CONCEPT NOTE
Research Proposal for SLP Funding – Seed Grants 2004

Project Title: Enhancing sweetpotato-pig systems in Asia for poverty alleviation

Lead Centre(s): International Potato Center (CIP)

Principal Investigator(s) and Contact Details:
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ILRI
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Total Cost of Project (SLP Funds, USD): 40,000
Anticipated Start Date and Duration of (SLP Seed Grant) Project: June 2004, 1 year

Locations of Project (Countries): Sichuan Province, China and northern Vietnam

Background (Max. 300 words)

With the introduction of economic reforms in China (since 1978) and Vietnam (since 1989), farm households received new incentives to expanded agricultural production and marketable surplus. In rural Sichuan and in much of northern Vietnam, pigs raised on locally-grown sweetpotato and other crops are the major source of agricultural income. The sweetpotato-pig production system is a main economic activity for tens of millions of rural households in these regions. Farmers, especially women (who play an increasingly significant role in agriculture as men migrate to cities in search of work), have used this crop-livestock system as a means of intensifying the value of their agricultural production in order to escape from the poverty that is endemic in these areas.

Small-holder pig producers, however, are confronted with serious constraints to expanding production. Small-holders also face severe environmental resource constraints to increasing agricultural production, and without substantial increases in productivity rural environmental resources will continue to be seriously degraded. They also face heightened market competition from larger-scale, specialized pig farms that have access to hybrid pig breeds, commercial feed preparations, veterinary services, and that are often located strategically close to markets. By comparison, small-holder systems have relatively low levels of productivity and face greater marketing constraints. Policies may also be biased against small-holders (1).

The results of recent research on sweetpotato-pig production systems in Sichuan (2) and Vietnam (3) show that there is a good possibility of substantially increasing small-holder productivity through the development and introduction of new sweetpotato varieties, improved methods of feed preparation, animal nutrition and health management. To date most sweetpotato breeding has concentrated on increasing fresh root yield alone, although for animal production farmers look for total dry matter production of both roots and foliage. Poor storability of roots and foliage means that much of this potential is wasted. Other research has shown that ensilaging roots and foliage can extend storability of the crop and reduce labor and energy inputs in the preparation of feed mixtures. Farmers also need better technical inputs for animal husbandry and marketing practices. Sweetpotato-based cropping systems are also good at preventing soil erosion, although implications of agricultural intensification and incentives for resource conservation need further systematic evaluation. By developing and extending sustainable, location-specific sweetpotato-pig production innovations to small-scale producers, this can be a very effective pathway of agricultural development for poverty alleviation.

Project purpose (Max. 200 words)

a) State project purpose simply and directly
b) State why the SLP is the appropriate funding mechanism
c) State what inter-center synergies are expected from SLP participation in the project

GOAL: To enhance rural income opportunities with specific focus on women by improving production and sustainable utilization of sweetpotato and other crops as feed resources in pig production.

OBJECTIVE: To develop and disseminate improved sweetpotato varieties, on-farm feed processing methods, improved pig nutrition and management, and agricultural and
resource policies for the benefit of farming families in Sichuan Province of China and northern Vietnam.

The SLP provides a venue for bringing together the expertise of several international agricultural research centers on a common problem. CIP and ILRI have collaborated informally on crop-livestock research in Asia, and have identified several areas where synergies could be brought to bear on significant issues, such as the crop-livestock system, although to date collaboration has been resource constrained. IFPRI brings an important policy dimension to the issues. Coordinated collaboration among centers with common interests is especially important in regional programs, which individually centers’ presence is small but collectively they bring considerable research synergies and strengths. Agricultural research institutions in China and Vietnam and the Sichuan provincial government have also expressed strong interest in the project and there are good possibilities for local resource mobilization and co-funding, especially in China. An SLP ‘seed grant’ would provide an excellent means of marshalling the resources of international centers and national programs to bring greater synergy and focus to these complementary efforts.

