

Pilot Project for Natural Resource Management  
Cardamom Mountain Range Corridor, Koh Kong Province, Cambodia

Proposal presented to the

**Asian Development Bank  
Poverty and Environment Program**

15 November 2005

**WildAid**

## A. BASIC DATA

1. **Activity title:** Pilot project for Natural Resource Management (forest protection through alternative livelihoods and reforestation) in the Cardamom Mountain Range Corridor, Koh Kong Province of Cambodia.
2. **Implementing organization:** WildAid
3. **Request date:** This proposal was first submitted on January 2005, reviewed by PEP Steering Committee in late April 2005 and re-submitted with modifications May 17, 2005. This proposal includes financial revisions as requested by the Committee and is submitted on 14 November 2005.
4. **Types of interventions:** The project addresses the causes of forest destruction in Chi Phat commune of the Cardamom Mountain Range Corridor. The project assists poor landless farmers who are conducting unsustainable forest burning and clearing for crop cultivation to develop permanent cultivation methods and establish sustainable water supply, so they no longer need to destroy the forest for survival. The project provides technical assistance on sustainable crop production with small scale drip irrigation, capacity building for managing an agriculture association and mini-credit fund and implementation of a reforestation scheme.
5. **Amount request:** USD 150,000
6. **Period this funding request will cover:** 17 months from July 1<sup>st</sup> 2006 to December 31<sup>st</sup> 2007.
7. **Region/Country:** village of Sovanna Baitong, Botum Sakor District, Koh Kong Province, Cardamom Mountain Range, Cambodia.

## B. DESCRIPTION OF IMPLEMENTING ORGANISATION

The implementing organization is WildAid and the farmers of Sovanna Baitong village, represented by their Agriculture Association. The Association takes a leading role in the pilot project, through planning and implementation and monitoring/evaluation of results. WildAid is an international conservation NGO headquartered in San Francisco, California, U.S.A. with field offices in 8 countries. As part of its "Surviving Together" program, WildAid supports protection of biodiversity in national parks in developing countries by helping poor slash and burn farmers/wildlife poachers develop alternative livelihoods so they no longer need to destroy the forest for survival. WildAid's park protection support also includes park ranger activities, zoning and demarcation and monitoring of wildlife populations. WildAid has been assisting the development of alternative livelihoods for the poorest rural farmers living in national parks since 1994 (Thailand, Burma, Cambodia, the Russian Far East, and the Galapagos Marine Reserve).

WildAid was founded in 1994 and is managed by a Board of Directors, an Executive Director and an Executive Operations Committee constituted by the four founders of WildAid. Each year, WildAid's accounts are audited by a US third party certified accountant.

Staff WildAid Cambodia: 43; Staff WildAid Global: 140

Total annual budget WildAid - Cambodia: 1,300,000 million USD; WildAid - Global: 4,565,858 USD

## C. PROPOSED PROJECT

### 1. Background and Rationale: Scope and strategy of SWEC program

In the Cardamom Mountain Range Corridor, the tropical forest is being destroyed at an unsustainable rate by poor landless farmers conducting slash and burn agriculture. Since November 2002, WildAid has worked with the farmers of Chi Phat commune, the Commune Council, the Thmar Bang district governor the Koh Kong provincial governor, the Provincial and National Steering Committees to find win-win solutions that will protect the forest and at the same time, help landless farmers develop permanent agriculture and alternative livelihoods.

WildAid's proposal to the PEP fund, "*Pilot Project for Natural Resources management in Koh Kong Province of Cambodia*" is a sub-project of the Alternative Livelihoods component of the South West Elephant Corridor (SWEC) program, a joint project implemented by WildAid and the Forestry Administration (FA). The SWEC program implements WildAid's park protection model, a comprehensive

approach to stopping forest clearing and extinction of endangered wildlife. This approach has five key activities implemented together, as five cogwheels of the same process.

- 1) **Ranger patrolling** (law enforcement and education) to stop forest fires, land grabbers and loggers/wildlife poachers on the ground;
- 2) **Zoning and demarcation** (participatory planning which results in government stamped zoning maps and installation of demarcation sign posts on the ground) to clearly delineate areas where farmers can grow crops and areas where forest is completely protected and no clearings are allowed;
- 3) **Community livelihoods** (sustainable agriculture, small enterprises, community-based support organisations) to help loggers, poachers and slash and burn farmers develop alternative means of revenue so they no longer need to destroy the forest for survival;
- 4) **National campaign**, involving participation of 5 ministries and the provincial governor to help overcome problems and hurdles and constantly improve the effectiveness of protection efforts;
- 5) **Monitoring of forest cover and wildlife** to identify whether protection efforts are effective.

In the Coastal Cardamoms, from May 2001 to December 2002, the number of elephant and tiger killings was so high (37 elephants killed from May 2001 to December 2002, WPO and CAT Treasury Report 2002) and forest fires were getting so much out of control (35-40 fires any given day) that the FA asked WildAid for help. In April 2002, WildAid and the FA created the *South West Elephant Corridor (SWEC)* program to stop destruction of biodiversity and forest cover of the Cardamom Mountain Range, focusing on the Coastal Cardamoms.

The first year of operations started with a small pilot project along National Road 48 and in Chi Phat, with three small ranger stations, to address immediate forest clearing and wildlife poaching threats. In addition to stopping 401 cases of land grabbing along road 48 by rich speculators, the rangers identified three communities where forest destruction through unsustainable slash and burn practices were at their worst (Chi Phat, 50 square kilometers of forest destruction, Chhay Ariang 28 square kilometers, and Talam, 20 square kilometers). One of these communities (Chi Phat) became the focus of the first SWEC alternative livelihoods project, which is described in this proposal.

#### Causes of forest destruction in Chi Phat Commune

For the past 25 years, the poorest farmers from Chi Phat commune have been conducting unsustainable slash and burn agriculture resulting in the permanent destruction of over 50,000 ha of tropical forest and have been living off less than 12 USD a month per household with an average annual income of 144 dollars/year (0.4USD/day), far below the poverty line (1USD/day). These farmers are barely able to secure basic food supply, with an average rice production of 840-1,200 kg/ha, which is below the minimum annual rice consumption of 1,440 kg for a 6-7 person family.

The situation was very different in the sixties and early seventies, where these same Chi Phat farmers were sedentary, cultivating rice along Chi Phat river, and participating in Cambodia's rice exports to Southeast Asia. The Khmer rouge regime in 1975 changed everything, imposing collectivism and confiscating buffalos and plowing equipment. After the collapse of the regime in 1979, farmers no longer had the equipment necessary for rice production, so they turned to slash and burn agriculture. Clearing 1-2 ha of new forest every year, using ashes of burnt forest as fertilizer, farmers planted rice by digging holes in the ground and used rainfall for irrigation. Monsoon rains, however, quickly washed away top soil and ashes along with the majority of seeds. Tall dense grass (*Alang Alang Imperata*) quickly invaded cleared lots, forcing farmers to move further into the forest every year. Year after year, slash and burn farmers live isolated in temporary shelters with no water supply, trapped in a cycle of poverty and destruction.

Today, after 25 years of unsustainable destruction of forest, the lack of root system is endangering underground water tables (forest root system no longer serves as conduit of rainwater to underground water tables), thus shrinking water supply and fisheries (rivers and coastal). If deforestation continues at this unsustainable rate, the Cardamom Mountain forests -- the last largest mainland tropical forest in Southeast Asia and key watershed for the entire west of Cambodia -- risk disappearing.

WildAid's alternative livelihood project aims at helping slash and burn farmers return to permanent cultivation by addressing the root causes of their destructive activities. The project reaches that objective by providing:

- 1) access to proper farmland ownership
- 2) farm inputs, equipment and technical training
- 3) year-round water supply for crop irrigation and household use
- 4) access to financial capital.

The project aims at assisting 400 families over a period of 4 years (2004-2008). The Ministry of Agriculture has donated the land for the project and to date 200 families are taking part in the project, supported by funding from USAID, DANIDA and Japanese Embassy.

In October–December 2003, WildAid completed a Participatory Rural Appraisal with the first 113 families and prepared the project site. In January-December 2004, WildAid's agriculture team helped the first 113 farmers develop sustainable cultivation methods and the community development team facilitated the creation of the Agriculture Association and Community Fund (a small savings and credit fund). In 2005 a further 80 families joined the project, a further 120 and 80 families are projected to join in 2007 and 2008 respectively.

