CONCEPT NOTE – SLP SEED GRANT 2004

1. Project Title: Low-toxin grasspea for improved human and livestock nutrition and ecosystems health in drought-prone areas in Asia and Africa

2. Lead Centre(s):

- International Center for Agricultural Research in Dry Areas (ICARDA), Aleppo, Syria.
- International Livestock Research Institute (ILRI), Nairobi, Kenya.
- Third World Medical Research Foundation (TWMRF), Portland, Oregon, USA.

3. Principal Investigator(s) and Contact Details:

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4. Collaborators and Contact Details:

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5. Total Cost of Project: U$ 41,000

6. Anticipated Start Date and Duration of Project: 2 years (June 2004 to May 2006).

7. Locations of Project (Countries):

- ICARDA, Headquarters in Syria and, Ethiopia respectively.
- ILRI-ICRISAT, Andhra Pradesh, India
- Research sites and farmers' in Asia (Bangladesh, India, Pakistan).
- Research sites and farmers' fields in Africa (Ethiopia and Eritrea).

8. Background (Max.300 words)

Grasspea (*Lathyrus sativus* L) is a high-protein food-feed legume grown by nearly 200 million poor crop-livestock farmers on about 5 million hectares in dry areas. Because it is tolerant to drought, disease, and low soil fertility, it sometimes serves as the only available food source for the poor when other corps fail [1, 2, 3, 4, 5]. Planting grasspea in rotations with cereals or as a green manure is sustainable. It improves cereal yields and soil fertility[1, 6]. Approximately 90% of its total production is in Asia (Bangladesh, India, Nepal, Pakistan) and East Africa (Ethiopia, Eritrea) [1, 3]. Production, processing and marketing, by women offer an alternative or extra source of revenue. It is estimated that nearly 0.5 million people in Asia and Africa currently suffer from 'lathyrism', or paralysis of the leg caused by the presence of a neurotoxin (β-N-oxalyl-L, β-diaminopropionic acid or β-ODAP) in the seeds[6, 7, 8.] Domestic animals also suffer. The leaves and stems have low or zero β-ODAP content and can be used as fodder without any health effects.

Research by ICARDA and partners indicates that the seed β-ODAP content could be reduced through genetic enhancement and improved agronomic practices, but millions of poor farmers in Asia and Africa still grow toxic landraces because locally-adapted low-toxin lines and packages for their sustainable production are lacking[1, 2, 9]. Also, most national grasspea improvement programs do not have access to cheaper and faster methods to determine seed β-ODAP content. Further research and development is needed to develop adapted low-toxin grasspea lines and options (technological and socio-economic) to encourage adoption by farmer to improve food security, and prevent lathyrism, poverty and associated environmental degradation in smallholder crop-livestock farming systems in drought-prone areas.

9. Project purpose (Max. 200 words)

a) State project purpose simply and directly:

The purpose is to develop and disseminate options for the use of low-toxin grasspea as a food-feed crop to provide safe food for smallholder farmers and their livestock and to prevent degradation of the natural resource base in drought-prone areas of Africa and Asia.

Specific objectives are to : (1) establish an interest group for research and development on grasspea as a food-feed crop in drought-prone areas in Africa and Asia; (2) organize a stakeholders' workshop to review the use of grasspea as a food-feed and identify benchmark sites and communities for testing and scaling-up options for use of low-toxin grasspea lines as a food-feed crop; (3) develop a project proposal to seek additional funds for research and development; and (5) strengthen the capacity of project partners and disseminate project findings.

b) *State why the SLP is the appropriate funding mechanism*:

The SLP provides a forum for inter-center synergy for collaborative research and development on the production and use of food-feed crops for sustainable crop-livestock production.

c) State what inter-center synergies are expected from SLP participation in the project

The expected synergies are ICARDA's expertise in research for development on low-toxin grasspea and farmer participatory research in the dry areas of West Asia and North Africa, and ILRI's expertise in ruminant nutrition, forage quality and animal health.

10. Will the Project Contribute to CGIAT Goals in?

CGIAR Goals	*Yes/No*	*Project Contribution*
a) Germplasm enhancement	Yes	Adapted low-toxin lines
b) Natural resource management	Yes	Improved agronomic/soil management options
c) Policy analysis	Yes	Policy and institutional analysis
d) NARS institutional development	Yes	Group and individual training of staff/farmers

11. Outputs (Max. 300 words)

1) National and international research and development agencies working on grasspea and lathyrism in Africa and Asia contacted, and an interest group on the use of grasspea as a food-feed crop established by the end of the 1st quarter.

