APPENDIX-E

AGRICULTURAL SUPPORT SERVICES

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CHAPTER E-1 VILLAGE DEVELOPMENT COMMITTEE

All the Communes in the priority area have established the Village Development Committee (VDC). As Trapeang Kranhung and O Saray Communes have just established VDCs recentry (2001), farmers group (FG) activities under VDC have not started yet.

Established VDC in the Priority Project Area

Commune	Established by	Year Established
Trapeang Kranhung	SEILA Program	2001
O Saray	SEILA Program	2001
T.T.K. Cheung	UNICEF	1997
Cheang Tong	UNICEF	1998 - 1999
Ta Phem	RD&RP	1997
T.T.K. Tboung	UNICEF	1999
Nhaeng Nhang	RD&RP	1997

The member of VDC was selected by vote among villagers. Most of village chief hold post of VDC president concurrently as shown below:

Selection Type of Village Chief

Commune	Communes and Villages		Village Chief	VDC President
Trapeang Kranhung	1	Khpob Svay	Ou Chhoeun	Pol Ly
O Saray	1	Trapeang Dang Tuek	Uk Oeurn	Heng Paek
	2	Trapeang Krasang	Sam Houen	Ket Born
	3	Boeng Satong	Khann Nim	Choem Chim
	4	Trapeang Khchau	Kep Yi (Ye)	Tim Mon
T.T.K. Cheung	1	Peak Bang'aong	Hing Noeung	Hing Noeung
	2	Prey Khvav	Prak Norn	Khoem Hoeun
	3	Trapeang Svay	Non Nom	Non Nom
	4	Ta Suon	Phoeung Soeun	Phoeung Soeun
	5	Prey Ta Lei	Mey Chrin	Mey Chrin
	6	Pou Doh	In Sambat	In Sambat
	7	Prey Sbat	Oum Rim	Oum Rim
	8	Prey Dak Por	Chen Sa Roeun	Chea Sa Roeun
	9	Prey Kduoch	Khot Nan	Khot Nan
Cheang Tong	1	Srae Khvav	Ouk Pheng	Ouk Pheng
	2	Ta Reab	Neak Hoeung	Neak Hoeung
	3	Angk Kralanh	Phai Tem	Moung Chorn
	4	Angk Baksei	Leung Sim	Leung Sim
	5	Trapeang Srangae	Nhip Meas	Nhip Meas
	6	Totueng Thngai	Oum Pheun	Oum Pheun
	7	Trapeang Tuek	Khim Nop	Sor Phaen
	8	Ta Toeum	Long Chorn	Long Chorn

	9	Moeang Char	Neang Khon	Neang Khon
	10	Ti Pat	Yann Koy	Aek Mom
	11	Srae Kruo	Sok Sot	Mom Choeun
	12	Tuol Tbaeng	Kom Nim	Kong Touch
	13	Nomou	Chet Im	Ouan Nyop
Ta Phem	1	Mrum	Kong Rorn	Kong Rorn
	2	Trapeang Ampil	Ouk Cheung	Ouk Cheung
	3	Ta Much	Thoung Phen	Thoung Phen
	4	Moha Sena	Pot Douk	Pot Douk
	5	Ta Mom	Louk Lim	Louk Lim
T.T.K. Tboung	1	Trapeang Chuuk	Ngeth Keng	Nam Men
Nhaeng Nhang	1	Kim Sei	Ouan Saroeun	Eng Moeun
	2	Trapeang Snao	Sor Pauv	Chhim Norn

CHAPTER E-2 EXTENSION SERVICES

E-2.1 Agricultural Research and Extension in Cambodia

E-2.1.1 Research and Development in Cambodia

The Cambodian Agricultural Research and Development Institute (CARDI) was established in 1997 in collaboration with UN (United Nations) agencies, IRRI (International Rice Research Institute) and Australian Government. It has a role of core institute of agricultural research activities in Cambodia. CARDI is an autonomous operating organization. CARDI aims to increase agricultural productivity through human and institutional development, scientific research and development of technologies appropriate for Cambodian conditions.

In order to achieve the objectives, CARDI is carrying out various activities and programs. The major programs are as follows:

- Plant breeding: release of 34 rice varieties (15 local varieties and 19 improved varieties), and supply of the seeds to seed grower farms,
- Plant protection: providing pest management system based on the data collected in the field,
- Agricultural engineering: demonstration on improved water management, land preparation, harvesting and post harvest technologies in collaboration with other agencies and private sector,
- Soil and water management: providing appropriate soil improvement technology including plant / water management and fertilizer recommendation to 10 major soil groups,
- Agronomy / farming system: providing integrated farming system for increased agricultural production, food security and improvement of nutrition condition of rural people,
- Social science / economics: research and evaluation on development of social relationships with various groups in the rural area, and
- Training and Information.

Besides CARDI, there are six (6) national research stations, five (5) agricultural development centers and three (3) rural development centers in the country for the agricultural research, dissemination of the improved farming technology, training of farmers and agricultural technicians, and seed multiplication. These research stations and centers belong to the Department of Agronomy and Agricultural Land Improvement (DAALI), MAFF. Among them, 11 stations and centers aim at rice production, two centers aim at rice and vegetables, and one research station aims at

vegetables. Tonle Bati and Kobal Po Agricultural Development Centers are located in Takeo Province. The former which was established in 1989 supported by NGO (World Council of Churches), is providing technical service for dissemination of paddy farming technology and paddy seed multiplication. The latter aims at rice and vegetable production. The research stations and agricultural development centers, however, do not well function due to lack of materials, budget and staff.

Kbal Koh Vegetable Research Station located in Kandal Province under DAALI was established in 1985 as a vegetable research center in Cambodia in order to;

- select suitable vegetable varieties of high yield and resistance to insects and diseases,
- disseminate new farming technologies to farmers through training and demonstration farm, and
- multiply and distribute high quality seeds to target areas of vegetable cultivation through the extension activities of MAFF.

The station is producing and supplying various vegetable seeds. However, the production capacity is limited only for extension activities due to lack of budget and staff, small farm area for the production, and frequent inundation of the experimental farm in the rainy season. Kinds of vegetable seeds produced in the station are tomato, water convolvulus, onion, mung-bean, yard-long-bean, bitter gourd, sponge gourd, pimento, mustard green, cabbage, cauliflower, kale, chinese radish, corn, etc.