Will the Project Contribute to CGIAR Goals in:

a) Germplasm enhancement  Yes/No
b) Natural resources management Yes/No
c) Policy analysis Yes/No
d) NARS institutional development Yes/No

Outputs (Max. 300 words)

OUTPUTS: In the target areas the project will

1. Develop and apply models for assessing crop-livestock management strategies for sustainable, intensive agricultural production and natural resource management;

2. Breed and disseminate improved sweetpotato varieties for better use as animal feed;

3. Develop locally-acceptable methods of post-harvest feed preparation for improved storage and nutritionally balanced animal feed rations;

4. Produce and pilot locally appropriate extension protocols for farmer-participatory extension for improving crop production, pig nutrition, animal health and management;

5. Evaluate influence of policies on small-holder crop-livestock production and marketing systems where women play an important role;

6. Monitor and evaluate project implementation, technology adoption and impact.

Potential Impact of Outputs: (Max. 200 Words)
a) Poverty alleviation  
b) Food security  
c) Environmental protection or enhancement

The project has the potential to improve crop-animal systems productivity among millions of small-scale farms in Sichuan and Vietnam. The sweetpotato-pig systems is pervasive in Sichuan: 89 percent of Sichuan’s 80 million farm households raise pigs (4) and an estimated 10-15 million
households grow sweetpotato, mainly for pig feed (1). Sweetpotato is a favored crop for the more marginal production environments, being planted on rainfed hillsides while the irrigated plains are sown to rice and other grain crops. Sichuan also has a high incidence of poverty: a recent study estimated that in 1998, 21 percent of Sichuan’s population lived on less than $1/day (5). Poverty is likely to be more acute in areas where sweetpotato predominate because of its prevalence on marginal lands. Sweetpotato serves a multifaceted role for these poor households: it is a food security crop, it is a primary feed for pigs (the main agricultural income source), and it protects fragile hillsides from erosion. The situation in northern Vietnam is similar, especially in the densely populated Red River Delta and its surrounding provinces. The Red River Delta region holds Vietnam’s greatest number of poor households (6). Here, sweetpotato is grown primarily as a winter crop in rotation with the main rice crops, although many farmers also grow sweetpotato in the Spring and Summer seasons to supply feed for farm-raised pigs (3).

Research Activities in Relation to Outputs (Max. 300 words)

Output 1: Develop and apply models for assessing crop-livestock management strategies for sustainable, intensive agricultural production and natural resource management;

ILRI has considerable experience with building simulation models of crop-animal production systems involving ruminants, and CIP-ILRI collaborative research in Latin America has extended these models to include monogastric animals (pigs). Adapting these models to the Asian production context will enable alternative or modified crop-animal production systems and technologies to be quantitatively assessed in an interactive, iterative mode amongst producers, extension agents and researchers.

Output 2: Breed and disseminate improved sweetpotato varieties for use as animal feed

CIP has worked with Chinese and Vietnamese breeders to develop advanced populations of high-yielding sweetpotato varieties, focusing on total dry matter yield and quality. CIP has also developed rapid multiplication methods of virus-free sweetpotato planting material that have been successful used elsewhere in China. Promising new varieties will be field-tested on-farm in project sites to solicit farmer evaluations.

Output 3: Develop locally-acceptable methods of post-harvest feed preparation for nutritionally balanced animal feed rations

Ensilaging of sweetpotato roots and vines, and other available crops provides an effective means of improving nutrient value and extending storability of farm-grown crops. Appropriate ensiling methods are location- and season-specific, depending on availability of local materials and feed additives. ILRI and CIP have experiences with on-farm participatory research to adapt ensiling methods for sweetpotato and other crops to local conditions.

Output 4: Produce and pilot locally appropriate extension protocols for farmer-participatory extension for improving crop production, pig nutrition, animal health and management;

Capturing the potential value of improved feedstock also requires careful management of animal husbandry and health. It is essential to identify which kind of extension model is most appropriate for target groups of farmers, such as women (e.g., Rural Specialty Associations organized by farmer themselves is becoming a popular means of knowledge and technology dissemination in western China). Diagnostic tools and training materials will be developed for training extension personnel.
Output 5: Evaluate influence of policies and village-level institutions on small-holder crop-livestock production and marketing systems where women play an important role.