2) A stakeholders workshop to review the use of grasspea as a food-feed crop and identify benchmark sites and communities representative of the dry areas of Africa and Asia organized and a first draft of the workshop proceedings prepared by the end of the 5th quarter.

3) Database on indigenous knowledge on grasspea and lathyrism, including local methods to treat seeds to reduce toxicity, and constraints and opportunities for grasspea as a food-feed crop for smallholder crop-livestock farmers in selected communities documented by the end of the 4th quarter.

4) A project proposal developed based on the consultations, workshop and surveys by the end of the 5th quarter.

5) Seed of selected low-toxin grasspea lines multiplied and distributed to research and development agencies in participating countries to initiate detoxification of landraces by the end of the 7th quarter.

6) Enhanced capacity and awareness of at least 40 research and development staff, 5 policy makers, and 2 graduate students on production and use of grasspea as a food-feed crop through the consultations and workshops by the end of the 7th quarter.

Expected outputs from the larger proposal will include: 1) cheaper and faster methods for determining seed β-ODAP content, 2) adapted low-toxin grasspea genotypes, 3) reduction in prevalence of lathyrism, 4) sustainable technological options for the production and use of low-toxin grasspea as a food-feed crop, 5) policy and institutional options for adoption of low-toxin grasspea, 6) strengthened capacity and enhanced information exchange between all stakeholders.

12. Potential Impact of Outputs: (Max. 200 Words)

a) Poverty alleviation

Empowering farmers in Ethiopia to produce rural low-toxin grasspea will create jobs and provide additional income.

b) Food security

Low-toxin grasspea would provide safe food for humans and feed for livestock in regions where drought is frequent. The availability of high quality feed could result in increased meat and milk production thereby preventing malnutrition.

c) Environmental protection or enhancement

The expected increase in livestock feed from the adoption of low-toxin grasspea lines will reduce grazing pressure on rangelands. The use of grasspea in rotations with cereals and as green manure crop could increase soil organic carbon and nitrogen concentrations and prevent erosion by providing vegetative cover.

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

The SLP seed grant will be used for the following activities over a 2-year period.

- An interest group of research and development agencies working on grasspea as a food-feed crop and lathyrism in Africa and Asia will be established through consultations based on information gathered from the Lathyrus and Lathyrism Newsletter and the TWMRF (Output 1).

- A stakeholders' workshop will be organized to elaborate the project components, define roles, and select benchmark sites and communities. Invited speaker will review research and development activities, policy and institutional arrangements relating to the use of grasspea as a food-feed crop in the participating countries. Participants will include - community-base organizations (CBOs), farmers' interest group (FIGs), national agricultural research and extension institutes (NAREs), non-governmental organizations (NGOs), and policy makers. A draft of the workshop proceedings will be prepared (Output 2).

- Surveys will be conducted in the selected communities to document local knowledge on production, markets, culinary treatments and use, and experience with grasspea and lathyrism to complement existing data with assistance of graduate students. The survey data will be integrated into Geographical Information System (GIS) databases to characterize the benchmark sites and to identify the recommendation domain. *Ex-ante* economic impact of low-toxin cowpea will be assessed (Output 3).

- A project proposal will be developed based on the information from the consultations, workshop and baseline surveys (Output 4).

- Seeds of selected low-toxin grasspea lines from ICARDA will be multiplied and distributed to research and development institutions to initiate detoxification of landraces (Output 5).

- Capacity of the partners will strengthened and knowledge exchange enhanced through the workshop, project reports, and graduate training (6).

14. Impact and Beneficiaries: (Max. 150 words)

a) *State, preferably in quantified terms, what development impact might be achieved in the short or medium term and who are the beneficiaries*.

Within the two-year project period, a research and development interest group on grasspea as a food-feed crop will be formed, the capacity and awareness of at least 20 research and development staff, 2 policy makers, 2 MSc and 3 FIG will be enhanced through participation in consultations, workshops and surveys. In the medium-term (5-8 years), farmer-adoption of the low-toxin grasspea may prevent the incidence of lathyrism by 10-20%. Also, crop and livestock outputs of resource poor farmers is expected to increase by 20%, household income by 20%, and soil organic carbon and nitrogen by 10% when planted in rotation with cereals or used as green manure.

b) State, what indicators will be used to demonstrate impact

Perceptions of research and development staff, policy makers and farmers through monitoring surveys, number of households adopting low-toxin grasspea as a food feed-crop, land area covered by the low-toxin grasspea, and reported cases of lathyrism.

c) State, what activities will be undertaken during the project's life to prove impact either ex-ante or ex-post.