One of the challenges faced by the project in 2004 was the longest dry season in 50 Years: farmers were waiting for the rain to start falling in mid-April as usual, but the rain did not start until July. In addition the second rice crop, planted on September 1<sup>st</sup> died when t rains stopped completely in mid-October rather than in November. This lesson learned led to the visit of 2 groups of senior agronomists specializing in tropical agriculture and irrigation systems who all recommended the installation of small-scale drip irrigation systems – this lead to the submission of the PEP Fund for the Phase 3 families (2007). By providing water supply for crop cultivation, the proposal address one of the main causes of food insecurity amongst rural poor and links the project to the ADB CSP Priority Area One (Rural Economic Development- Section3 Water Resources, Irrigation and Drainage). Please see Annex I for further details of the project implementation and development of the sustainability model.

## 2. Objectives

**The overall objective** is to reduce forest loss by 800 ha per year by increasing livelihood standards of 400 families of the poorest slash and burn farmers of the Coastal Cardamoms Biodiversity Corridor.

**The specific objective** is to pilot a community-managed water resource system for 120 families in 2007, which will facilitate the development of sustainable natural resource use.

The target group is the poorest farmers of the commune of Chi Phat conducting slash and burn in the tropical forest of the Coastal Cardamoms, destroying 1.5-2 ha of new forest every year (50 ha of clearings per family for the last 25 years). The beneficiaries of the project are 120 families who will participate in the 2006 Participatory Rural Appraisal to be conducted by the Community Development team and wish to practice sustainable natural resource management (permanent crop cultivation and reforestation of previously destroyed forest lots). Families participating in the project will benefit by receiving 1.5 ha of land, crop inputs, equipment, training, and access to capital.

## D: IMPLEMENTATION TEAM

### Comparative advantage of WildAid to implement irrigation projects.

WildAid's technical team offers many advantages for implementing this irrigation project, as follows:

Competent technical team: the Agriculture team working with the 2004 families is led by 2 foreign agronomists (both Bachelors in Agronomy) with respectively ten and fifteen years experience in drip-irrigation systems. They are living on-site with the farmers. In addition, the project is supported by 4 senior agronomists specializing in tropical agriculture, drip-irrigation systems and economic sustainability which have participated in project design and are providing oversight through on-site assessments and recommendation reports: Dr. Jules Pretty from the University of Essex in the U.K and Dr. Sawaeng Ruaysoongnern from the University of Khon Kaen in Thailand, both experts recommended by U.S.A.I.D.,

and Mr. Arye Volk and Mr. Oved Dafna, Professors from the Faculty of Agriculture in Hebrew University of Jerusalem.

The two Cambodian agronomists working with the 2004 families on a daily basis were trained during 6 weeks in Chaingray, Thailand, on installation, operation and maintenance of drip irrigation systems. In addition, a Thai irrigation technician worked on the installation of the drip irrigation system for the 120 families of 2004 and spent 6 weeks on-site training all the families to manage the irrigation system.

Irrigation as part of an Integrated Agriculture System: As mentioned above, this is not just an irrigation project, it is an integrated agriculture system aiming at rebuilding top soil and soil fertility -- of which irrigation is but one component. WildAid's four agronomists working on the project site have practical experience in integrated agriculture systems and have intimate experience day in and day with tropical soil agriculture in the area. That is why drip irrigation is a key component, but not the only component: it works hand-in-hand with 1) integrated agriculture techniques (ground cover, green manure crops, composting, intercropping, crop rotation, fertigation, plantation of trees to stock nitrates and other nutrients, to retain soil, to serve as a conduit for rainwater into underground soil and to +provide shade) and also 2) community development facilitation to help farmers overcome problems and hurdles, get organized as a community, develop community-based organisations that support joint problem solving and help improve livelihoods and quality of life of the community.

Successful Pilot project: WildAid's agriculture team has already helped farmers implement a successful irrigation pilot site in October-December 2004, which is on-going and has been extended to the Phase2 families (2005).

## **E. IMPLEMENTATION TIMEFRAME**

### **Irrigation System**

The Phase 3 families will join CADP in January 2007, following a period of Participatory Rural Assessment. After 1 month of lot preparation the families will begin crop cultivation and will require irrigation. In order to reduce any potential delay in crop production, the irrigation system will need to be ordered by August 1<sup>st</sup> 2006 in order for it to be delivered in time for the lot preparation. If the grant funds were made available July 2006, the irrigation system could be ordered and installed by January 2007 for the first crop to be planted in February 2007.

### **Training**

Farmers will need one year to learn the Integrated Agriculture System and receive capacity building in basic business management skills and handicraft skills: the timeframe for farmers' skill building is one year, from January 1<sup>st</sup> 2007 to December 30<sup>th</sup> 2007.

## **F. PROJECT OUTPUTS**

- Output 1.** Farmers become users of small scale drip irrigation system and receive training in Integrated Agriculture System
- Output 2.** Farmers have access to financial capital, learn basic business management skills and handicraft skills
- Output 3.** Farmers implement community reforestation of old forest clearings

Details of how the outputs will be achieved and monitored are reported in Annex II.

## **G. POTENTIAL CONSTRAINTS AND RISKS**

The main potential constraint would be lack of funding. The main risk to the project, and farmer sustainability, would be another extended dry season without an irrigation system.

## H. EVALUATION AND INFORMATION DISSEMINATION

At the project level, information about natural resources protection and crop improvement are disseminated within the Agriculture Association. At the commune level, this information is communicated by the farmers themselves talking to relatives and helping other farmers start opening their minds to new practices. At the provincial level, the governor supports the replication of the model in other sites to benefit both people and forest protection. ADB's GMS Biodiversity Corridor Initiative (BCI) team has also expressed interest in replicating the model throughout the Cardamom Mountain Range Corridor. A 3 year pilot study will be completed in 2009. At the Ministry of Agriculture level, agronomists from the Ministry are receiving feedback on how the project model is improving, and the Ministry is considering how to replicate the model in other parts of the country.

The project model can be adopted in other countries as well, because it tackles the root causes of poverty that lead to forest destruction, which are similar in many DMCs countries. The core outputs package - training and capacity building conducted by technical expertise on a daily basis, provision of inputs and equipment - is easily replicable.

## I. COST ESTIMATE AND DISBURSEMENT SCHEDULE 2006-2007

Item	Partner Contribution	Requested	Total (US\$)
<b>Preparatory activities</b>			
Procurement of irrigation equipment	40,000	80,000	120,000
<b>Implementation activities</b>			
Operational costs (diesel, fertilizers, working tools)	32,693	40,000	72,693
Community reforestation: seed collection	250		
Community reforestation: manure	2,400		
Community reforestation: labor	7,488		
Community reforestation: transport	1,920		
Agriculture team leader (2,500/month)	15,000	15,000	30,000
Agriculture team member (1,040/month)	12,481		
<b>Training and Capacity Building</b>			
Community team leader (2,500/month)	15,000	15,000	30,000
Community team member (1,040/month)	12,481		
<b>Contingencies</b>	14,800		
<b>TOTAL EXPENSES</b>	154,513	150,000	304,513

### Disbursement Schedule

July – December 2006: On signing of contract **53% of total** (procurement of irrigation system)

January – June 2007: Operational costs and technical support: **24% of total**

July – December 2007: Operational costs and technical support: **23% of total**

The budget is contingent upon project implementation according to the project schedule

## J. WORKPLAN AND REPORTING

Please refer to Appendix III for further details of the workplan. Progress reports will be made at the midterm and project conclusion.

## **ANNEX I**

### **Project implementation and development of the sustainability model:**

Project implementation started in January 2004 with basic inputs and training but without irrigation. The model implemented in 2004 to help farmers reach sustainable livelihoods was based on farmers' requirements expressed during the participatory planning phase preceding the project (Participatory Rural Appraisal), crops cultivated by local farmers around the project site, methods used on pilot sites implemented by the Ministry of Agriculture and the Food and Agriculture Organization (FAO), and additional pilot sites by other NGOs (for example the Haggar soja farms). To create the sustainability model for the project, WildAid took farmer requirements and successful methodologies from different pilot sites around Cambodia, and then compounded them with an income generation component, so that farmers were not stuck with just food security. The objective of the project is for farmers to do well with their crops, generating enough profit to be able to start their own small businesses (kroma weaving, grocery store, village cafes) and buy new equipment, new livestock, etc.