E-2.1.2 Extension Services

(1) National Level

Agricultural extension service is managed by Department of Agricultural Extension, MAFF. Improvement of the extension system in Cambodia is being implemented with the support of the Australian Government as the Cambodia Australia Agricultural Extension Project (CAAEP). Provincial Department of Agriculture, Forestry and Fisheries (DAFF) under MAFF is providing field-level agricultural extension services. It is responsible for the transfer of technology to farmers concerning staff. The extension services cover all the aspects and stage of agricultural production and marketing, and from land preparation to post harvest. The extension work is designed to accelerate the improvement of technologies and enhance the decision-making skills of farmers, with increased use of demonstrations, Farmer Field School (FFS) and mass media.

(2) Takeo Province

The Agricultural Extension Section of DAFF Takeo has 32 staff including the section chief. The extension workers of this office cover 10 districts in the province. Three (3) extension workers were newly assigned from the provincial office to the Tram Kak District office of DAFF Takeo in 2001. Nine (9) staff in total are assigned in the district office, in which three (3) persons are in charge of agricultural extension service activities.

At present, the agricultural extension workers visit communes for providing guidance of paddy cultivation and plant protection to leader farmers. Also, DAFF Takeo is conducting Farmers Field School (FFS) aiming at extension activity by farmers themselves at village level. FFS provides technical guidance on the improved farming technology including IPM (Integrated Pest Management) through seminar and workshop to leader farmers. The farmers trained in FFS are expected to work as trainers on the farming technology in their villages. The extension system has still not well functioned in the Study Area. Because the extension system covers only a part of the Study Area due to shortage of manpower and budget of DAFF, and the village activities of trained farmers are insufficient due to shortage of facilities (such as demonstration plots) and support for the activities.

Improvement of livestock husbandry is a responsibility of the Extension Section and the Animal Production Section of DAFF Takeo. The services aim at extension of animal husbandry and vaccination/veterinary services. However, the service activities are not sufficient due to shortage of staff and budget. Some NGOs are working on livestock husbandry in their target villages.

E-2.1.3 Farmer Field School (FFS)

Farmer Field School is being implemented through three channels of donors; i) CAAEP (Cambodia Australia Agricultural Extension Project) supported by Australian Government, ii) IPM (Integrated Pest Management) Program supported by World Bank (Agricultural Productivity Improvement Project: APIP), and iii) Danish Government (Danish-Cambodian Natural Resources and Environmental Program). CAAEP coveres 13 provinces; Takeo, Kandal, Kampong Spueu, Battambang, Kampong Thom, Bantey Meanchey, Prey Veng, Svay Rieng, Kampong Cham, Siemreap, Kampot, Kampong Chnang and Pursat. This project is implemented through Department of Extension, MAFF. IPM/APIP by World Bank covers seven (7) provinces: Kandal, Takeo, Kampot, Kampong Speu, Kampong Cham, Pursat and Siemreap, through DAALI, MAFF. IPM program by Danish

covers other seven (7) provinces; Kampong Thom, Kampong Chhnang, Battambang, Banteay Mean Chey, Otdor Mean Chey, Savay Rieng and Prey Veng through DAALI.

FFS aims at training of leader farmers who perform extension activities in their villages as Village Extension Workers (VEWs). One session of FFS is held one day every week during 16 weeks according to the cropping season of target crops, with attendants of 25 - 30 leader farmers including female. Venue of FFS is set at commune office, pagoda or school in and around the target village. The guidance of FFS includes all the stages from land preparation to post harvesting, and livestock husbandry of pig and chicken. Three courses of paddy, vegetables and livestock have been set for FFS.

MAFF is providing Training of Trainers (TOT) for FFS. More than 300 trainers have been trained by TOT in the country.

DAFF Takeo has two sources of FFS implementation of CAAEP by Australia through Extension Section and IPM/APIP by World Bank through Agronomy section. Achievement of FFS in Takeo Province is shown in Table E-1, and 14 trainers are available in Takeo Province in total.

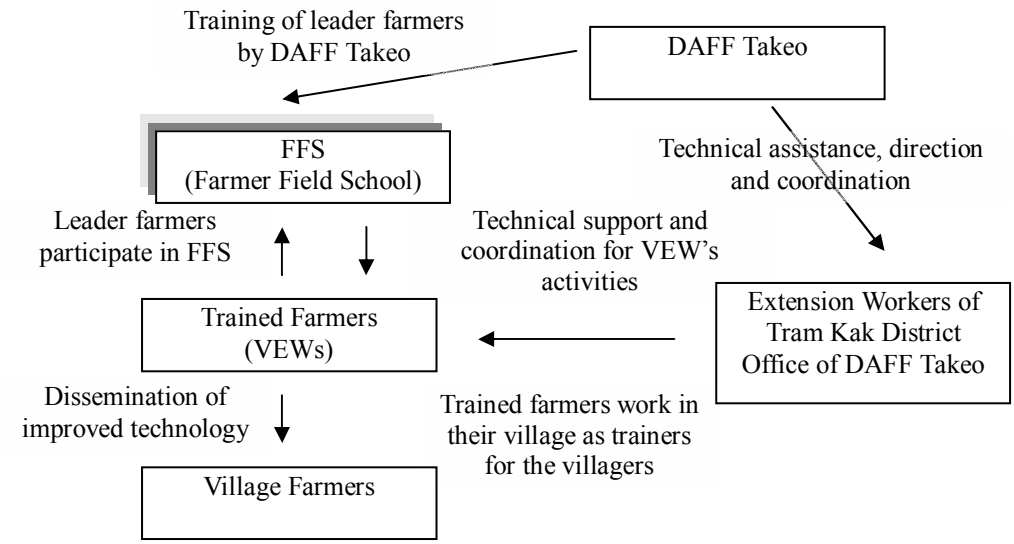
Existing Trained Trainers in Takeo Province

DAFF Takeo	Person
Extension section	3
Agronomy and Land Improvement Section	2
District office of DAFF Takeo	
Samrong	1
Bati	4
Don Keo	2
Kirivong	2
Total	14

Source: DAFF Takeo

E-2.2 Evaluation of Present Extension System

Takeo DAFF is implementing Farmer Field School (FFS) for training of leader farmers aiming at activation of extension activities by the trained farmers (Village Extension Workers: VEWs). The trained leader-farmer performs as a VEW in his/her village to disseminate improved farming technology to the villagers. Framework of the extension system by FFS and VEW is shown in following.



