

**CPWF SMALL GRANTS PROGRAM
FORMAT FOR PROPOSAL SUBMISSIONS**

Proposing Institution: Asian Institute of Technology (AIT), Thailand

Project Title: (no more than 20 words): **Increasing water use efficiency by using mulch under SRI (System of Rice Intensification) management practices in Northeast Thailand**

Brief Title: (no more than 5 words): Growing rice with mulch

Budget Requested: (min \$25k max 75k) US\$ 75,000 (total 95,000 US\$)

Project Duration: (up to eighteen months) **Target commencement date:** January 2006 – July 2007

1. PROJECT TEAM

1. Lead Institution: Asian Institute of Technology

Name of Project Leader: Prof. V. M. Salokhe

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Telephone number: (land line and mobile): +66-2-524-5479 ; Mobile: +6618330209

Primary discipline/experience of importance to this proposal: Sustainable Agriculture Production & Management

Type of Institution: OTHER: (Regional International Postgraduate Institute). The details could be seen at www.ait.ac.th

(* A brief CV of the project leader is attached, a detail version is available on request.)

Name of Project member: Prabhat Kumar

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Primary discipline/experience of importance to this proposal: Integrated Crop Management and Farmer's lead research and extension

Type of Institution: OTHER: (Regional International Postgraduate Institute). The details could be seen at www.ait.ac.th

(* A brief CV is attached, detail version is available on request.)

2. Institution: Thai Education Foundation

Name of Principal Investigator: Mr. Marut Jatiket

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Primary discipline/experience of importance to this proposal: Integrated Crop Management, Participatory farmers training and research

Type of Institution: NGO (The details could be seen at www.thaied.info)

(repeat as necessary with more team members) (delete institution types that are not applicable)

(provide a one page c.v. of the project leader and key principal investigators)

The project leader confirms that official representatives of all the institutions listed above have agreed to execute the proposal as described if it is selected for funding. YES

2. LINK TO CPWF RIVER BASINS

CPWF Benchmark basin in which the project will be conducted: Andean / Indo-Gangetic / Karkheh / Limpopo / Mekong / Nile / Sao Francisco / Yellow River / Volta
(mark the basin that applies)

3. THE PROJECT

3.1 Provide a summary of the background leading to your proposal (maximum 300 words justifying why your proposal is important and the work, or lack of it, that it builds on).

Rice production in northeastern Thailand (over 55% share in total Thai rice production) is severely constrained by lack of irrigation water, inadequate water management techniques, flash floods and droughts (Kabaki, et al., 2003; Anonymous, 2005; Kupkanchanakul, 2005).

In addition, the increasing international demand and higher net return from organic rice have compelled farmers' group to explore alternative crop management options using LEISA (Low External Input Sustainable Agriculture) concepts. These varied interests have attracted scores of farmers to grow their rice using principles of the System of Rice Intensification (SRI). (Gypmantasiri, 2002)

SRI (see, Uphoff and Randriamiharisoa, 2002) is based largely on the principles of ecological farming to achieve "more crops with less seed and less water" with environmental sustainability. The recent research finding shows that two major principles of SRI i.e. alternate wetting and drying (AWD) during vegetative stage and the use of organic fertilizers have potential to increase rice yield with less use of water than conventional practices (Yang et al., 2004). However, in Thailand, those farmers who grow rice using SRI principles experience weeds as a major yield constraint and so a greater number of labor units is required than conventional methods. Therefore, in spite of the potential SRI yield advantage over conventional methods, farmers do not follow this management practices on a larger scale. To combat this situation some farmers have come-up with innovative practices to manage their weed problems by intercropping a green manure crop in inter row spaces; and then followed by flooding the field and mixing it in to the soil at the time when rice canopy closes. This practice provides mulch to cover the exposed soil surface at early growth stage of rice (since rice seedlings are widely transplanted under SRI practice) which reduces weed problems and conserve soil moisture as well. At the later growth stages, the mulch seems to enrich soil fertility since this practice increases rice yield by almost double compared to conventional methods.

However, due to lack of any intervention on a larger scale this SRI/mulching practice has remained in the domain of few farms only. In addition, clarity regarding the selection of appropriate/suitable green manure crop species is yet to be established, particularly by farmers' communities on a location by location basis.

This proposal aims to validate and upscale these innovative techniques with rice farmers and NGO partners using Participatory Action Research (PAR) methodology in two selected villages of Northeast Thailand. Furthermore, it aims to create knowledge base/understanding on the discussed issues for the rice farmers, non-government

organizations (NGOs) and government organizations (GOs) working in area in order to create awareness and disseminate information, that may be later taken up through various other extension means by the larger cross sections of the farming community in the country and beyond.