Following the Participatory Rural Appraisal, farmers from the northwestern section of Chi Phat were invited to join the Community Agriculture Development Project (CADP). A total of 75 families from Chi Phat, along with 38 families from Preik Tanon, Prolean and other forest locations came together to form the first 113 families to work on the Year 1, 2004 pilot project. Another 80 families have joined in Year 2 (2005). A total of 400 families are projected over the life of the project.

Because the 200 families of Year 1 and 2 have stopped slash and burn practices, it is estimated that CADP so far has prevented burning of 2 ha of forest / year per family, saving 612 ha over the first two years of the project (by the end of 2005). In addition, the project is in the process of replanting 45 ha of burned forest.

205 families still remain in Chi Phat conducting slash and burn on the northern, eastern and southern sections of Chi Phat. Some of the families will be joining CADP in the future and others prefer to stay, waiting for other alternative sources of income to be developed locally in Chi Phat. WildAid is planning to seek the advice of several expert consultants to help Chi Phat farmers find sustainable development solutions through non-timber forest products (NTFPs), community-based energy generation, and community forestry.

This proposal focuses on providing water supply and equipment for 0.5 hectares of land to each of the 120 families who will take part in CADP in 2007, to ensure food security and long-term economical sustainability.

- The overall objective is to benefit the forest and the farmers. The two projects (CADP in Sovanna Baitong and community management of natural resources in Chi Phat) aim to alleviate poverty by helping farmers become economically self-reliant, so they no longer need to destroy the forest for survival. At the same time, because farmers have abandoned their previous slash and burn and wildlife hunting practices, the forest can regenerate.

### **Activities**

At the onset of the project, each farmer receives 1.5 ha of land (0.5 ha irrigated), 1 water well, 10 sorts of vegetable seeds, 7 species of fruit tree saplings, 3 chickens and 2 piglets, rice supplements, 1 bag of fertilizer, rice seeds, cassava stock, and other basic inputs. A tree nursery and a vegetable nursery on-site help farmers improve yields and shorten harvest cycles, so they can increase their revenues. For those families that are beginning on the project, tractor cultivation and irrigation are free. After each commercial vegetable harvest, the project's financial support is stepped down and the farmers' financial responsibility is increased (please see CADP sustainability chart in the Annex). Families are expected to become economically self-sustaining at the end of the second year on the project. During their first year in CADP, families receive financial support for equipment and inputs. During their second year, the project ceases to provide financial support but continues to provide technical support. In addition, farmers have on-going access to the mini-credit scheme of the Community Fund if they need to borrow money.

WildAid provides technical expertise on-site to help coach farmers on a daily basis with two teams, agriculture and community development. Because they live on-site, the teams are able to ensure daily assistance, facilitate problem identification and solving, and conduct on-going monitoring.

The agriculture team provides skill building in integrated agriculture systems:

- Plowing and soil preparation techniques
- Selecting good seed stock
- Propagation and planting techniques (including intercropping and rotating crops)
- Top soil rebuilding (composting leaves and crop residues, planting “green manure”, using termite mounds and cow manure)
- Techniques to avoid top soil erosion
- Irrigation and fertigation
- Maintenance of irrigation system and farming equipment
- Pest control
- Monitoring results by comparing inputs and yields
- Sharing results with other farmers to improve each family’s yields
- Harvesting, storage and transporting techniques
- Identifying markets
- Calculating cost of inputs, revenues, loan repayments and profits and planning crops based on profitability

WildAid’s agriculture team assists the Agriculture Association in identifying markets and securing economically advantageous contracts, and also encourages individual farmers to find their own niche production and sales. By receiving this kind of on-the-job coaching, the leaders of the Association learn how to conduct procurement and sales. By buying stock of inputs in bulk (seeds, fertilizer, small equipment, hand tools, plastic ground cover sheets, etc.), the Association is able to obtain a 5% price reduction. Inputs are then sold through the Agriculture Store. The store offers lower than market prices to farmers and still makes a small profit, which, along with loan repayments, is entered into the Community Fund to help pay Association fees and equipment maintenance costs.

The community development team assists farmers organize their activities and facilitates the participatory process within the Agriculture Association and Community Fund:

- Help build trust amongst the villagers to create a strong and viable community
- Actively engage villagers to express their concerns and needs
- Facilitate problem identification and solving, election of community leaders, Agriculture Association chiefs and heads of Service Groups
- Train the Service Groups (managing procurement and sales, managing the Community Fund, providing basic health care, managing water resources and waste, etc.)
- Provide basic business management skills for farmers to manage their revenues, savings and loans
- Train families in small enterprise development, using loans from the mini-credit scheme
- Conduct regular household economy surveys to assess whether farmers are becoming sustainable or not
- Facilitate school registration, teacher arrivals, surveying parents for additional education needs (for example, constructing a kindergarten at a new location so small children do not have to walk to far to the school)
- Facilitate farmers’ creation and implementation of policies on community issues (loan repayments, domestic violence, lack of agriculture commitment, public disturbance, etc.)

- Help form women's groups to address gender issues
- Provide trainers in handicrafts and help procure equipment and inputs (to-date, 10 families have learned kroma weaving and are making a profit of approximately 50 dollars/month after loan repayment)

## **SUSTAINABILITY**

The irrigation system, along with daily agriculture and community development assistance are the basis for farmers' economic self-reliance. Vegetables produced in CADP with the irrigation system produce 8 times higher yield and revenues than without the irrigation system. These results are a strong motivator for farmers, the majority of which works very hard to raise their standard of living. A small percentage of farmers who prefer not to work as hard, cultivate their home garden and have their livestock but earn most of their revenues by working as laborers to others. To support economic self-reliance, the agriculture and community development teams have helped the farmers develop two community-based organizations, the Agricultural Association and Community Fund. Through these mechanisms, farmers are learning to manage their revenues, savings and loans, manage small enterprises, and create a civil society that lives in peace and prosperity.

The community development team conducts regular household economy surveys to assess whether farmers are becoming sustainable or not and what they need in order to overcome hurdles. For those families that are beginning on the project, tractor cultivation and irrigation are free. After each commercial vegetable harvest, the project's financial support is stepped down and the farmers' financial responsibility is increased (please see CADP sustainability chart in the Annex). Families are expected to become economically self-sustaining at the end of the second year on the project. During their first year in CADP, families receive financial support for equipment and inputs. During their second year, the project ceases to provide financial support but continues to provide technical support. In addition, farmers have on-going access to the mini-credit scheme of the Community Fund if they need to borrow money. Capacity building in savings and loans has been successful, and 100% farmers are paying their loan interest on time every month.

### **Recommendations of Expert Mission**

Dr. Jules Pretty from the University of Essex in the U.K. and Dr. Sawaeng Ruaysoongnern from the University of Khon Kaen in Thailand visited CADP in December 2004. Their "Report of an Expert Mission" states that, "one year after the resettlement of the first families to the new agricultural site, it is already clear that the move has been successful for many if not all the families" but that improvement of soil fertility, provision of irrigation and improvement in social capital needed to be implemented for the families to become sustainable.

#### *1) Providing irrigation*

Because of lack of plant growth during the dry season and because the length of the dry season cannot be predicted (9 months in 2004), if irrigation equipment is not installed, farmers will not be able to cultivate enough vegetables and field crops each year to become economically self-sustaining. The only solution to remedy this is to install irrigation.

After the drought of Year 1, WildAid's agriculture team anticipated this and helped 22 families implement an irrigation pilot project to gather comparative data with non-irrigated lots. The October 2004 - May 2005 pilot irrigation site has demonstrated an 8 fold increase in revenues as compared to non-irrigated lots. Each family made an average revenue of \$114 per month over a 3 harvest cycle in 7½ months as compared to an average of \$13 on non-irrigated land.