Framework of Present Extension System

DAFF Takeo has provided 46 sessions of FFSs in total in Tram Kak District for four (4) years from 1998 to 2001; 24 sessions for paddy, nine (9) sessions for vegetables and 13 sessions for livestock as shown in table below. More than 1,000 farmers have been trained as VEWs in the district. Four (4) communes among seven (7) communes which areincluded in the priority areas have been provided FFS.

Achievement of FFS in Tram Kak District

(No. of FFS sessions)

Year	FFS for Paddy	FFS for Vegetable	FFS for Livestock
1998	3 (2)	-	2 (0)
1999	8 (4)	4 (2)	2 (2)
2000	6 (0)	5 (3)	3 (1)
2001	7 (2)	-	6 (3)
Total	24 (8)	9 (5)	13 (6)
Target communes related with priority areas	TTK Cheung, Cheng Tong, Ta Phem, and TTK Tboung	TTK Cheung, Cheng Tong, TTK Tboung	TTK Cheung, Cheng Tong, TTK Tboung

Note: Figures in ( ) show sessions of FFS in the communes related to the priority plans
Source: DAFF Takeo

It is evaluated that FFS system has been well implemented. However, activity of the trained farmers (VEWs) has not been realized in the village, due to the lack of group activity in the village community, lack of field to demonstrate the technology learned at FFS, and lack of support and monitoring to VEWs from DAFF. According to the interview survey to each commune chief, only 4 commune chiefs in the 18 communes know the visits of extension workers.

As mentioned in Appendix D Agriculture, lack of improved paddy seed is one of

main reasons of low yield of paddy. Farmers repeatedly use paddy seeds produced by themselves without renewal. It results in mixture of different varieties, recession of variety, decrease of productivity, and low quality of product. Distribution of qualified paddy seeds is essential for increase of production and quality of paddy.

For smallholders, input requirement per household is not much. On the other hand, transportation cost from market (Ang Roka, or Angk Ta Saom) to village, is considerably high. Group purchase of the inputs is the recommendable to reduce transportation cost, to get the inputs of good quality, and to lower purchase price by bulk dealing.

E-2.3 Basic Concept of Improvement of Extension Services (Master Plan)

The extension services including livestock husbandry and paddy seed multiplication will be executed through farmers groups organized aiming at agricultural extension, livestock and seed production.

(1) Agricultural Extension

Agricultural extension service system should be improved to increase production of paddy and diversified crops. DAFF Takeo is providing FFS aiming at training of leader farmers, and district office of DAFF supports field activity of the trained farmers. However, the systematic extension activities have not been observed in the Study Area due to shortage of manpower and budget of DAFF. It will be necessary; i) to train leader farmers for village level extension activities through FFS, ii) to organize an extension farmers group under VDC (Village Development Committee) in which the trained farmers play a role of group leaders for extension activities, iii) to set up demonstration plots in the village, iv) to multiply and distribute improved paddy seed, and v) to assign field staff (field extension specialists) for technical service of cropping to the farmers groups and coordination with DAFF.

i) Extension farmers group will be organized under VDC. The leaders of the group will participate in FFS provided by DAFF, and they will act as core persons of the extension activities in their villages using demonstration plots. The group would operate group purchase of farm inputs, such as improved seed and fertilizer, in order to reduce transportation cost, to get inputs of good quality, and to lower purchase price. The extension farmers group will have some potential for expansion of their activities or joint-operation with other farmers groups, for group use of agricultural machinery, group selling of products, group processing of products, group credit, and cooperation with FWUC (Farmer Water User Community).

ii) DAFF will provide FFS for training of leader farmers selected from their VDCs. FFS will be held at commune office, school or pagoda in and around the village every week (one days / week) during four months according to the cropping season of target crops (paddy and diversified crops including vegetables). Around 20 - 30 farmer participants will attend in a session of FFS.

iii) Demonstration plots (Demo-plot) of major crops (paddy and diversified crops including vegetable) will be provided at farmers' fields in order to demonstrate and verify improved-varieties and improved farming techniques, and to examine improved farming techniques by the group members. Improved varieties of diversified crops will be planted in the demonstration plots. The seeds will be provided from agricultural research stations.

iv) Seed multiplication of paddy is indispensable in the irrigated area in order to distribute improved paddy seeds to farmers. The seed multiplication will be done by seed production farmers groups in the irrigated area. DAFF Takeo will give technical guidance and inspection of produced seed through the farmers groups.

v) The field extension specialists are necessary to activate performance of the extension groups and to coordinate support services from DAFF. They will be recruited from local consultants or participate from local NGOs. Commune Rural Development Committee (CRDC) or Farmer Water User Community which cover several villages would be able to coordinate the support by DAFF to the extension farmers groups.

(2) Extension Services on Livestock Husbandry

Extension on livestock husbandry will be required for the beneficiaries of two irrigation development plans, namely Upper Slakou River Irrigation Reconstruction Plan and Small Reservoir Rehabilitation Plan. The activities will consist of; i) training of model livestock farmers (demonstration plots) in FFS on target animals (pig or chicken), and ii) importation of improved breeding stock from researchers or advanced areas in Cambodia. The model farmers would be leaders of livestock farmers groups. The leader farmers will be trained on improved animal husbandry techniques, such as feeding, animal pen/hut facilities and animal health in FFS provided by DAFF. The model farmers will demonstrate the improved animal husbandry, and the leader farmers will supply young animals of the improved breed to the group members, and disseminate raising technique to the farmers in the village.

E-2.4 Strengthening Plan of Extension Services for Priority Areas

Proposed extension plan is comprised of three (3) components, i) strengthening plan of extension service system, ii) paddy seed production plan, and iii) distribution plan of farm inputs.

E-2.4.1 Strengthening Plan of Extension Services System

Dissemination of improved farming practices and irrigation farming will be done by the extension services of DAFF Takeo through VDC and FWUC. DRD will support the establishment and activation of VDC.

Proposed extension plan for USP basically follows the present framework of DAFF extension system, aiming at strengthening of the present system, especially activities of Village Extension Workers (VEWs). For this purpose, it is proposed as a supporting program of agriculture that VEWs will be organized in an extension farmers group under VDC, and demonstration plots (Demo-plots) will be set up in farmers' field. The proposed extension system is illustrated in Fig. E-1

Extension services for SRP and PDP will be provided by the same system as USP project, such as FFS, extension farmers group and Demo-plot. The system will be simplified, because each Project is situated in a village and respective beneficiaries belong to the same VDC, and they would be members of FWUG or PUG (Pond User Group).