Policy and related institutional issues, e.g. the modes of delivery of technical information to resource-poor communities especially women and factors affecting their access to other inputs and to output markets, generally are important in conditioning producer household and community responses to changes in incentives within small-holder crop-livestock production systems. These aspects will be evaluated for their impacts on technology adoption and smallholder marketing decisions.

Output 6: Monitor and evaluate project implementation, technology adoption and impact.

To ensure that the project and its activities are addressing the needs of the producer households and communities, participatory M&E methods will be used to assess from a user perspective the efficacy of the technology development and dissemination. Results will generalizing the successful models for extending new technologies as well as understanding unsuccessful experiences, and identify the key factors affecting the spread of new crop variety and agricultural technology in different areas. The M&E process will link closely with the evaluation of policy and institutional constraints (Output 5).

Impact and Beneficiaries: (Max. 150 words)
a) State, preferably in quantitative terms, what development impact might be achieved in the short or medium term and who are the beneficiaries.
b) State what indicators will be used to demonstrate impact.
c) State what activities will be undertaken during the project’s life to prove impact either ex-ante or ex-post.

Smallholder-farming families in Sichuan and Vietnam will directly benefit through the introduction of new crop varieties and improved animal production methods. Women play a major role in pig production and preparation from local feed sources and will be among the target beneficiaries of the new technology. Soil erosion and deforestation will be reduced by intercropping sweetpotato in the hilly areas, saving forest land from clearing. This is of particular concern in Sichuan, where land deterioration, soil erosion and forest devastation is prevalent in many areas, especially those poor regions.

Dissemination and Uptake Pathways (Max. 150 words):
a) Indicate what channels will be employed to ensure technology uptake
b) Indicate what methods will be used to upscale the findings
c) Suggest what might be the dimensions of the eventual recommendation domain

Sichuan has a well-developed agricultural extension service and strong rural institutions for agricultural technology dissemination. Working through the provincial, county and township level agricultural and animal husbandry services and NGOs will ensure that project results are extended widely to the households. In Vietnam, there are strong village-level organizations. Several bilateral and NGO agricultural development projects in Vietnam focus on crop-livestock improvement. By working with local organizations, bilateral projects and NGOs, this will provide a means of achieving rapid dissemination of research results to a wide area.

China is the world's largest sweet potato and pork producer, accounting for 85% of global sweet potato production and 44% of the global pork production. Findings from the project are likely to
have potential application throughout the Southern China areas across 15 provinces with 261 million ha of total land area and with a rural population of over 420 million persons, where agricultural conditions are similar with Sichuan and the sweetpotato-pig production system is widespread. There is also potential for the application of research results to sweetpotato-animal production systems in East Africa, Indonesia and elsewhere.

**Risks and Assumptions Associated with Output Achievement** (Max. 200 words):

1. Develop and apply models for assessing crop-livestock management strategies for sustainable, intensive agricultural production and natural resource management.  
   Risk: The complexity of the crop-livestock systems and the markets which they supply, the variability of each system component and its parameter estimates combine to invalidate the models as practical tools for producers and their extension agents.

2. Breed and disseminate improved sweetpotato varieties for use as animal feed.  
   Risk: Variability of major traits is insufficient or negatively correlated to allow total productivity improvement; planting materials are not available in large enough quantities; dissemination methods and agents are ineffective.

   Risk: Labor and other input requirements outweigh the benefits from the new diets.

4. Produce and pilot locally appropriate extension protocols for farmer-participatory extension for improving crop production, pig nutrition, animal health and management.  
   Assumption: Local, County, Provincial etc extension services and their private counterparts will use the dissemination material and that the material will be valid beyond the pilot communities.