WildAid conducted market research to identify an irrigation system that provides the best value for cost. The results of this research are detailed in the Irrigation Analysis table in the Annex. The Cambodian market is currently unable to provide the systems required to effectively irrigate the sandy soils encountered in Koh Kong province. Development of Cambodian manufacturers to produce fittings for irrigation systems is currently being undertaken by the NGO IDE. However, this is not available and there is no planned timeline for production or market availability.

To ensure sustainability of water supply, WildAid is planning to increase the volume of water in the existing lake/reservoir and needs to conduct a water reservoir survey for the eastern side of the road.

## 2) *Building top soil*

Because of the high sand content of the soil, farmers need to intercrop legumes as green manure and till it into the soil after growth, as well as add cow manure and termite mounds. These three soil additions will bring nitrogen, increase organic matter, earthworms and beneficial micro-organisms, and increase the soil's moisture retention. Over time, rebuilding top soil will bring deep minerals to the soil and break up hardpans, as well as improve water, root and air penetration in the soil and smother weeds.

## 3) *Improving human capital*

Dr. Sawaeng and Dr. Pretty recommended that the farmers of CADP create a network with farmers in the eastern provinces of Thailand, where farmers have implemented similar cultivation systems with success over the last 20 years. Based on this recommendation, CADP Agriculture Association leaders have visited model farms in Surin and Buriram and established network contacts with Thai farmers to share information.

### **CADP sustainability model**

When WildAid and the farmers created the sustainability model for Year 1, it was used as a spring board to start the project, and everyone was well aware that unknown circumstances and obstacles would occur during the first year, requiring changes and improvements to the model. It is in this spirit of pilot project experiment that the model was tested the first year. And indeed, imponderables did arise, such as the 2004 extended drought. This first sustainability model did not provide irrigation, was heavily oriented towards food security, (instead of cash crops), and had a small amount of cash crops and handicraft enterprises for revenue generation.

#### *1. 2004 sustainability model*

#### **The project did not provide irrigation.**

Each family received 1.5 ha of land divided as follows:

2,500 m<sup>2</sup> Home garden

- ◆ Vegetable seeds, fruit trees
- ◆ Fast growing firewood
- ◆ Livestock (2 piglets, 5 chickens)
- ◆ Home compost and natural pesticide
- ◆ Home nursery

2,500 m<sup>2</sup> Small cash crops

- ◆ Sugar cane, taro, sweet potato, ginger

0.5 Ha Cassava

0.5 Ha Rice

- ⇒ Project provided technical training, community development, capacity building in basic business management skills, and specialty training in handicrafts
- ⇒ Project provided initial agriculture inputs, equipment, and mini-credit scheme
- ⇒ Farmers sold products on local market in Andong Tuek – vegetables (melons, gourds, long beans, radishes); fruit (jackfruit, mango, rambutan, durian, longan, banana); and kromas. Cassava was sold to a tapioca manufacturer in the neighboring province of Kompong Speu.

This first sustainability model had no irrigated crops. When the first dry season stretched out to become the longest drought in 50 years (9 months instead of the usual 5-6 months), it became obvious that the model had to be revisited to consider the possibility of irrigated crops. In October

2004, WildAid started an irrigation pilot project for 22 families and invited international tropical agronomists, upon the advice of U.S.A.I.D., to assess the situation and make recommendations.

1. *2005 (revised) sustainability model*

Changes to the 2004 model were made after the visit of Dr. Jules Pretty and Dr. Sawaeng Ruaysoongnern.

**The project provides irrigation.**

Each family receives 1.5 ha of land which is divided as follows:

- 1 ha cash crop vegetables and spices (**irrigated**), livestock (2 piglets, 5 chickens), home compost, natural pesticide
  - 0.4 ha fruit tree intercropping (**irrigated**)
  - 0.5 ha rice
  - 0.5 ha agro-forestry
- ⇒ Project provides technical training, community development, capacity building in basic business management skills, and specialty training in handicrafts
- ⇒ Project provides initial agriculture inputs, equipment, and mini-credit scheme
- ⇒ Farmers sell products on local market, in Phnom Penh and on international markets - spices and vegetables (ginger, corn, pineapple, gourds, long beans); fruit (citrus, jackfruit, mango, rambutan, durian, longan, banana, and lychees); and kromas.

Both 2004 and 2005 sustainability models include community services

The leaders of the Agriculture Association provide community services through 6 Service Groups, formed through facilitation by the project community development team:

- ⇒ Community Fund (financial services)
- ⇒ Procurement and marketing services
- ⇒ Agriculture services (agriculture store, equipment, facilities)
- ⇒ Education (community school, gender issues, domestic issues)
- ⇒ Natural resource management (waste disposal, water quality, controlling illegal fishing, logging, wildlife poaching)
- ⇒ Health services (monthly vaccines, HIV, malaria, child delivery)

**Sustainability comparison between non-irrigated farms and irrigated farms in the project**

The agronomy team has compared yields and revenues between non-irrigated farms of Group 9 and irrigated farms of Group 7. The comparison was made during the 6 months of December to March (2 growing (\*) cycles of veggies) after the pilot drip irrigation system was installed in Group 7 in October 2004.

In Koh Kong province the seasons are as follows: 7 months of dry season from October to April (with some rain showers in October and April, but not enough to leave the soil moist), and 5 months of rainy season from May to September. Last year, the dry season was much longer, from November 2003 to end of July 2004 (9 months). Farmers without irrigation can only cultivate a narrow range of crops: 1) rice during the wet season (but last year the second crop of rice planted in September was destroyed because rains that started in October, then stopped for 2 weeks, causing all the seedlings to dry out); 2) cassava (9 month harvest cycle); 3) sugar cane, taro and sweet potatoes (the problem with these crops is that they can survive during the dry season but do not grow at all at that time, generating no revenue, just waiting for the rainy season to grow again); and 4), home garden vegetables which do not survive during the dry season. It is because of these problems facing farmers during the dry season in Koh Kong, that the agriculture sustainability specialists Dr. Jules Pretty, Dr. Sawaeng Ruaysoongnern, Mr. Arye Volk

and Oved Dafna have all recommended irrigation to support an economically self-sustaining model <sup>1</sup>.

The comparison table below is based on the assumption that the dry season in Koh-Kong province is on average 7.5 month, which gives 3 veggies growing cycles. During the rainy season, the same land is used for growing rice as food security (not for revenue). Irrigation is provided by a small-scale drip irrigation system very suitable for vegetables, and intercropping. Every family will receive 0.5 ha of irrigated farm (0.1 vegetables, green manure and field crops; 0.4 fruit trees intercropped with vegetables, green manure and field crops) but we are using only 0.1 for the comparison charts, since the pilot sites were based on 0.1 per family.

(\*) growing cycle – the time from planting seedlings or seeds until the harvesting. This time is dependant on varieties, temperature, day length, etc. We gave an average growing cycle time.

**Table 1 Overview of irrigated farm compare to non-irrigated farm.**

Farm parameter	0.1 hectare of non-irrigated farm	0.1 hectare of drip irrigated farm
The varieties that can be grown	Cassava, (Sweet-potato, Taro & Yam can grow with little irrigation by hand and very poor results). Few kind of tropical fruit trees: Coconut, Cashew (give yield only after 7 years).	All tropical and subtropical vegetables, all tropical and subtropical fruit trees, all tropical and subtropical field crops.
Fertilizer	Basic fertilizer in soil before planting. Not so efficient and can damage the environment by leaching.	Improving soil with organic matter before planting and “fertigation” (i.e. very small amounts of fertilizer dripped directly onto the root system of the plant over 24 hours, being absorbed immediately by the plant and eliminating leaching) in small amounts all through the growing period.
Soil	Neglected all over the dry season and exposed to wind and erosion creating loss of organic matter and microbiology activity.	Improved all over the year by keep irrigation, fertilization, composting, mulching, tilling of green manure/other manures, all of which builds top soil, improves microbiology activity and prevents erosion.
The expected yield from 0.1 hectare	Field crop as Cassava, Yam, Taro, Sweet potato – 2000kg in 9 month.	Vegetable & field crop (average) – 3000kg in 7 months. Fruit plantation – 1500kg/ year.