(1) Farmer Field School (FFS)

FFS aims at training of leader farmers who perform in their villages as VEWs. A session of FFS will be held a day every week during 16 weeks according to cropping season of target crops. Venue of FFS will be commune office, pagoda or school in and around the target area. Curriculum of FFS covers all the farming practices from land preparation to post-harvesting, and Integrated Pest Management (IPM). Two (2) kinds of FFS causes will be provided for the target crops: paddy and diversified crops including vegetables. FFS trains participants through providing seminar, workshop and field tour. Besides the above target crops, FFS for the paddy seed production farmers is proposed in order to produce and distribute improved paddy seed in USP area.

Around 30 farmers will participate in a session of FFS. They will be selected from VDC of each village. Requirement of trained leader farmers (VEWs) is as follows:

- 3 - 4 VEWs / village,
- 1- 2 VEWs / Farmer Water User Group (FWUG) of tertiary irrigation unit,

- a VEW / 30 - 40 farm households, or
- a VEW / 1- 3 sub-villages

The requirement of VEWs and FFS's sessions for training are shown in Table E-2.

(2) Demonstration Plots in Farmers' Field

Demonstration plots (Demo-plots) aim to demonstrate improved farming technology and improved varieties for beneficiaries at the field. Demo-plots will be set up at farmers' field of 0.1 ha per plot in the project area. Seeds and fertilizer required will be supplied free of charge from DAFF. The landowner farmers will provide themselves other inputs and production cost such as labor force and draft animal, and operate the Demo-plot according to the instruction of the extension worker and VEWs. The owner farmers will get the products as an incentive. Demo-plots will be basically set up in VEWs' farm land and shifted every year or every season.

Demo-plot will be conducted for 4 years after completion of the construction works. Demo-plots will be set up eight (8) plots in total to each SC FWUC (Farmer Water User Community of Secondary Canal) every year during four (4) years: respective two (2) plots for i) local paddy, ii) HYV paddy, iii) rainy season diversified crops, and iv) dry season diversified crops. Proposed number of demo-plots is shown in Table E-3

SC FWUC and FWUG of tertiary irrigation units will support the operation and coordination of Demo-plots every season through discussion with the extension farmers groups. TSAU (Technical Supervision and Assistance Unit of FWUC Apex Committee) will support technically the operation of demonstration plots, and coordinate supporting from DAFF.

(3) Extension Activities of VEWs

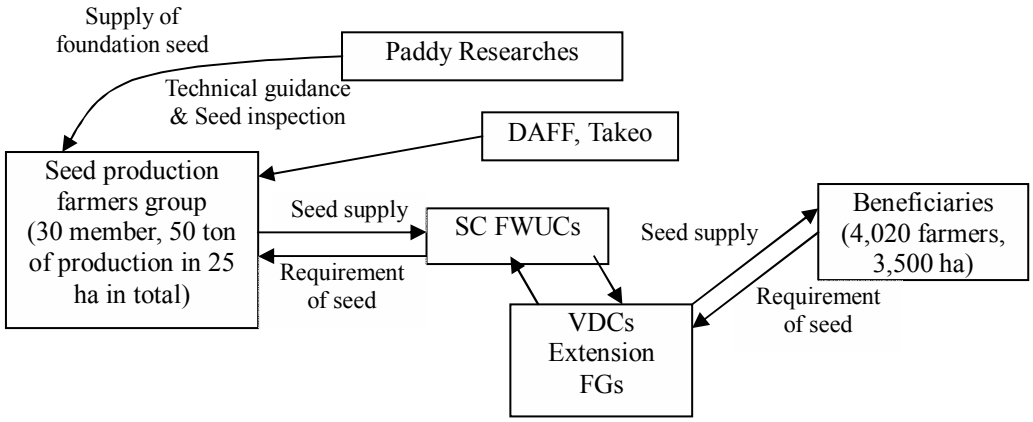
VEWs trained in FFS will be organized in the extension farmers group under each VDC. VEW will disseminate the improved farming technology into the villagers. Extension officers of DAFF Takeo and District Office of DAFF Takeo will support and monitor the VEW activities. VEWs will use Demo-plots effectively for dissemination of improved technology.

E-2.4.2 Paddy Seed Production and Distribution Plan

Distribution of improved paddy seed of both local and high yielding varieties (HYVs) is indispensable for increase of the production and improvement of quality. It is proposed to multiply the paddy seed by farmers groups of seed production in USP area. Requirement of the paddy seed is estimated at about 50 - 60 ton per year

for 3,500 ha of paddy field assuming 50 - 65 kg/ha of seeding rate and renewal of the seeds every four (4) cropping seasons. The required paddy seed will be produced in 25 - 30 ha of paddy field or by 30 farmers (certified seed production: 2,000 kg/ha, average paddy field: 0.8- 1.0 ha/farmer).

The certified seed will be distributed to the farmers through the extension farmers groups. The seed price will be about Riel 600 - 700 /kg. Price of the foundation seed supplied from research stations is Riel 2,400 /kg.



Proposed Plan of Paddy Seed Production

E-2.4.3 Input Supply and Distribution Plan

Most of fertilizer and seeds of diversified crop are currently supplied by private sector. They are imported from foreign countries; Thailand, Vietnam and Philippines for fertilizer, and Thailand and Taiwan for vegetable seed. Under the market economy policy, the demand is supplied in market through the private dealers.

Farm-gate price of fertilizer is generally higher (5 - 7 %) compared with those in Takeo and Angk Ta Saom market. It is recommendable that the extension farmers group would operate group purchase of inputs such as seed and fertilizer. Handling charge can be collected from the members of the group purchase. The collected handling charge could be used for VEWs activity. It is also recommendable that the input cost of Demo-plots should be covered by a part of the handling charge in order to realize sustainable operation of Demo-plots after the supporting period of four years. Following procedures are recommendable for the group purchase of the inputs.

i) Extension farmers group arranges the group purchase of inputs with a commodity list and an estimated price list for the villagers,
ii) Villagers place order with advance payment to the farmers group according the

list,

iii) Farmers group orders the requirements to dealers. Trucks of the Marketing Units of Apex FWUC Committee will be available for transportation of the inputs from Phnom Penh or Takeo Town with appropriate charge,

iv) Extension farmers group distributes the inputs to the villagers according to the order together with instruction how to use the inputs,

v) Extension farmers group arranges the account by commodities, based on the selling prices, and handling cost including transportation cost and extension activity cost of VEWs,

vi) Extension farmers group clears the account (refund or additional collection) according to the balance.