3.2 Who is/are the target group/s of your project? (maximum 100 words)

Six groups of small holder rice growers (5 men and woman farmers in each group) from a selected village in the northeast Thailand will form the core research farmers group, along with the personnel and field staffs of the partner NGO and local level government agriculture and extension office, and AIT. Each participating farmer will invite 5 of their friends from nearby villages to be partners, observers and learners in the action research process; they would participate at each key intervention points during the research period, mid-season evaluation and at harvest cum field day.

3.3 What specific agricultural water management strategy or technological/dissemination innovation does the project intend to address? (maximum 100 words)

- The project will helps farmers to innovate and localize the agronomic practice suitable to increase water use efficiency i.e. flooded rice to AWD rice by using SRI management practices.
- This will be further integrated with local innovations like use of green manure crops as intercrops, use of rice straw so that suitable mulching could be achieved within the framework of existing production practices.
- In addition, the project will also explore how to obtain information on water harvesting techniques if they have any or alternatively, what kind of specific intervention is needed for the conserving water.

3.4 Provide a summary of your project methodology/approach activities for achieving the project results (maximum 500 words)

A bottom-up participatory problem census will precede the development and conduct of the participatory action research involving resource poor men and women rice farmers, NGO partners and other stakeholders (local Govt. officials etc.). The following key steps will be followed:

- a. Village Immersion – to visit and collect primary information along with the local NGO partner. The information so collected will be utilized to developed a baseline survey questionnaire;
- b. Baseline Survey – A detail baseline survey will be conducted keeping in mind the various socio-economic groups of the farmers;
- c. Crop Calendar development – The information collected will be analyzed and presented as crop calendars back to the same farmers group to re-validate the information collected;
- d. Final Crop calendars and search of options – Farmers groups will be presented with the final crop calendars of their practices of rice husbandry and using the ‘non-formal education based’ tools like leading questions to help the farmers to

- establish cause-effect relationship leading to establishing the key problems - especially those associated with water use efficiency;
- e. Problems listing, prioritization and development of the action research plans – water-related problems will be focused and suitable local innovation, ideas from outside (a detail research will be carried out before hand) will be listed. This will be followed by the development of the action research designed along the categories such as: topics, title, time requirement, material requirements, procedures, information collection (data collection), data analysis, interpretation etc. In addition, general and other needed logistics e.g. land, compensation issues, assignment of the responsibilities etc. will be discussed with the partner farmers and NGO for the smooth conduct of the action research;
 - f. Action research – Core farmers will present the details of the action research (objective, methodology, information collection, how they would interpret the results) to the members of community and their friends and begin the action research;
 - g. Weekly farmers meetings – Concept of Agro-Ecosystem analysis will be introduced and weekly crop monitoring and information recording will be ensured by the participating farmers and the trainers?;
 - h. Mid –term evaluation – Partner farmers will organize the mid-season evaluation, thereby the trends of the results, other pertinent issues etc. will be discussed and shared with everyone in the community;
 - i. Harvest-day/Field day – Field day will be attended by all farmers along with local media, govt. staffs and other concerned where the results of the action research will be shared and key lesson learned will be taken note of;
 - j. Workshop I- A Workshop would be conducted in the vicinity of the action research village, where the local and other policy makers etc. will be invited and an open forum will be organized to share the results from the action research.
 - k. Workshop II - In addition, more information will be collected from ongoing related work in Thailand, which would be later compiled and shared with all key agencies in the country and region by organizing a workshop at AIT.

3.5 What results will your project provide to the CPWF? (maximum 200 words)

The project will establish whether alternative water use methods, which not only increases the rice yield but also adds to the overall sustainability, are feasible without bringing any major technological input from outside. It would further demonstrate whether farmers are fully capable of understanding and developing/localizing technologies to increase water use efficiency by utilizing their latent learning abilities in association with the research institute and non-governmental organizations in an equitable and gender/social/economic sensitive manner. The process of action research would also provide further impetus to the participating farmers to take-up more such action research either in same group or in other groups to find local solutions to other problems related to water use efficiency etc. So, in summary, we would provide the results on technology change (innovation/localization); process of action research to achieve it; economic details of the change; mechanisms to spread the results; policy imperatives; awareness about water use efficiency for agriculture purposes etc. Apart

from these direct results, we would be able to sensitize the students and govt. and NGOs staffs studying in AIT from various Mekong countries (Thailand, Laos, Cambodia and Vietnam) on the issues and methodologies through presentation, participation and seminars.