The three next tables (2-4) show the comparison between the economies of 0.1 ha of irrigated farm to 0.1 ha of non-irrigated farm. The comparison is made in the dry season (months October to May) for 7.5 months of growing. For vegetables intercropped with field crops, this period is 3 growing cycles (2.5 month in average per cycle). For fruit trees, this period is one growing cycle. For non irrigated farm, this period is also one growing cycle (the cycle period derives from the varieties that can be grown in the different contexts).

<sup>1</sup> Arye Volk and Oved Dafna “ Agricultural Development in Koh Kong Province, Pilot Site Agriculture Pre-Feasibility Study” July 2003, Arye Volk and Oved Dafna “ Agricultural Development in Koh Kong Province Irrigation Pre-Feasibility Study Report” October 2004, Jules Pretty & Sawaeng Ruaysoongnern, "Report of an Expert Mission" February 2005.

**Table 2 The economy of 0.1 ha of irrigated veggies on 7.5 month (3 growing cycles)**

0.1 hectare of irrigated veggies & (*)field crops	USD
Inputs	
Seeds and seedlings	50
Fertilizers	150
Tractor operation ( maintenance, driver salary fuel, oil)	2.1
water 3 m3 /day*225 days* 5 us\$cent/1m3	33.5
Transport to PP market@3*Ton	10
Sub-Total Inputs	245.6
Output	
0.1 hectare=3000kg in average@0.2 USD*Kg	600
Revenue	
revenue over 7.5 month (3 growing cycles)	354.4

**Table 3 The economies of 0.1 ha of irrigated fruit trees on 7.5 months (1 growing cycle)**

0.1 hectare of irrigated fruit plantation	USD
Inputs	
Fertilizers	70
Tractor operation ( maintenance, driver salary fuel, oil)	2.1
water 3 m3 /day*225 days* 5 us\$cent/1m3	33.5
Transport to PP market@2*Ton (8ton yield)	7
Sub-Total Inputs	112.6
Output	
0.1hectare=1500kg in average@0.2USD*Kg	300
Revenue	
Revenue over 7.5 month (1 growing cycle)	187.4

**Table 4 The economies of 0.1 ha of non-irrigated cassava farm on 7.5 month (1 growing cycle)**

0.1 hectare of no-irrigated cassava	USD
Inputs	
Fertilizers	17
Tractor operation ( maintenance, driver salary fuel, oil)	2.1
Transport to starch company@2*Ton	10
Sub-Total Inputs	29.1
Output	
0.1 hectare=2000kg in average@22.5 USD*1000Kg	45
Revenue	
Revenue over 7.5 month (1 growing cycles)	15.9

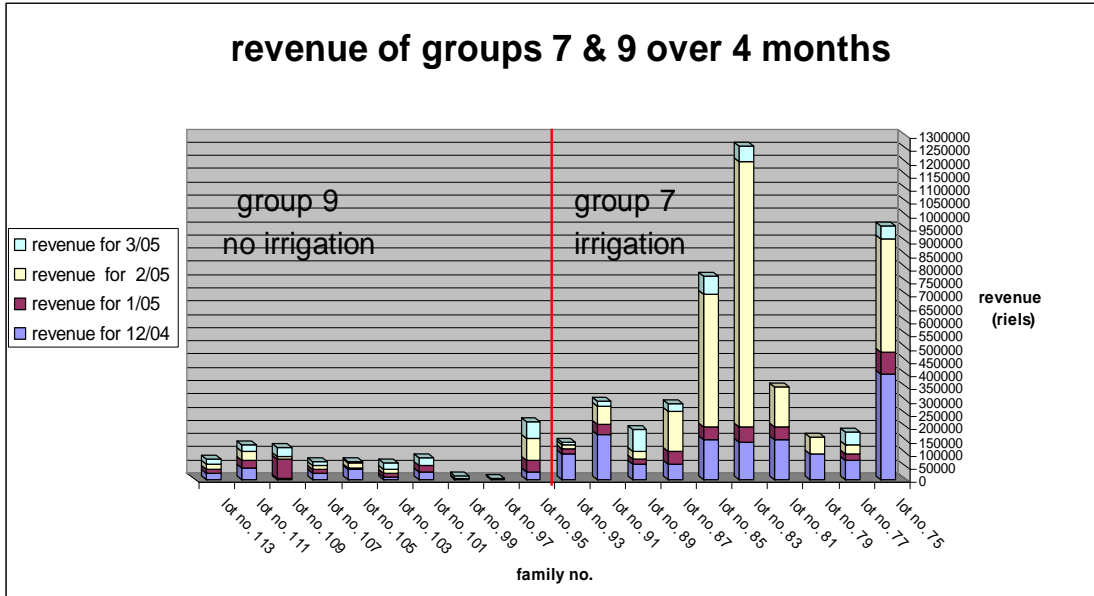
(\*)The field crops (water-melon, corn, pumpkin, ginger, long-bean and green manures as cow-pea) are intercropped with the plantation, the field-crops grow inside the fruit trees and after 3 years it becomes a fruit trees plantation.

The next two tables (5-6) are based on reports of the two groups of families (Group-9 with non-irrigated 0.1 ha farms and Group-7 with irrigated 0.1 ha farms per family) about their income during the months of 12/04 – 03/05.

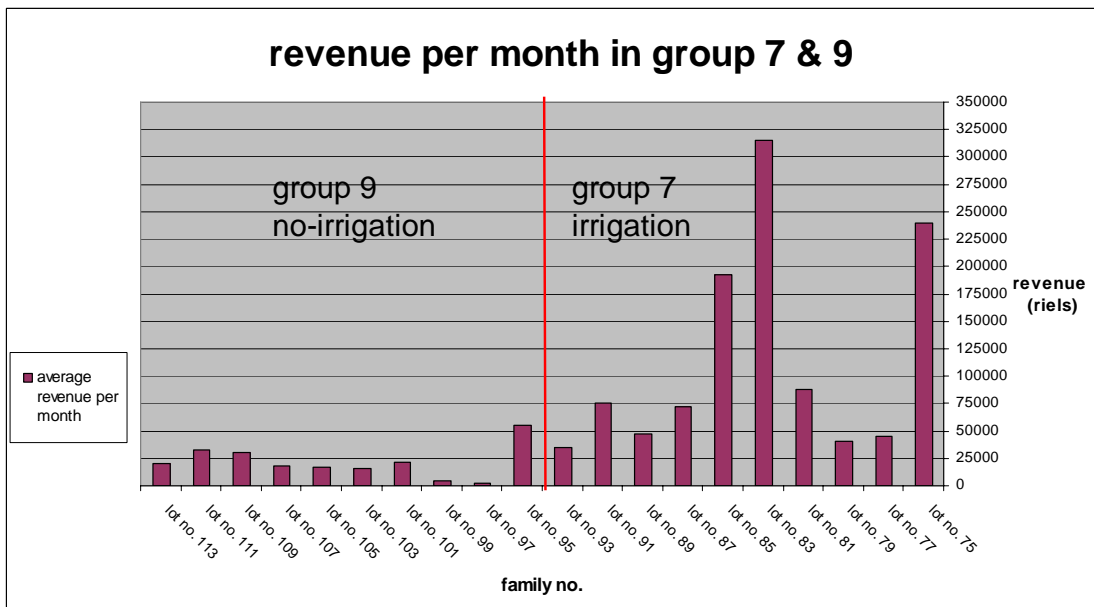
The first table compares the revenue of the families in the two groups for 4 months. Please note the variations of revenue in Group 7 (with irrigation) which follow growing cycles. The 12/04

harvest is shown in **blue** with a sharp increase in revenues, followed by the 01/05 planting in **purple** with a reduction in revenues, harvesting again (second cycle) on 02/05 in **yellow** with another increase in revenues, and planting of the third cycle in **green** with reduction in the revenues. The table shows a big improvement of most of the families' revenue in the second cycle.

In the same time we can see almost no income in Group 9 (non-irrigation).



The second table shows the average revenue per month of every family of Group 7 (irrigation) and Group 9 (non-irrigation) in the months 12/04-03/05. We can see significant difference between the average revenue of the two groups.