E-2.4.4 Implementation Schedule and Estimated Cost of Extension Activities

Table E-4 shows implementation schedule and cost estimation of the extension activities. FFS sessions will be provided for two (2) years of the previous and the first years of the production stage for USP and SRP, and 1st and last year of the stage-1 for PDP. Demo-plot will be conduct for four (4) years from the previous year of the production stage (construction stage) for USP and SRP. As irrigation water for Demo-plot will not be available in the construction stage, it will be set up in rain-fed field for paddy near water sources such as pond for diversified crops. The number of Demo-plots will be less at the construction stage. Group purchase of inputs may start from 5th year of production stage, after strengthening of VDC activities.

The cost of FFS is estimated at Riel 5.12 million per session, or Riel 171,000 per participant including per diem for trainers and other cost (materials, text, venue cost, etc.). Cost of Demo-plot is estimated at Riel 176,000 /plot for paddy and Riel 190,000 /plot for vegetable / diversified crops including the input cost and the per diem of technical support staff and monitoring by DAFF.

CHAPTER E-3 CREDIT SERVICES

E-3.1 Rural Credit System

E-3.1.1 Conditions of Rural Credit in the Study Area

Formal banking and financial system is limited to urban area in Cambodia. Only ACLEDA Bank is available in Takeo Province. Furthermore, there is no institutional credit system for agricultural input in Cambodia. Instead of the above, micro-credit by NGOs is expanding in the rural area. NGOs, such as ACLEDA, CRS, CDC, MCC, CCN, and EMT have worked in the Study Area for the rural micro-credit. Besides, donor-financed credit programs such as UNICEF program, RD&RP and SEILA Program provide micro-credit through farmers groups in the Study Area. These programs provide fund for credit to VDCs. Farmers groups operate the credit to villagers for input purchase and other purposes. The credit repaid can be used as a revolving fund for the credit. The interest rates of the credit vary from 2 % to 6 % per month depending on the operation organization, purpose and conditions. In generall, interest rates of 4 % - 6 % per month are applied for NGO's credit, while 2 % - 4 % per month for farmers group credit. The credit for fertilizer by farmers group has a lowest interest rate of 2 %. Farmers, who do not have access to such micro-credit, have to apply for credit by moneylender paying a rate of 10 % or more per month.

E-3.1.2 Credit for Farm Inputs in Priority Areas

Living standard of farmers in the priority areas is still at subsistence level. Their financial situation is too low to invest for farm inputs.

In the priority areas, farmers groups (FGs) for credit under VDC is implementing group credit for input purchase to the member. The credit farmers groups have covered 30 villages except five (5) villages in O Saray and Trapeang Kranhung Communes related with USP project. VDCs of the remaining five (5) villages were set up in 2001 by SEILA program of Department of Rural Development (DRD) in Takeo Province.

Each VDC was granted US$200 - 2,300 for credit fund from the donors, UNICEF or RD&RP by JICA. And some of the VDCs were given additional fund from UNICEF. The capital fund is repeatedly used as revolving fund for cash credit for fertilizer purchase of VDC member. VDC can use the accumulated interest for the village development. The general conditions of the credit and the system are shown in Fig. E-2

Table E-5 shows present situation of the VDC credit in 30 villages concerned with the priority area. UNICEF and RD&RP provided about US$ 20,000 in total to 30 villages from 1997 to 1999. The credit users repaid to the VDC at nearly 100 % repayment ratio with interest every season. All villages have not used the interest for village development. The amount of fund increased to US$29,000 in total including the accumulated interest as of October 2001.

In 2001, 51 % of farm households used the credit, the average lending amount per user was US$15.3, which is approximately equivalent to the average of present input cost per farm household.

Besides, the VDC credit, micro-credit by NGOs has been relatively well developed in the priority area. However, farmers cannot apply for micro-credit due to the high interest rate (usually 4 % per month). many of farmers buy fertilizer from traders. The traders supply fertilizer to farmers at the planting season, and payment with paddy or cash after the harvest with 15 - 20 % of interest.

E-3.2 Proposed Credit System

Input cost of fertilizer and seed in the proposed USP is estimate at Riel 810 million in total, which will is about 3.4 times of Riel 240 million at present. The average cost per household will increase from Riel 60,000 at present to Riel 200,000 in total consisting of paddy (Riel 135,000) and diversified crops (Riel 65,000). It is necessary to support financially for purchase of the inputs considering present financial condition of the farmers, who want cash credit for input purchase. However, available fund source is not enough even with fertilizer credit by VDC and micro-credit by NGOs.

Three (3) kinds of credit systems for the farmers will be available for input purchase. They are; i) VDC credit, ii) credit by appropriation from FWUC's reserves, and iii) micro-credit by NGOs.

1) Credit by VDC

Fertilizer credit system by VDC is currently operated in 30 villages, and it will be started from 2002 in the remaining five (5) villages. The total fund for the credit in the existing 30 villages totaled US$29,000 as of October. 2001. However, the fund capital is not sufficient to the input requirement of proposed plan.

2) Credit by NGOs

One commercial bank and several local NGOs work for micro-credit in the project

area. The interest rate is generally 4 % per month. It is considerably higher comparing with fertilizer credit by VDC (2 % per month) and traders supply (equivalent with 3 - 4 % per month of interest rate). Due to the high interest rate only few farmers use micro-credit for input purchase currently. Otherwise, the credit fund of NGOs is limited to expand credit for inputs purpose.

3) Credit by FWUC's Reservation

FWUC will reserve capital for replacement of irrigation facilities from collected ISF. The capital will be accumulated to more than 1.5 billion Riel at the maximum. A part of the reserves will be able to used for the credit according to the decision of the FWUC's general meeting. It will be managed under SC FWUC. The purpose of credit will be limited to input purchase, and the input will be supplied by in-kinds. Target should be limited to the weak among beneficiaries to encourage ISF payment. It is recommendable that the interest rate is 2 % per month which is the same rate as VDC credit.

