use, with a constant release of the repellent allowing cattle to graze freely with the dispenser placed on their bodies. The dispensers can be prepared from locally available materials. Preliminary results from ongoing experiments among pastoralists in Nguruman, Kenya, show that these repellents effectively protect cattle. The challenge now is to evaluate how these repellents can be integrated with other existing techniques to design improved control strategies that rely less on drugs. Particularly promising is a ‘push-pull’ strategy that uses a combination of repellents (to ‘push’) and baited traps/targets (to ‘pull’) to enhance suppression rates substantially. Integrated control strategies based on repellents will be highly relevant for pastoralist and agropastoralist livestock keepers. The repellent technology will be especially suited for transhumant communities – often among the poorest – since the repellent technology affords full mobility.

8. ICIPE, ILRI and the Kenyan Trypanosomiasis Research Institute (KETRI) are established leaders in research on vector-borne livestock diseases, especially trypanosomiasis. ICIPE’s focus on identifying innovative bio-control methods for vector control has led to the development of the repellent technology. ILRI has considerable experience in technology development, field-testing and research strategies to assess integrated control methods for trypanosomiasis and tick-borne diseases. Increasingly, ILRI has enhanced its research capacity in assessing delivery pathways and target clients for animal health services. A better understanding of these is crucial for enhancing delivery, adoption and impact for poor farmers. With the decline in public-sector service provision, both ICIPE and ILRI are confronting the challenges for enhancing the transfer and adoption of research outputs, such as this repellent technology, from public-sector development to private-sector delivery. One component of this, used by ILRI to discuss its vaccine development programme with commercial partners, is the development of a business plan. This experience of developing a business plan with commercial partners will be invaluable in assessing opportunities and attracting private-sector partners to move a field-proved repellent technology rapidly to livestock keepers.



9. Given the likely flexibility of the repellent technology, it could easily be integrated into IFAD-funded development projects to improve livestock production. These include: the Central Kenya Dry Area Smallholder and Community Services Development Project in Kenya; the Northern Regions Livestock Development Project in Namibia; the Mara Region Farmers' Initiative Project and the Agricultural and Environmental Management Project in the United Republic of Tanzania; and the Southern Province Household Food Security Programme in Zambia. IFAD has also provided considerable support in the past to research expressly devoted to assessing trypanosomiasis control and its impact in Africa. Indeed, although the repellent technology was developed primarily with funding from the European Union, the critical step of translating the technology into a practical prototype occurred as a spin-off to an earlier IFAD-supported project on impact assessment. Unlike IFAD's previous research grants in this area, which have been devoted to broad assessments of trypanosomiasis control, the proposed programme has the much more focused objective of 'packaging' a promising new technology and getting it into the hands of livestock keepers as quickly as possible.

### III. THE PROPOSED PROGRAMME

10. The overall objective of the programme is to reduce poverty among pastoral and agropastoral communities in sub-Saharan Africa whose livestock are at risk of trypanosomiasis by accelerating the adaptation and transfer of a new, more cost-effective, bio-control technique using tsetse repellent.

The programme is organized around five principal activities:

11. **Optimizing the tsetse repellent prototype.** Work at ICIPE will continue to refine the technology, including the possibility of augmenting the current available repellent with other volatile repellents identified from water-buck, and identifying short-range/contact candidate repellents.

12. **Development of an epidemiological model prototype.** Related research at ILRI and KETRI, and at NARS in Uganda, the United Republic of Tanzania and Zambia, on trypanosomiasis infection dynamics will be applied to evaluating the expected impact of repellent-based control. The prototype will be used to inform the appropriate design of field trials. Moreover, as the model is refined based on the results of those trials, it will serve as the basis for a decision-support tool to formulate recommendations for implementing repellent-based control across the various eco-epidemiological situations faced by livestock keepers.

13. **Refining the tsetse repellent technology: field trials.** A series of field trials will be designed and implemented to validate critical parameters and results derived from the epidemiological modelling regarding optimal integrated control strategies, such as the appropriate proportions of cattle to treat with repellent versus pour-on insecticide in the proposed 'push-pull' technique. The trials will also provide the basis for ex-ante evaluation of the financial viability of the various strategies. At the same time, the performance of controlled-release of the repellent formulation and devices, their placement and deployment on the animal for long-term use, and their toxicological assessment with respect to animal health, will be evaluated.

14. **Socio-economic and financial evaluation of 'best-bet' control strategies in farmer-managed trials.** Preliminary results from the modelling and researcher-managed field trials will be used to identify best-bet repellent-based control strategies. These best-bet strategies will then be evaluated on-farm using a participatory research approach in partnership with livestock keepers and local livestock health services. The lessons from these trials will permit assessing the economic and technical incentives that will drive eventual uptake of the technology. They will also provide feedback for further adaptive research as needed to ensure that the technology is appropriate for pastoralist production systems.

15. **Development of a business plan for production and delivery.** To ensure rapid deployment, it is important to build on the initial efforts to patent the repellent technology, and to develop a more detailed business plan to identify and evaluate possible options for commercial production and distribution of repellent products. This will involve describing the steps needed to develop a commercial product, identifying possible actors and funding sources, estimating commercial production costs, evaluating optimal delivery pathways and assessing potential adoption. The business plan will be important in attracting potential commercial partners early on in the process of finalizing a commercial product, and exploring opportunities for cofinancing from the private sector for commercial product development.

#### IV. IMPLEMENTATION ARRANGEMENTS

16. The research requires a dynamic, collaborative partnership among two international centres (ICPE and ILRI), a Kenyan NARS (KETRI) and NARS in other participating countries (e.g. Uganda, the United Republic of Tanzania and Zambia) as well as livestock health service staff and pastoralist communities in the programme areas. ICPE has been responsible for the development of the repellent technology, whereas ILRI has developed expertise in the epidemiology and socio-economics of trypanosomiasis. KETRI is the main partner for research related to trypanosomiasis in Kenya. The Kenya Agricultural Research Institute (KARI) and NARS in the other member countries may be called upon to complement KETRI's involvement by providing support from its epidemiology and socio-economics unit. Fieldwork will be initially conducted in the Nguruman pastoralist area of southern Kenya. ILRI and ICPE will be the main partner institutions. Kenya, Uganda, the United Republic of Tanzania and Zambia are participating countries. The grant will have a steering committee to provide oversight support and guidance. The steering committee will be composed of all relevant stakeholders (ILRI, ICPE, participating NARS, donors) and IFAD.

#### V. INDICATIVE PROGRAMME COSTS AND FINANCING

All amounts are in USD (USD 1.00=Ksh75)	IFAD	ICPE	ILRI	KETRI	Other NARS <sup>1/</sup>	Total
1. Personnel <sup>2/</sup>	390 000	51 600	25 800	20 000	20 000	507 400
2. Capacity Building/Training	229 000	100 000	0	0	0	329 000
3. Travel	72 000	0	0	10 000	10 000	92 000
4. Laboratory and Field Costs	328 000	80 000	50 000	15 000	15 000	488 000
5. Vehicles and Equipment	47 000	0	0	25 000	25 000	97 000
6. Incremental Administrative Backstopping	192 000	20 000	50 000	0	0	262 000
<b>Total</b>	<b>1 258 000</b>	<b>251 600</b>	<b>125 800</b>	<b>70 000</b>	<b>70 000</b>	<b>1 775 400</b>

<sup>1/</sup> Uganda, the United Republic of Tanzania and Zambia.

<sup>2/</sup> Extra core activities to be supported by ICPE (20%)/ILRI (10%) and the balance as indicated here by IFAD.