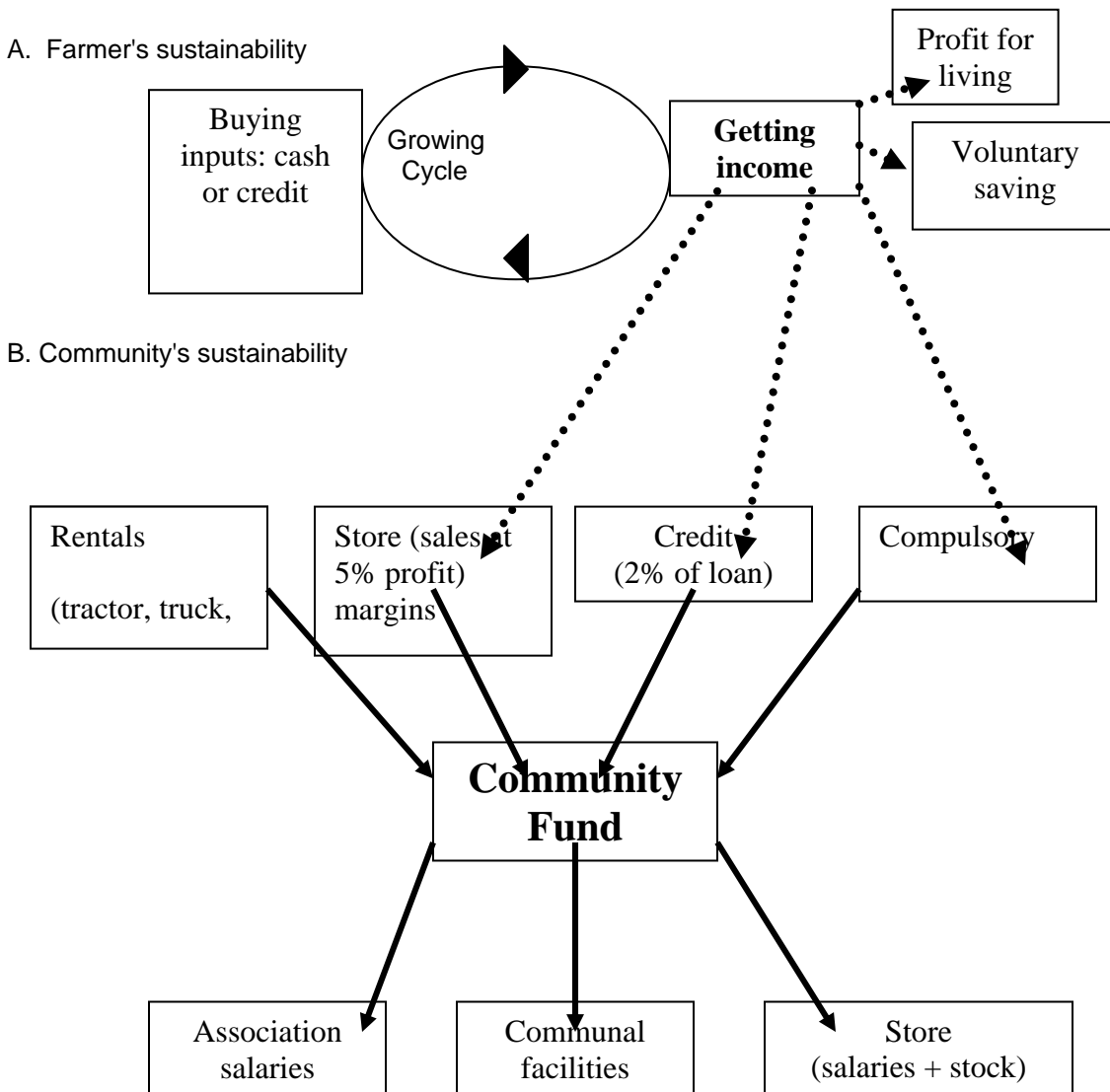


## Project Sustainability Model

Please note that a mini-credit fund of 24,000 USD was provided by USAID in 2004 for the project. This money serves as a revolving fund for farmers that need small loans.

Crop cycle sustainability, Year 1

- Cycle 1: 100% inputs supported by the project
- Cycle 2:
  - open association store for selling agriculture inputs
  - 50% inputs supported by the project
  - 50% of inputs paid by the farmers (cash from crop harvest or mini credit)
- Cycle 3:
  - 100% inputs paid by farmers (cash or mini credit)
  - technical & community development support by project



\*The community fund is kept in a bank account in Sre Ambel with access by the association credit officers, accompanied by a WildAid representative.

It will take two years for the families of each phase (Year 1, year 2, etc) to become sustainable. During the first year, farmers are familiarizing themselves with the integrated agriculture system and becoming part of the agriculture association, learning to manage their revenues and loans, and acquiring basic business management skills. During the first year, the project provides economic support for inputs on a decreasing schedule (see sustainability chart below) and WildAid technicians provide intensive support in training and capacity building. The second year, there is no economic support for inputs, except through the mini-credit scheme (farmers can borrow at any time if harvest revenues are not sufficient to purchase inputs for the next cycle) and technical assistance is provided only when needed.

For the 2007 families, they will start their first irrigated crop cycle at the beginning of February, enabling them to benefit from the fruit tree and intercropping cycle and the second cycle of vegetable crops.

### **Incentive Scheme**

In order to help farmers shift from slash and burn cultivation to crop diversification and more intensive agriculture, an incentive scheme is woven into many activities of the project. This incentive scheme is based on a holistic approach that helps farmers tackle the main problems that led them to practice slash and burn cultivation. The incentive structure is as follows:

1) **Incentive for farmers to stay on the same land** – provide legal land titles after 3 years for farmers who have proven active participation in the project's agriculture activities; this incentive is provided by the Ministry of Agriculture which has donated the land to the project and the Ministry of Land Management which will provide land titles to the farmers (both ministries are represented on the National and Provincial Steering Committees which helped design the project and are overseeing implementation).

2) **Incentive to implement intensive agriculture** -- creation of the agriculture association which provides all the basic needs for the farmers: a) helps purchase inputs at lower costs (agriculture association store); b) facilitates access to markets and sources out best buyers (marketing service group); c) supports farmers who's yield was low and could not buy inputs for the next crop cycle (mini-credit scheme); d) disseminates successful results of "best-in-class" farmers throughout the village (i.e. by seeing their neighbors earn good revenue through intensive cultivation methods, the others start implementing these methods too); e) cultivation by tractor; and f) all-year-round provision of irrigation and drinking water. Training by the project technical teams: training in home garden, in making compost, in intercropping and intensive agriculture methods, in irrigation, cover crops and green manure and other top-soil building techniques, best practices in rice cultivation, setting up small pilots to test new crops (corn, soja, mushrooms), tree planting and grafting, animal production. Courses at the Ministry of Agriculture Institute of Agronomy. Capacity building for association leaders and 6 service group leaders to manage the association (skills in leadership, communication, conflict resolution, problem solving, basic business management skills, community fund management). Trips to Thailand to link up with the network of farmers in the Surin province. The 8 key association leaders from the 2004 families have already established contacts and have visited 7 model farms in Surin and Buriram, witnessing their successes over the past 10 years. Farms that were visited had drip irrigation systems, with an integrated farming system (intercropping, compost, green manures, cover crops as in the project). The project association leaders were very enthusiastic.

3) **Incentive through pilot sites** – in the September-December 2004 irrigation pilot sites where 22 families cultivated different types of vegetable crops (eggplant, cucumber, watermelon, tomatoes, squash, chilies, cabbage, morning glory, gourde, etc.), farmers worked very hard and crops yielded good revenue (see charts below). These pilot sites were one of the best incentives for the other farmers to practice intensive agriculture. At the end of December, the farmers discussed results in the agriculture association and all 120 families of 2004 have requested to receive irrigation equipment on their lots. As for the 2005 families, having actively participated in

a six-month Participatory Rural Appraisal (PRA) for 2005-2006, all families have visited the project site, saw the benefits of the irrigation pilot sites, had meetings with the association leaders, and requested to have drip irrigation on their lots. Association leaders have discussed with them their experience and explained the difference between the 2004 hard working families which are getting good revenue and the less hard working families that are not getting as good revenue. New families understand and are very interested and enthusiastic about the intensive vegetable and fruit intercropping system. 25 families have already signed their contracts and arrived on-site.