Beneficiaries, who cannot apply for the above credit, have to use input supplied by traders as mentioned above. In order to avoid increase of trader's price and interest rate, VDC and FWUC should monitor the price and interest rate. Meanwhile, the farmers would be able to reserve the capital to invest for the input by themselves.

Tables

Table E-1 Achievement of FFS in Takeo Province

	1996		1997		1998		1999		2000		2001 *1		Total	
	FFS *2	farmers *3	FFS *2	farmers *3	FFS *2	farmers *3	FFS *2	farmers *3	FFS *2	farmers *3	FFS *2	farmers *3	FFS *2	farmers *3
Takeo Province														
Provided by Extension section														
Paddy	0		6	150	12	221	45	1,280	30	903	18	439	111	2,993
Vegetables	0		1	30	6	1	1	28	8	224	0	0	16	283
Livestock	0		0	0	1	35	10		7	215	7	219	25	469
Provided by Agronomy section														
Paddy	12	360	21	630	25	750	30	900	33	990	30	900	151	4,530
Vegetables	0		0		0		1	30	0		1	30	2	60
Livestock	0		0		0		0		0		0		0	0
Total														
Paddy	12	360	27	780	37	971	75	2,180	63	1,893	48	1,339	262	7,523
Vegetables	0	0	1	30	6	1	2	58	8	224	1	30	18	343
Livestock	0	0	0	0	1	35	10	0	7	215	7	219	25	469
Nos. of Demonstration Plots														
Paddy	12			44		123		192		174		73		606
Vegetables	0			0		0		0		28		0		28
Livestock	0			0		0		0		14		26		40
FFS in Tram Kak District														
Paddy					3		8		6		7		24	
Target commune					TTK. Tboung *c TTK. Cheung *a Leay Bour		TTK. Tboung *c TTK. Cheung *a Leay Bour Cheang Tong *a Angk Ta Saom Ta Phem *a		Angk Ta Saom Sre Ronong Kus		Angk Ta Saom TTK. Tboung *c Ta Phem *a		8 Communes in total	
Vegetables							4		5				9	
Target Commune							Kus TTK. Tboung *c TTK. Cheung *a Sre Ronong		Kus TTK. Tboung *c TTK. Cheung *a Popel Cheang Tong *a				6 Communes in total	
Livestock					2		2		3		6		13	
Target Commune					Kus		TTK. Tboung *c TTK. Cheung *a Leay Bour		Leay Bour Cheang Tong *a Popel		Leay Bour Cheang Tong *a TTK. Tboung *c TTK. Cheung *a Popel		4 Communes in total	

Note *1: 2001: Figure of 2001 shown by plan
*2: Times of FFSs
*3: Number of trained farmers
*a: Communes related with USF
*c: Commune related with Kim Sei SRI

Source: DAFF, Takeo

Table E-2 Requirement of VEWs and FFSs

	USP	Ang160 SRP	Kim Sei SRP	PDP
Beneficiaries	4,020	130	37	88
FWUG	72	1 *1	1 *1	1 *2
Irrigable area (ha)	3,500	25	27	5.8
Villages concerned	32	1	1	1
Requirements of VEWs *5				
Paddy	120	3	2	-
Vegetables/div, crops	120	3	2	5 *3
Requirement of FFS				
Paddy	4	(1) *4	(1) *4	(1) *4
Vegetables/div. crops	4	(1) *4	(1) *4	(1) *4
Paddy seed production *6	1	-	-	-

Note *1: FWUC
*2: Pond User Group (PUG)
*3: 2 VEWs for 1st stage and 3 VEWs for 2nd stage, totaled 5 VEWs.
*4: FFS will be held together with neighboring villages
*5: Figures excluded trained farmers up to 2001, 1-2 trained farmers may be available in the village up to 2001.
*6: FFS for seed production farmers group of about 30 members

Table E-3 Proposed Annual Number of Demonstration Plots

	Paddy		Vegetables / Div. crops		Total *	Construction year
	Local Variety	HYV	Rainy season	Dry season		
USP	12	12	12	12	48	Paddy: 12, Vegetable: 6
Ang160 SRP	1	1	1	1	4	Paddy: 2, Vegetable: 0
Kim Sei SRP	1	1	-	1	3	Paddy: 2, Vegetable: 1
PDP	-	-	1	1	2	Paddy: 0, Vegetable: 2

Note *: Total plots of USP, Ang160 SRP, and PDP will be reduced to 18, 3 and 0 plots, respectively

Table E-4 Implementation Schedule and Cost of Extension Activity

Implementation Schedule

1 USP

Stage	2005 Construction	2006 Production 1	2007 Production 2	2008 Production 3	2009 Production 4
FFS (Sessions)					
Paddy	(2)	(2)			
Vegetables/Diversified crops	(1)	(2)	(1)		
Paddy seed production		(1)			
Demonstration Plot					
Paddy (Local and HYV)	(12)	(24)	(24)	(24)	
Vegetables/Diversified crops	(6)	(12)	(12) (12)	(12) (12)	(12)

2 Ang161 SRP

Stage	2002 Construction	2003 Production 1	2004 Production 2	2005 Production 3	2006 Production 4
FFS (Persons participated)					
Paddy	(1)				
Vegetables/Diversified crops	(1)				
Demonstration Plot					
Paddy (Local and HYV)	(2)	(2)	(2)	(2)	
Vegetables/Diversified crops	(1)	(1) (1)	(1) (1)	(1) (1)	(1)

3 Kim Sei SRP

Stage	2003 Construction	2004 Production 1	2005 Production 2	2006 Production 3	2007 Production 4
FFS (Persons participated)					
Paddy	(1)				
Vegetables/Diversified crops	(1)				
Demo-plot					
Paddy (Local and HYV)	(2)	(2)	(2)	(2)	
Vegetables/Diversified crops	(1)	(1)	(1)	(1)	

4 Tr. Snao PDP

Stage	2002 Stage-1	2003 Stage-1	2004 Stage-1	2005 Stage-2	2006 Stage-2
FFS (Persons participated)					
Vegetables/Diversified crops	(1)		(1)		
Demonstration Plot					
Vegetables/Diversified crops		(1) (1)	(1) (1)	(1) (1)	

Cost Estimation (Unit: Riel 1000)