Monitoring and adoption surveys to provide data for *ex-ante* impact assessment of the potential rate of adoption.

15. Dissemination and Uptake Pathways (Max. 150 words):

a) Indicate what channels will be employed to ensure technology uptake

The channels will include: 1) using a community-based participatory approach to allow FIGs, CBOs, NGOs in applying recommended packages on their fields; 2) involving all stakeholders (NARS, NGOs, CBOs, FIGs policy makers) from problem identification through evaluation and monitoring of technologies; 3) organizing farmers' field days, travel workshops, and farmer-farmer visits; and 4) producing easy-to-read extension bulletins, and policy briefs.

b) Indicate what methods will be used to upscale the findings

The project findings will be up-scaled by: 1) involving NARES, NGOs and policy makers in general meetings; 2) the use of local media for passing important messages; and 3) production of policy briefs, advisory notes, and posters in local languages for decision makers.

c) Suggest what might be the dimensions of the eventual recommendation domain

The dry areas in Asia and Africa with annual rainfall ranging from 150-300 mm, covering a land area of more than 200 million hectares, and home to nearly 100 million poor farmers will be the recommendation domain.

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

- There will be political stability.
- Landrace grasspea is a significant food-feed crop.
- The larger proposal will be funded for 3 -4 years.
- Policy makers and NAREs in the participation countries will be supportive because they are already looking for technologies to prevention lathyrism, and reduce food insecurity and poverty in dry areas.
- Local and international NGOs and Advanced Research Institutes are willing to participate.

17. Financial Summary (Funds Requested from SLP):

Breakdown costs for the following line items: Employment, Capital equipment, Consumables, Travel, Training, Dissemination, Overheads (in Thousand US Dollar units)

	Year		Total
	2004	2005	
Employment	*3*	*3*	*6*
Equipments	*2*	*0*	*2*
Consumables	*4*	*2*	*6*
Travel	*13*	*2*	*16*
Training	*3*	*2*	*5*
Dissemination	*3*	*2*	*5*
Sub-total	*28*	*11*	*39*
Overhead	*1.4*	*0.55*	*1.95*
Total	*31.5*	*11.5*	*40.92*

18. 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.

- Asian Development Bank and African Development Bank are targeted for about US$981,200 over a period of 3 to 4 years.

- The Concept Note has a good chance of being turned into a major project proposal because the seed money will be used to build a multi-institute and multi-disciplinary research and development consortia with complementary capabilities for project proposal development and implementation. The proposed activities will also provide quantitative data and baseline information needed to write the proposal. A similar ICARDA-led project on grasspea was funded by DfID.

- Time-frame and milestones that will be achieved to submit a concept note and/or a full proposal are presented with the outputs (see section 11). Details are shown in Table 1.

Table 1. Timing of project activities and milestones

Activities	**Year 1**				**Year 2**			
Consultations and stakeholders' workshop								
Baseline survey and literature review								
Develop concept note and project proposal								
Multiplication of selected low-toxin grasspea lines								
Capacity building and knowledge exchange								
Project reports								

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

Member	Capability/Responsibility	Key Staff
ICARDA	Genetic enhancement of low-toxin grasspea using conventional and molecular methods. and development of tools for predicting seed β-ODAP content.	Ali El-Moneim
ILRI	Ruminant nutrition, forage potential of germplasm, and animal health.	Hanson J, Micheal B
BARI	Grasspea improvement, agronomy, and animal production	Raman R R
EARO	Grasspea improvement, agronomy, animal production and	Teketay D

	knowledge dissemination.	
IGFRI	Grasspea improvement, agronomy, animal nutrition, and knowledge dissemination.	Mehra R B
USK	Grasspea improvement using molecular techniques	Chowdhury M A
TWMRF	Prevalence of Lathyrism and dissemination of low-toxin grasspea	Palmer V
BAD	Livestock production, and knowledge exchange	Abdul Majid
BLPRI	Livestock and forage production, graduate training	Hamid Jalil

20. References

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2. Ali M. Abd El-Moneim, and Cooks P S (1993). Adaptation and yield stability of selected lines of *Lathyrus* spp under rainfed conditions in West Asia. *Euphytica*. 66 89-97.
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6. Small E. 1999. New crops for Canadian agriculture. In Janick (ed). Perspectives on new crops and new uses. ASHS Press, Alexandria, VA. USA. Pp. 15-52.
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9. Lui X, and He F. (1990) *Lathyrus sativus* and lathyrism in China. *Lathyrism Newsletter*, 2:2.
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