4) **Incentive through access to health care** – by joining the project, families have access to basic health care (vaccinations, malaria pills, etc.) and can pay for medical care through the credit scheme at 2% (instead of 10% to 100% through previous lenders) and/or personal savings from crop revenues (which are kept in the Community Fund in a special bank account).

5) **Incentive through access to education** – by joining the project, families can send their children to school every day, in the school built by the project at walking distance of their homes. During a recently visit to the project (April 28 2005), the Head of Mission of USAID visited approximately 10 homes of the 2004 families and asked them if they were planning on staying in the project, and what was the most important factor in deciding them to stay. All 10 families said that the school was the most important factor and that is was a very strong incentive for them to implement intensive agriculture.

6) **Incentive through first year rice provision scheme** – the project provides an average 50 kilos of rice per family (amounts depend on size of family) during their first year on the project, as well as two piglets and three chickens, which helps them with basic food supply during the transition period.

7) **Incentive through contract agreements** – farmers have signed a contract at the onset of the project whereby they agree to no longer burn and clear the forest, to not cut trees nor poach or trade wildlife. They commit to protecting the environment and natural resources by not dumping chemicals or trash into the waterways, by not using electrocution or pesticides for fishing. They agree to actively participate in the agriculture activities of the project and to promote cooperation in the community. If they have respected their contract, they will receive legal land titles after 3 years.

8) **Role of the Ministry of agriculture (MAFF) - incentive through participation of central and provincial government** – having a National Steering Committee and a Provincial Steering Committee to oversee the project have also been good incentive mechanisms. Three ministries participate on these committees: MAFF, MOE and Land Management, as well as the provincial governor and his cabinet. The committees visit the site frequently, and understand the model because they participated in designing it with the families and WildAid. Led by MAFF, the National Steering committee watches the model very closely in view of replicating it in other sites. They have frequent discussions with the agriculture association leaders and with farmers in the field, providing support and motivation for families to take responsibility for their farm revenues. MAFF is especially interested in progress in the areas of irrigation -- because of long droughts throughout the country, efforts to provide water supply and irrigation to farmers is now part of a national policy. Other areas of interest are intercropping, green manure, ground cover crops, composting, which all help rebuild top soil and retain moisture. WildAid agronomists working on the project are in on-going consultation feedback contact with the MAFF agronomists working on FAO pilot sites who have helped create the project model, informing them on how the initial model has evolved and improved. MAFF has big hopes that the model is one of the key answers to the anarchic land encroachment in Cambodia. As part of MAFF's role in the project, the Forestry Administration is working with the project tree nursery to test four types of commercial timber saplings, to see which ones will have the best economic benefit for local people.

To summarize, the biggest incentive is an easier and more profitable life than in the forest (less malaria, access to lower credit, access to school, water, etc. ), when farmers see the profit they are making, they want to continue and even do more. They also consider that having the support

of a community life (before they were disseminated in the forest, isolated by groups of one to five families) is a major incentive.

## ANNEX II

### PROJECT OUTPUTS and INPUTS:

Inputs		
1: Purchase of small-scale drip irrigation system	The irrigation system will be purchased in Thailand, based on the same model as the irrigation system used for the pilot project and for the 2005 families.	
2: Consultants	International Consultants: <ul style="list-style-type: none"> <li>▪ Agriculture team leader - 1 person, 12 months</li> <li>▪ Community development team leader - 1 person, 12 months</li> </ul> Local Consultants: <ul style="list-style-type: none"> <li>▪ Agriculture team member - 1 person, 12 months</li> <li>▪ Community development team member - 2 persons, 12 months</li> </ul>	
Output	Activity	Performance indicator
1. Farmers become users of small scale drip irrigation system and receive training in Integrated Agriculture System	Purchase and installation of a small scale irrigation equipment to cover 60 hectares (0.5 ha/family for 120 families). To guarantee water supply, the project obtained the approval the Ministry of Water Resources to use water from the lake next to the village. The water resource management is conducted at community level by the Agriculture Association since the fees collected pay for the fuel, repair and maintenance of the irrigation system.	<ul style="list-style-type: none"> <li>▪ Farmers able to operate irrigation system correctly.</li> <li>▪ Farmers practice sustainable, permanent agriculture.</li> </ul>

	<p>Training by the Agriculture Team on soil preparation, proper planting and crop growing techniques, management of irrigation equipment (water flow, proper use of fertilizer, proper planting of seedlings, improving crop cycles and yields, maintenance and repair of equipment, fertigation); intercropping, diversification and rotation of crops; weeding and crop health protection; building top soil (composting, mulching and green manure); selection of good seed stock; starting seedlings and saplings in nursery; economic management of seed stock; vegetable and fruit trees care; fruit tree grafting.</p>	
<p>2. Farmers have access to financial capital, learn basic business management skills and handicraft skills</p>	<p>Capacity building by Community Development team on participating in and managing the Agriculture Association.</p> <p>The Agriculture Association operates as a collective decision making body which offers 6 basic community services ( i.e. natural resources service group, purchasing and sales service group, health and education, etc.). Capacity building includes understanding the election system, roles and responsibilities, training in leadership, managing and implementing activities of Service Groups, problem solving processes, conflict resolution, crop yield statistics and sharing lessons learned, decision making processes for identification of suppliers and buyers, basic business management skills.</p>	<ul style="list-style-type: none"> <li>▪ Farmers receive training from Community Development team.</li> <li>▪ Farmers participate in community discussions.</li> <li>▪ Farmers develop and vote for community and service group leaders.</li> </ul>

	<p>Farmers receive capacity building by the Community Development team on Community Fund management.</p> <p>The Community Fund operates as a savings and loan system: farmers have access to small start-up capital for the provision of inputs before they start generating revenues, interest repayment allows growth of the Fund and savings increase capital so more loans can be allocated. The savings and loan system requires training for the families who benefit from it and for the Agriculture Association responsible for its management. Training includes calculating cost of inputs, revenue and profit per family; loan needs per crop or activity; repayments of loans depending on type of crop and activity sector; compulsory savings mechanisms to save inputs for next crop inputs; mechanisms to ensure loan repayment by families; understanding budget management for disbursements for crop production.</p>	<ul style="list-style-type: none"> <li>▪ Farmers utilize Credit Fund are able to repay loans and make compulsory savings.</li> </ul>
3. Farmers implement community reforestation of old forest clearings	<p>Farmers will collect the seeds in the forest during the 8 months covering germination cycles of 5 different species.</p> <p>As soon as they are collected, the seeds are planted and will produce a total of 800 saplings per family. After exiting the nursery, the growing saplings will be planted on the borders of farmers 0.5 ha irrigated farm lots where they will benefit from the irrigation and shading in the initial phases of their growth (approximately 18 months-2 years) allowing them to develop safely until they are ready to be planted in the forest and survive on their own. When the saplings are ready, the farmers will plant them on 1 ha of cleared forest that they previously destroyed through slash and burn practices. 1 ha of cleared forest will be replanted every 4 years.</p>	<ul style="list-style-type: none"> <li>▪ Number of hectares of forest cleared by slash and burn replanted.</li> </ul>
<b>Outcomes</b>		
1. Farmers Sustainability	<p>Families are able to continue paying for their crop cycles by themselves (either through crop profits or loans)</p>	<ul style="list-style-type: none"> <li>▪ Number of farmers that continue purchasing their crop inputs after the 3<sup>rd</sup> cycle</li> </ul>