	USP	Ang160 SRP	Kim Sei SRP	PDP	Total
FFS *1					
Quantity	(session)	(person)	(person)	(person)	(person)
Paddy	4	3	2	0	125
Vegetables/Diversified crops	4	3	2	5	128
Seed production	1	0	0	0	30
Total	9	6	4	5	283
Unit cost *2	5,120	170.7	170.7	170.7	
Cost	46,080	1,024	683	854	48,641
Demo-plot					
Quantity	(plot)	(plot)	(plot)	(plot)	(plot)
Paddy	84	8	8	0	100
Vegetables/Diversified crops	78	7	4	6	95
Unit Cost	*3	*3	*3		
Paddy	177	177	177	*4	
Vegetables/Diversified crops	191	191	191	161	
Cost					
Paddy	14,868	1,416	1,416	0	17,700
Vegetables/Diversified crops	14,898	1,337	764	966	17,965
Total	29,766	2,753	2,180	966	35,665
Total	75,846	3,777	2,863	1,820	84,306

Note *1: 30 participants per a FFS session
*2: FFS cost includeing Trainer cost and material and venue expenses
*3: Demo-plot cost is included input and per diem for monitoring and technical guidance by DAFF
*4: Demo-plot cost is per diem for monitoring and technical guidance by DAFF for PDP

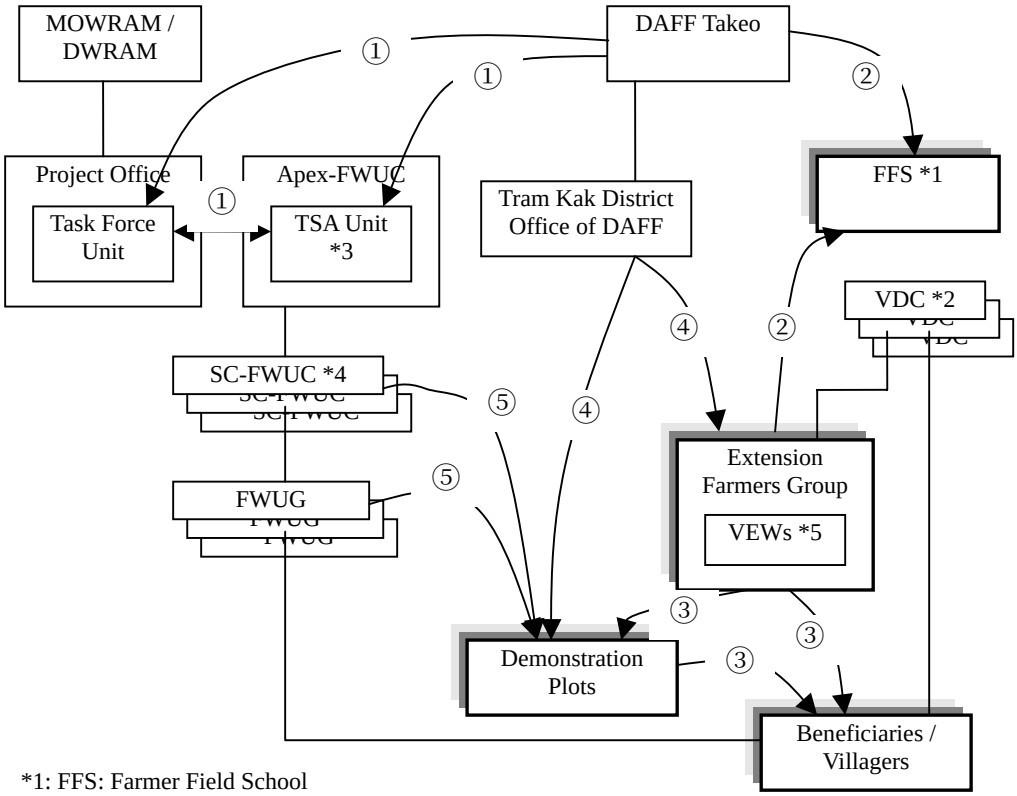
Table E-5 Present Situation of Fertilizer Credit Operated by Credit Sub-VDC

Commune / Village	No. of farm house-holds	Fund for credit					Credit for inputs			
		Donor	Year established	Original capital *1	Additional capital *2	Present *3	No. of users	Users ratio	Average	
									User *4	Villager *5
USP				(US$)	(US$)	(US$)		(%)	(US$/hh)	(US$/hh)
0 Trapeang Kranhumg	55	SEILA	2001 (on-going)							
1 Khpob Svay										
1 O Saray										
1 Trapeang Dang Tuek	108	SEILA	2001 (on-going)							
2 Trapeang Krasang	197	SEILA	2001 (on-going)							
3 Boeng Satong	86	SEILA	2001 (on-going)							
4 Trapeang Khchau	107	SEILA	2001 (on-going)							
2 T.T.K. Cheung										
1 Peak Bang'aong	241	UNICEF	1997	1,448		1,793	96	40%	18.7	7.4
2 Prey Khvav	89	UNICEF	1997	700		812	72	81%	11.3	9.1
3 Trapeang Svay	86	UNICEF	1997	1,260		1,561	70	81%	22.3	18.2
4 Ta Suon	180	UNICEF	1998	1,098		1,371	79	44%	17.4	7.6
5 Prey Ta Lei	52	UNICEF	1997	550		605	52	100%	11.6	11.6
6 Pou Doh	223	UNICEF	1997	2,300		2,897	190	85%	15.2	13.0
7 Prey Sbat	176	UNICEF	1997	1,290		1,654	64	36%	25.8	9.4
8 Prey Dok Por	72	UNICEF	1997	360		463	22	31%	21.0	6.4
9 Prey Kdouch	57	UNICEF	1998	450		604	30	53%	20.1	10.6
3 Cheang Tong										
1 Srae Khvav	163	UNICEF	1998	350	350	962	48	29%	20.0	5.9
2 Ta Reab	116	UNICEF	1998	250	250	685	54	47%	12.7	5.9
3 Angk Kralanh	123	UNICEF	1998	250	120	503	28	23%	18.0	4.1
4 Angk Baksei	114	UNICEF	1998	250	250	668	28	25%	23.9	5.9
5 Trapeang Srangae	50	UNICEF	1998	200	200	539	33	66%	16.3	10.8
6 Totueng Thngai	94	UNICEF	1998	250	250	696	45	48%	15.5	7.4
7 Trapeang Tuek	73	UNICEF	1998	250	250	669	50	68%	13.4	9.2
8 Ta Koem	94	UNICEF	1998	450		604	55	59%	11.0	6.4
9 Moeang Char	274	UNICEF	1998	530	530	1,418	106	39%	13.4	5.2
10 Ti Pat	98	UNICEF	1998	200	300	671	53	54%	12.7	6.8
11 Srae Kruo	99	UNICEF	1998	200	200	535	43	43%	12.4	5.4
12 Tuol Tbaeng	151	UNICEF	1998	600		807	62	41%	13.0	5.3
13 Nomou	149	UNICEF	1998	350	350	935	58	39%	16.1	6.3
4 Ta Phem										
1 Mrum	134	RD&RP	1997	400		1,011	75	56%	13.5	7.5
2 Trapeang Ampil	137	RD&RP	1997	400		893	72	53%	12.4	6.5
3 Ta Much	91	RD&RP	1997	400		961	75	82%	12.8	10.6
4 Moha Sena	216	RD&RP	1997	400		1,189	94	44%	12.6	5.5
5 Ta Mon	115	RD&RP	1997	400		843	67	58%	12.6	7.3
Total	4,020			15,586	3,050	26,349	1,721	43%	15.3	6.6
Total of 27 villages established credit VDC	**3,467**			**15,586**	**3,050**	**26,349**	**1,721**	**50%**	**15.3**	**7.6**
SRP										
Nhaeng Nhang										
1 Kim Sei	77	RD&RP	1999	500		600	77	100%	7.8	7.8
TTK. Tboung										
1 Trapeang Chhuk	181	UNICEF	1999	300	500	1,050	45	25%	23.3	5.8
PDP										
Nhaeng Nhang										
1 Trapeang Snao	111	RD&RP	1999	500		1,005	111	100%	9.1	9.1
Total of 30 village established credit-VDC	**3,836**			**16,886**	**3,550**	**29,004**	**1,954**	**51%**	**14.8**	**7.6**