3.6 What elements of your proposal are innovative and why? (maximum 300 words)

The growing interest of farmers in SRI practice in this region reflects their eagerness to change existing ways of cultivation, mainly to increase economic return by optimizing external input use. This proposal does not recommend that SRI be treated as a stand-alone technological approach to increase water productivity, but those elements of SRI that contribute to improved water productivity, economically, environmentally or socially should then be incorporated into local production systems. For instance, a recent survey conducted by one of the students of AIT on farmer's perception on SRI, concluded that farmers are willing to adopt this practice mainly due to less seed and water requirements, provided that training and technical support is given to them for managing weed and water so that they could pursue their interests within the context of their existing resources. Until now no Asian research institution has attempted to explore SRI and validate its potential, especially for farmer fields in Thailand. But farmers' interest and their growing concerns have been fully perceived by our institution (AIT); and now several students are undertaking SRI-related research work looking on various aspects such as rice physiology, soil status, socioeconomic status of the farmers etc. These ongoing studies should not only benefit the farmers involved in the proposed PAR trials; but also students will get further opportunities to explore mulching and optimal water usage in more detail, in Thailand; or in their home countries as AIT is a member of greater Mekong Sub-region Academic and Research Network (More info. Could be seen at <http://www.gmsarn.org/>).

Furthermore, the multicultural and international environment of AIT, which is a unique research and training institute in the Mekong region, provides an excellent platform for quick dissemination of valuable information obtained by the proposed PAR trial to the level of government official and planners. Also, the proposed work would have great potential to be assimilated and sustained not only at farm level but at the research level within the AIT, where it would inspire the future generations of students, NGO workers and planners from the Thailand and region to undertake research to improve our understating on the issues of water productivity.

3.7 How, if at all, does your proposal address issues of (maximum 600 words total in this section)

- 1. stakeholder involvement** (demand by them and their inclusion in project activities; acknowledgement of their contribution)

Stakeholder involvement is the major plank of the project (see above the details on the demand from them), as this proposal has kept in mind the bottom-up approach right from the problem realization and gaining consensus until dissemination of solutions and formulation of related policy imperatives. The outcomes of the projects are centered around the idea of contributing to the overall wellbeing of the small holder rice farmers

(both men and women) in terms of capability building in order to understand the problems related to water productivity for rice production, and a search for practical solutions using proven ideas/technologies from the community or from outside. As a last major initiative the project aims to link the farmers' group with like-minded groups in the region and the country generally to think and plan sensible experiments, and ultimately influence public policies related to water productivity both at local and at national level. The project is designed to have strong scientific backstopping and overall support from the reputable regional institute of AIT, which over the years has contributed to sustainable water use in Asia, but with special emphasis on the Mekong river basin. In addition, the project builds around keeping the issues of sustainability in terms of skills, process, and resource as a main guiding principle.

2. gender (for instance, in data collection and analysis, farmer group activities)

Gender roles in the proposed project are well integrated. It will start with selection of the area and farmers and over 50% of the selected small holders would be women farmers. In addition, a minimum of half of the small group leaders would be women. We also foresee women farmers taking the lead in inviting other farmers to be part of the action research process. Like their male counterparts, they would lead their group, monitor the weekly crop development, maintain records of farms and participate in data analysis and its interpretations, organizing harvest day etc. with full vigor in an equitable manner. The benefits from the research should be captured equally by male and female farmers.

3. environmental security (e.g. biodiversity, water quality)

The proposed project idea is not only addressing the water productivity issue but it very much encompasses biodiversity issues, along with soil fertility and system productivity. For example, Thailand used to have more than 3500 different strains of rice; but by 1990s, just five varieties accounted for half of the rice lands. The principles of SRI that offers to go with traditional varieties and other proposed parts of the projects have demonstrated vision for conservation and taking into account the ecological-based principles as a guiding force. This follows as SRI, which is theoretically visualized and empirically practiced, involves a judicious use of local farm inputs, as determined by a reduced dependency on external inorganic fertilizers and pesticides; which, in turn, helps to uphold the concerns of environmental security as underlined by the CPWF. The study proposes to use standard methodological protocols and analytical tools for assessing and valuing the socio-economic and environmental costs and benefits of conservation of biodiversity, soil and water quality.