	<p>Farmers provide enough cash flow to the Community Fund to pay for community services (including Agriculture Association and Community Fund salaries as well as maintenance and replacement of communal equipment and facilities)</p>	<ul style="list-style-type: none"> <li>Amount of cash flow generated by the Community Fund to pay for community services and maintenance of equipment at the end of the first year.</li> </ul>
	<p>The Agriculture Association is delivering the required support to farmers and Service Groups have sufficient skills and capacity to handle their tasks efficiently</p>	<ul style="list-style-type: none"> <li>Percentage of outputs per service groups as compared to the number of tasks required (e.g. number of loans disbursed, number of loan repayments and savings cashed in by the Credit Group managing the Community Fund; number of well priced contracts secured by the Marketing Group with suppliers and crop buyers).</li> </ul>
2. Protection of the environment	<p>Increased tropical forest cover: by stopping an average of 2 ha of forest clearing per family per year, the project will save 612 ha of forest in 2005 (113 families of 2004 and 80 families of 2005); 37.5 ha of previously cleared forest lots will be reforested in 2006 with indigenous tropical species.</p>	<ul style="list-style-type: none"> <li>Sustainable food security and economic self reliance for 120 families in Phase 3.</li> </ul>
	<p>By leaving the forest to join the project farmers, are saving 2 ha forest per year, they are no longer burning and clearing forest for survival. Is the project providing enough incentive to prevent farmers returning to a non-sustainable lifestyle</p>	<ul style="list-style-type: none"> <li>Percentage of farmers that are satisfied with the project at the end of the first year and do not want to return to the forest to make a living through slash and burn agriculture.</li> </ul>
	<p>Farmers participating in the projects' reforestation scheme are helping replant native tropical tree species every year on the forest lots that they had previously denuded, creating a community forest buffer zone with watershed and biodiversity value</p>	<ul style="list-style-type: none"> <li>Number of farmers that have participated in harvesting tree seeds for growth in the nursery and have helped transport and replant seedlings in the forest.</li> </ul>

	<p>Farmers actively participate in responsible natural resource management by sustainable collection of non timber forest products (NTFPs) and sustainable fisheries</p>	<ul style="list-style-type: none"> <li>▪ Number of farmers that have respected their contracts and have not hunted wildlife nor chopped down forest trees for operation of charcoal kilns, number of fishermen in the project that have not used illegal fishing methods (by electrocution, pesticides etc.).</li> </ul>
	<p>Positive environmental influence of the project on neighbouring villages</p>	<ul style="list-style-type: none"> <li>▪ Number of neighbours that have abandoned illegal fishing methods and are working with the project fishermen teams to protect common fisheries.</li> </ul>
	<p>When farmers' standard of living increases, they can focus on their children's education, which in turn has a positive impact on the environment. In 2004, the project built a school for the farmers' children. By acquiring education, children can aspire to having a real job in the future and will no longer be dependant on the forest for survival. By going to the project school, they also learn the importance of preserving surrounding natural resources. WildAid's community development team makes regular presentations to the children about activities they can do to protect the environment. WildAid's mobile education bus the Kouprey Express visits the project regularly to help raise awareness in children about protecting the forest and wild animals (animal costume shows, videos, displays, songs and games)</p>	<ul style="list-style-type: none"> <li>▪ Number of children that attend school on a regular basis.</li> </ul>

## **PROJECT MONITORING**

The project will monitor progress based on expected outcomes, following performance indicators described above and the following monitoring methodology:

### **Monitoring methodology**

The project's monitoring methodology is based on the continuous improvement cycle of the Total Quality Management model:

- Assess needs and set project objectives
- Design and implement project components to meet objectives
- Monitor results to evaluate whether project outputs meet expected objectives (identify gaps)
- Implement course corrections

Farmers, assisted by WildAid's technical team, have implemented this model since its inception in October 2003, which has resulted in an imbedded culture of continuous learning. Farmers and technicians together try something, see if it works, and then implement improvements based on lessons learned. Project technicians will be with the project until 2010, allowing farmers' steady growth and learning curve. Over time, farmers' knowledge and practical know how will be well integrated, generating self-confidence in trying new types of crops and enterprises, as well as the ability to process data and replicate successes to the whole community.

On-going monitoring is conducted by the agriculture association officers, aided by the project technical team. When significant gaps are identified, appropriate surveys are conducted to identify root causes of problems, through family surveys, crop seed and yield inventories, supplier and market surveys, and discussions at the association level. Solutions are designed internally or with help of external consultants (for example expert agronomists). On-site evaluation is conducted through seeds and yields inventory and daily work with the farmers, weekly meetings and survey interviews. Documentary evaluation is conducted through review of meeting minutes, accounting books, stock inventory and survey reports.

WildAid is responsible for oversight of the project. As such, the WildAid project technicians - while focusing their efforts on empowering the farmers to make their own decisions - retain oversight of the project and aid in process facilitation, helping farmers overcome hurdles and gaps. The WildAid team is led by the Agriculture Team Leader. WildAid's Cambodia Country Director, as project supervisor, supports the project team in facilitating project design, long-term planning, land use planning and water supply designs, yearly and monthly budgeting, monthly reporting and cash flow projections, as well as helping identify root causes of problems, overcome gaps, and design improvements to meet expected objectives.

### **Management system**

The project is managed through the Agriculture Association headed by one leader and two deputies. Each service group of the Agriculture Association has its own leader and deputies. The new village operates within the government structure of Cambodia with a village chief and two deputies reporting to the Commune Council of Chi Phat. WildAid oversees the project with the help of the Provincial and National Steering Committees.

**ANNEX III**

**WORKPLAN: July 2006 – June 2007**

TARGET	ACTIVITY	J	A	S	O	N	D	J	F	M	A	M	J	Remarks
		u	u	e	c	o	e	a	e	a	p	a	u	
		y	g	p	t	v	c	n	b	r	r	y	e	
<b>Community Agriculture Development Project (CADP)</b>														
1. 113 Phase 1 (2004) families become sustainable.	<b>Result 1: Establish sustainable agriculture, increase productivity levels and create financial sustainability.</b>													
	Procurement of irrigation system for 2007 families	■												
	Planting of green manure on 0.5ha previously irrigated land.	■	■	■										
2. 80 Phase 2 (2005) families achieve profits through 1 <sup>st</sup> year yields.	Preparation of 0.1ha land per family for irrigation and vegetable cropping (with manure).				■	■								
	Preparation and sowing of 0.4ha land per family for irrigation of fruit trees and inter-cropping (with manure).				■	■								
3. Prepare for arrival of 120 Phase 3 (2007) families.	Harvest of Cycle 1 vegetable crop from 0.1ha and 0.4ha plots.						■	■						
	Preparation of 0.1ha land per family for irrigation and second vegetable crop (with compost).						■	■						
4. By 2008: 400 families, shifting from destruction of forest to permanent agriculture.	Preparation of lots for 2007 families, installation of irrigation equipment						■	■						
	Preparation and sowing of 0.4ha land per family for irrigation and second inter-crop (with compost).								■	■				

TARGET	ACTIVITY	J	A	S	O	N	D	J	F	M	A	M	J	Remarks
		u	g	e	c	o	e	a	b	a	p	a	u	
		y		p	t	v	c	n		r	r	y	e	
	Harvest of Cycle 2 vegetable crop from 0.1ha and 0.4ha plots.													
	1.7 Planting of green manure on 0.5ha previously irrigated land.													
	1.8 Rice planting on 0.5ha non-irrigated land (Cycle 3).													
	<b>Result 2: Continue to develop farmers' business management skills, irrigation management skills and service group performance.</b>													
	2.1 Coach and monitor Agricultural Association and Credit meetings.													
	2.2 Conduct credit training to Phase 2 (2005) families													
	2.3 Monitor economic sustainability data of each family													
	2.4 Strengthen roles of service groups and community group leaders through discussions, mentoring and reviews.													
	2.5 Selection and training of irrigation chiefs.													
	2.7 Conduct Participatory Rural Assessment for 2007 families (Phase 3).													

### **July 2006 - October 2006**

During the wet season rice for family consumption is grown and the area used for cash crop production is left fallow.

A Participatory Rural Assessment will be conducted in **July – October 2006** to identify farmers dependant on slash and burn, who will want to start permanent agriculture in CADP in **January 2007 (Phase 3 families)**.

The irrigation system for the 120 Phase 3 families will be ordered in July 2005, to ensure delivery by January 2007.

### **November 2006 – May 2007**

During the dry season cash crops will be grown on irrigated land to produce high yields. The Agriculture Association is already in the process of identifying markets for the yields of the vegetable crops.

The economic sustainability of each family will be measured through the ability to re-pay loans, purchase assets, make savings and produce profits from agricultural sales. The objective is to identify families that may not be financially sustainable at the end of Cycle 2 and who will require further technical advice.

In January 2007, the lots for the Phase 3 families will be prepared and the irrigation system installed. Training will be provided to ensure that the irrigation system will be used effectively during the remainder of the dry season. Lots can not be prepared before this period due to the labor required in harvesting rice and the wetness of the ground.