2.2.4 Water Source Conditions

1) Water Source Conditions for Gravity Fed System

The source of water for the gravity fed system (GFS) is a stream or river up on the mountain. The flow rates of these streams and rivers are usually abundant in the rainy season, but sometimes become insufficent in the dry season. The sources of the GFS for the Pilot Study have enough water all year round, except for the source to supply the Pha Oudom scheme.

Although the source for the Pha Oudom water scheme was originally selected to supply 9 villages, the flow rate survey revealed a quantity enough for only 3 or 4 villages. However, after many changes in design due to complaints from all 9 villages (see the previous section 3.3.1 for an explanation of this situation), it was finally decided to connect the pipeline to all 9 villages, but with the consequence of reduced per capita supply rate and increased number of persons per tap. This means that the number of taps is far below the standard of Nam Saat. So, the residents of these villages must make all efforts to (1) conserve the forest around the intake so that the source will not be depleted (which means no slash and burn around this area), (2) conserve their daily use of water in order for everybody to receive water for a long time, and (3) plan a water fetching time schedule to minimize queuing and to avoid simultaneous tap opening (which can cause problems in water shortage at certain taps).

At the beginning of the Pilot Study, the selected water source conditions for the GFS in the Provinces of Bokeo and Luang Namtha were assessed by the JICA study team in November 1999, and water samples were collected from confirmed 9 streams. The rainy season of this year was completed in October 1999 in Bokeo and Luang Namtha Provinces, and the dry season started in November 1999. The Pilot Study including community dialogue and actual construction of GFS started in December 1999 at the selected sites in the two provinces, and water samples from water sources were collected before the start of the construction and after the completion of construction works by the Nam Saat field activity teams. The attached table shows the results of water quality

analyzed at the laboratory in Vientiane. The results reveal that there are no serious water quality problems for either of the pilot study water sources. Therefore, the parameters for consideration in the assessment of water quality are reviewed for the three important items described below.

Turbidity

The seasonal changes in turbidity of the streams are important indicators to assess the water sources. The turbidity ranged from 3.1 to 29.3 NTU in November 1999, just after the rainy season as was expected. The three samples from (H-17 to H-25) Houayxai 9 villages, (L-15) Tin That and (L-21 and L-12) Daen Kang/Hoai Mo indicated turbidity values above the Nam Saat water quality standard of 5.0 NTU in November 1999. However, for the samples from the next survey in January 2000, the turbidity recovered within the standard, ranging from 0.2 to 3.9 NTU.

Iron

Only one source from (H-17 to H-25) Houayxai 9 villages indicated an iron content beyond the Nam Saat water quality standard of 0.4 mg/l in November 1999. However, in the sample of the next survey in January 2000, the iron content recovered within the standard from 0.77 mg/l to 0.03 mg/l.

Coliform Group

Coliform group counts indicates the extent of organic contamination due to bacteria in the water source. In the samples of two sources from (V-6) Pangxai and (L-13) Chakhamping, the coliform group counts were found slightly beyond the standard ranging from 11 to 23 MPN/100ml and 10 to 17 MPN/100ml, respectively. On the other hand, samples from other sites indicated that the coliform group count after the rainy season was low due to the large river discharge as compared with other periods. Further, the number of coliform increased in the dry season due to the decrease in the discharge and increase in human activities surrounding the water source. The present situation concerning water contamination is not so serious, but tap water in the villages should be boiled before drinking.