Note *1: Capital fund by donor at established year
*2: Additional fund by donor after established
*3: Including accumulated interest as of October 2001
*4: Average amount of credit per user
*5: Average amount of credit per farm household

Source: VDC of each village

Figures



*1: FFS: Farmer Field School
*2: VDC: Village Development Committee
*3: TSA Unit: Technical Supervision & Assistance Unit
*4: SC-FWUC: Secondary Canal FWUC
*5: VEW: Village Extension Worker

Task force Unit in Project Office will be transferred to TSA Unit of Apex-FWUC in the production stage

① DAFF Takeo supports agronomy and extension aspects of the project according to the task with MOWRAM/DWRAM through Task Force Unit of the Project Office during the design/construction stage. And DAFF Takeo transfers technology to TSA Unit during first four (4) years of the production stage.

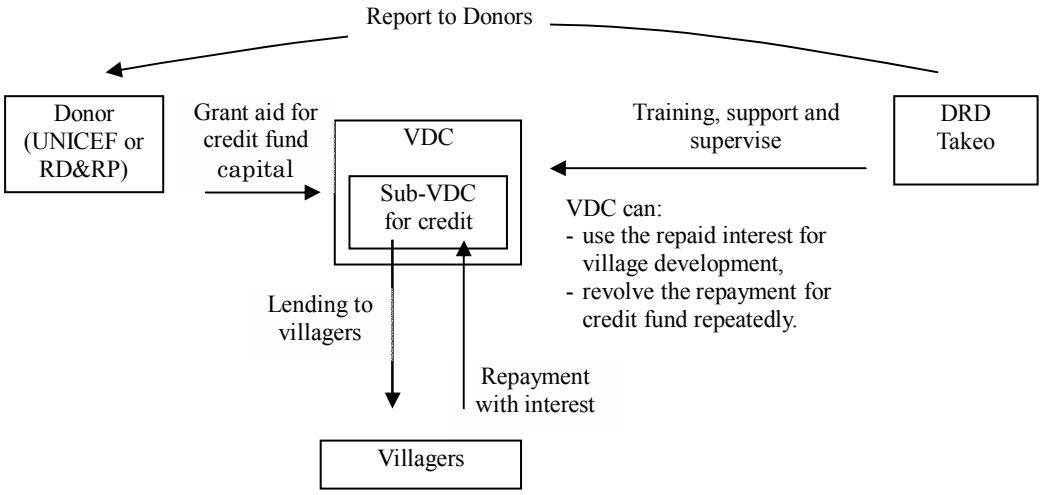
② DAFF Takeo trains leader farmers (VEWs) through FFS. The leader farmers participate in FFS from Extension FG of VDC.

③ VEWs of Extension FG disseminate improved farming techniques in their village. They also set up and manage demonstration plots to demonstrate and verify improved farming technology and improved varieties under the support and monitoring from District Office of DAFF Takeo.

④ Tram Kak District Office of DAFF supports the activities of Extension FG and operation of demo-plots with technical guidance.

⑤ Demonstration plots are set up in each SC-FWUC area under the coordination of VDCs and SC-FWUC. The plots are set up wit the area of about 0.1 ha per lot in the farmers' field, and operated by VEWs of Extension FG.

The Study on The Rehabilitation and Reconstruction of Agricultural Production System in The Slakou River Basin, The Kingdom of Cambodia	Figure E-1
Japan International Cooperation Agency	Proposed Extension Plan and Activities



Conditions of VDC Credit

Capital fund	Grant aid to each VDC from donor
Management of lending and repayment	Self-management by the VDC independently and autonomously. Usually, 2 members of credit sub-VDC operate the lending and repayment under the VDC.
Training, support and supervising	At the beginning, the donors trained and supervised the VDC member, and currently DRD are supervising the funds and operation.
Purpose of credit lending	Basically for purchase of fertilizer, and during the off-cropping season the fund can be use for other purpose (livestock, etc.).
Lending and repayment	Cash lending and cash repayment with interest.
Lending period	5 -6 months (one cropping season)
Interest rate	2% per month or 10% per season for fertilizer; and 2% or 4% per month for other purpose. The interest has to be repaid every month in some villages.
Revolving of repayment	VDC can revolve the repayment from users for credit fund repeatedly.
Utilization of interest	VDC can use the accumulated interest for village development according the decision of the VDC meeting.

The Study on The Rehabilitation and Reconstruction of Agricultural Production System in The Slakou River Basin, The Kingdom of Cambodia	Figure E-2 System and Conditions of Credit by VDC
Japan International Cooperation Agency	