5. Evaluate influence of policies on small-holder crop-livestock production and marketing systems.  
   Risk: Policy makers, regulators and their advisers will not be willing to address the constraints identified and to consider the policy options proposed; resources will not be available to the project, its partners or other stakeholders to advocate policy change.

6. Monitor and evaluate project implementation, technology adoption and impact.  
   Assumption: That the target communities will participate in developing, implementing and applying the lessons from a M&E process; that the process will be timely in its delivery of recommended actions and that these are implemented.

**Financial Summary (Funds Requested from SLP)**  
Breakdown costs for the following line items:

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment</td>
<td>5,000</td>
</tr>
<tr>
<td>Consumables</td>
<td>7,000</td>
</tr>
<tr>
<td>Workshops and travel:</td>
<td>17,000</td>
</tr>
<tr>
<td>Training</td>
<td>3,000</td>
</tr>
<tr>
<td>Overheads</td>
<td>8,000</td>
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</tbody>
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**Funding Strategy**  
Indicate which major donor is being targeted by the seed money period and the amount of funds sought. Explain why the Concept Note has a good chance of success in being turned into a major
project proposal. Indicate in a timeframe the plan and milestones that will be achieved in order to submit a concept note and/or a full proposal to the identified donor.

Potential donors targeted: IFAD, CIDA, ADB, DFID

IFAD (International Fun for Agricultural Development) has so far extended 17 projects to China, for a total loan amount of US$400 million. IFAD will continue to plays a catalytic role by focusing on the less favored areas - remote uplands and mountains, marginal coastal areas and rainfed areas. By developing and extending location-specific sweetpotato-pig production innovations to smallholders in less favored rainfed areas, this Concept Note has a good chance of success in being turned into a major project proposal for IFAD fund.

CIDA (Canadian International Development Agency) CIDA has agreed to implement the "Small Farmers Adapting to Global Markets Project" in China in order to assist China's small farmers to adapt to a market-oriented economy and improve rural livelihoods. Canada's contribution to the project is estimated at CND $19.7 millions in five years from 2003 and this will be supported by an equivalent counterpart budget from the Government of China. The currently proposed SLP Concept Notes fits well with CIDA’s strategy and objectives.

Plan and milestones for developing and submitting a proposal to the identified donor:

Stakeholder workshop: July 04;
Outline proposal agreed and circulated to possible investors: Sept 04;
Discussions with interested investors and proposal development: Oct-Dec 04;
Proposal submitted to interested investor: Jan-Feb 05;

Specific Capabilities of Consortia Members and Key Staff (Max.300 words)

1. CIP
   a. Areas of capability:
      i. Sweetpotato breeding
      ii. Sweetpotato post-harvest utilization for animal feed
      iii. Crop-livestock systems and resource management modeling
      iv. Impact assessment
   b. Staff:
      i. Keith Fuglie, Economist and Head of Impact Enhancement Division
      ii. Yi Wang, Crop Physiologist and CIP-China Liaison Scientist
      iii. Roberto Quiroz, Natural Resource Management Scientist / Systems Modeler
      iv. Carlos León-Velarde, Animal Breeder / Systems Modeler

2. ILRI
   a. Areas of capability
      i. Animal nutrition
      ii. Animal health
      iii. Crop-livestock systems and resource management modeling
      iv. Policy Analysis and Impact Assessment
b. Staff:
   i. Xianglin Li, forage agronomist and ILRI Liaison Scientist, China
   ii. Somkiat Saithanoo, animal scientist/Team Leader, ILRI SE Asia
   iii. M Herrero, animal nutritionist/systems modeller
   iv. W Thorpe, livestock systems scientist/ILRI Reg Rep, Asia

3. IFPRI
   a. Areas of capability
      i. Policy and market analysis
   b. Staff
      i. C. Delgado, Senior Research Fellow, Division of Markets, Trade, and Institutions
      ii. N. Heerink, Research Fellow and IFPRI-Beijing Office Coordinator

References