4. impact on the poor (including food security and wellbeing)

The ultimate objective of the proposal is to highlight and utilize those parts from the SRI concept which have been already adopted by many Asian farmers, and which uphold promises to increase over all net return by reducing cost of cultivation while at the same time increasing yield. The dual outcome should have a positive impact on overall food security, apart from reduced dependency on use of the chemicals and other harmful inputs.

The proposed work would also help to develop and link farmers to their rice production systems in a way which should connect them to their traditional practices. Also, empowering farmers with the tools and skills to identify problems, their analysis and finding ways to solve them, largely using local knowledge and resources will go long way to allowing them to stand on to their own feet.

In addition, the group formation, group working, critical thinking abilities of the farmers group will be strengthened. This, in turn will provide a strong local platform for raising concerns and issues pertaining to their overall wellbeing. The farmers group may develop into a pressure/lobby group, eventually with the help of the NGO partners, to take up matters concerning the environment and related policy issues with the local and regional lawmakers. So, in summary, our proposed design will add to the social wellbeing, as well as creating other constructive and positive bonds among farmers.

3.8 How do you intend to self-monitor the progress of the project towards obtaining the results? (including the roles of institutions/groups involved (maximum 200 words)

The self monitoring and correction process of project is designed with each step both in qualitative and quantitative terms. We propose to do a pre-action research evaluation of the farmers using criteria along the key areas like farmers perceptions on water problems, biodiversity, technologies etc and later compare it with a post action research to quantitative see the change. Since we are using a participatory methodology, the monitoring, planning and evaluations are part and parcel of each step in the project. Right from the beginning of the project, evaluations points and criteria will be jointly developed by all stakeholders and will be followed. For instance, the daily and weekly planning and evaluations will be carried out during each weekly meeting using non-formal education tools by expert trainers. We foresee that the monitoring and evaluation will feed to the planning part of the next step so as to improve the overall performance with passage of time to achieve successful end goals.

4. BUDGET (Calculate in US\$)

Divided by institution as follows:	Lead Institution	Partner 2	Partner 3	Partner 4	Partner 5	Totals
1. Personnel (one X 1200 US\$/monthX18 month)	22,000.00		\$0	\$0	\$0	\$0
2. Travel and accommodation	10,500.00	500	\$0	\$0	\$0	\$0
3. Other operational costs	16,000.00	2,000	\$0	\$0	\$0	\$0
4. Overheads	15,000.00	9,000	\$0	\$0	\$0	\$0
Total CPWF Budget	63,500	11,500	\$0	\$0	\$0	\$0
5. Additional budget provided by partner as 'matching funds'	15,000 *	5,000**	\$0	\$0	\$0	\$0
Total Cost	78,500	16,500	\$0	\$0	\$0	95,000

- *-* This includes the cost towards faculty time and cost of physical facilities use in-kind.*
- *** This includes cost towards facility use etc. in -Kinds*

Notes:

- Leave blank any budget columns that are not required.
- Capital items are not allowable.
- Provide clarification against amounts that you feel need explanation.
- No overhead maximum is stated, but be aware that your budget must be competitive and show value for money.

- Matching funds are not required, but a contribution will be viewed favorably either in cash and/or 'in-kind'.

Is there anything additional you would like to say in support of your proposal? (Maximum 100 words)

AIT as a lead institute brings with it the knowledge of sustainable water use technologies and experience from over 5 decades of working in the Mekong region. Also, very few institutes in the region can match AIT's dedicated research group working on various aspects of water conservation technique including SRI. The ongoing work from AIT will directly support the build-up of the design and knowledge base of the project.

Thai Education, another partner in the project, brings with it experience of over a decade of using non-formal education based training approaches for the agriculture production in Thailand (as Farmer's Field School, Kid's IPM etc.). Thai education is involved in various crop based training program supported by FAO, etc. etc.

References cited:

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Gypmantisari, P. (2002). Experience with the System of Rice Intensification in Northern Thailand. *In*: "Assessments of the System of Rice Intensification (SRI)". Sanya, China, April 1-4, 2002.

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N. Kabaki, H. Tamura, S. Fujimori, H. Morita, B. Uraipong, U. Arromratana and T. N. Nagara (2003). Development of a comprehensive series of technologies for lowland cropping systems in Northeast Thailand. JARQ (in press)

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Yang, C, Yang L., Yang. Y, Ouyang Z. (2004). Rice root growth and nutrient uptake as influenced by organic manure in continuously and alternately flooded paddy soils. *Agricultural Water Management*. 70: 67-81.