Water Quality Analysis Results of Pilot Study Water Schemes

No.	Village Name		Sampling Date	pH	Turb. NTU	Cond. µ S/cm	NO_2-N mg/l	NO_3-N mg/l	Cl- mg/l	SO_4^{2-} mg/l	T-Hardness mg/l $CaCO_3$	Fe mg/l	Mn mg/l	Cu mg/l	F- mg/l	Pb mg/l	As mg/l	Cr^{6+} mg/l	Cd mg/l	Coliform N/100ml
GFS (Gravity Fed System)																				
H-1	Poung		18-Nov	8.0	3.1	72	<0.02	0.08	3.9	<2.0	72	0.19	0.05	<0.02	0.20	<0.002	<0.005	-	-	15
			11-Dec	7.8	1.6	98	<0.01	<0.10	3.5	<2.0	90	0.08	0.03	<0.10	0.12	<0.002	<0.004	<0.05	-	23
			7-Feb	6.9	1.1	79	<0.01	<0.10	7.0	<2.0	56	<0.03	<0.02	<0.10	0.17	<0.002	0.004	<0.05	0.003	6
			12-Jun				<0.01	0.19	1.5	<2.0	44	<0.03	<0.01	<0.005	0.11	0.007	<0.005	<0.05	<0.002	23
H-7	Namma		14-Jan	7.7	1.3	117	<0.01	0.08	2.9	2.0	105	0.10	<0.02	<0.10	0.19	0.030	<0.004	<0.05	-	8
			8-Feb	7.4	1.3	130	<0.01	<0.10	<1.0	<2.0	91	<0.03	0.03	<0.10	0.20	<0.002	<0.004	<0.05	0.003	20
			12-Jun				<0.01	0.22	<1.0	<2.0	102	0.13	<0.01	<0.10	0.05	0.006	<0.005	<0.05	<0.002	15
H-17 to H-25	Houayxai 9 Villages		18-Nov	7.9	29.3	83	<0.01	0.08	3.5	<2.0	88	0.77	0.06	<0.02	0.30	0.007	<0.005	-	-	8
			13-Jan	7.5	3.9	94	<0.01	0.07	<1.0	3.0	105	0.03	0.02	<0.10	0.19	0.010	<0.004	<0.05	-	80
			24-Feb	7.6	5.0	103	<0.01	0.20	<1.0	<2.0	84	0.12	0.04	<0.10	0.10	0.003	<0.004	<0.05	<0.002	6
			13-Jun				<0.01	0.22	<1.0	<2.0	70	0.23	<0.01	<0.10	0.27	0.010	<0.005	<0.05	0.003	14
H-31	Done Keo		13-Jan	7.4	1.7	68	<0.01	0.12	3.6	<2.0	65	<0.03	<0.02	<0.10	0.10	<0.002	<0.004	<0.05	0.003	9
			23-Feb	7.7	2.6	88	<0.01	0.12	2.2	<2.0	71	<0.03	<0.02	<0.10	0.10	0.004	<0.004	<0.05	<0.002	7
			13-Jun				<0.01	0.27	1.5	<2.0	44	0.08	<0.01	<0.10	0.17	0.020	<0.005	<0.05	<0.002	14
H-32	Hat Phouan		26-Jan	7.7	1.6	55	<0.01	0.17	1.5	<2.0	44	0.12	0.03	<0.10	0.20	0.030	<0.005	<0.05	0.003	5
			23-Feb	7.5	2.3	76	<0.01	<0.10	11.0	<2.0	53	<0.03	<0.02	<0.10	0.10	0.007	<0.004	<0.05	<0.002	20
			11-Jun				<0.01	<0.01	0.7	<2.0	40	0.11	<0.01	<0.10	0.30	0.010	<0.06	<0.05	<0.002	43
P-1 to P-9	Pha Oudom 9 Villages		17-Nov	8.1	4.2	198	<0.01	<0.10	5.0	<2.0	180	0.06	0.04	<0.02	0.32	0.014	<0.005	<0.05	-	3
			11-Jan	7.7	0.5	202	<0.01	0.13	2.2	7.0	172	0.09	<0.02	<0.10	0.10	<0.002	<0.004	<0.05	0.003	9
			16-Feb	7.7	1.5	231	<0.01	<0.01	3.6	15.0	185	<0.03	<0.02	<0.10	0.10	0.008	<0.004	<0.05	<0.002	43
			15-Jun				<0.01	<0.005	<1.0	<2.0	114	0.03	<0.02	<0.10	0.17	0.030	<0.005	<0.05	<0.002	23
V-6	Pangxai		13-Nov	8.2	3.8	91	<0.01	0.07	3.5	<2.0	118	<0.03	<0.03	<0.02	0.62	0.021	<0.05	-	-	20
			9-Jan	7.6	2.9	131	<0.01	0.19	4.4	<2.0	132	0.10	<0.02	<0.10	0.34	<0.002	<0.004	<0.05	-	23
			8-Feb	7.8	1.5	157	<0.01	<0.10	1.5	<2.0	127	<0.03	0.02	<0.10	0.23	<0.002	<0.004	<0.05	<0.002	11
			26-Jun	6.9			<0.01	0.22	<1.0	<2.0	50	<0.03	<0.01	<0.01	0.21	0.010	<0.004	<0.05	<0.002	13
V-8	Namseua		9-Jan	7.2	1.0	45	<0.01	0.15	2.2	<2.0	53	0.20	0.02	<0.10	0.10	0.004	0.004	<0.05	0.003	68
			11-Feb	7.1	2.1	61	<0.01	<0.10	14.0	<2.0	42	0.03	<0.02	<0.10	0.10	0.020	<0.004	<0.05	<0.002	43
			27-Jun	7.0			<0.01	0.15	<1.0	<2.0	21	0.08	<0.01	<0.01	0.10	0.020	<0.004	<0.05	<0.002	43
L1 & L-2	Xiengkok Mai / Xiengkok Kao		10-Nov	7.6	3.6	63	<0.01	<0.05	4.3	<2.0	46	0.09	0.03	<0.02	0.30	0.019	<0.005	-	-	3
			13-Dec	7.2	1.0	65	<0.01	<0.10	3.7	<2.0	76	<0.03	<0.02	<0.10	0.10	<0.002	<0.004	<0.05	<0.002	49
			9-Feb	7.4	0.8	84	<0.01	<0.10	2.9	4.0	44	0.05	<0.02	<0.10	0.11	<0.002	<0.004	<0.05	<0.002	12
			25-Jun	7.1			<0.01	0.18	<1.0	<2.0	44	0.05	<0.01	<0.10	0.15	0.008	<0.005	<0.005	<0.002	33
L-4	Luang		11-Nov	7.6	2.8	88	<0.01	0.27	1.4	<2.0	74	0.05	<0.02	<0.02	0.21	<0.002	<0.005	-	-	5
			8-Jan	7.5	0.6	96	<0.01	0.13	2.9	3.0	74	0.06	0.02	<0.10	0.58	0.030	0.006	<0.05	0.002	7
			18-Feb	7.5	5.5	119	0.05	<0.10	7.3	<2.0	90	<0.03	<0.02	<0.10	0.10	0.005	<0.004	<0.05	<0.002	23
			24-Jun	7.0			0.02	0.17	0.7	<2.0	53	0.34	0.10	<0.10	0.15	0.045	0.005	<0.05	0.002	43
L-13	Chakhamping		11-Nov	7.3	7.8	61	<0.01	0.21	3.5	<2.0	60	<0.03	0.02	<0.02	0.14	0.004	<0.005	-	-	10
			8-Jan	7.4	1.4	76	<0.01	<0.10	1.4	<2.0	53	0.40	0.02	<0.10	0.10	<0.002	<0.004	<0.05	-	17
			18-Feb	7.4	3.0	94	<0.01	<0.10	7.4	<2.0	55	<0.03	<0.02	<0.10	0.10	0.008	<0.004	<0.05	0.004	43
			24-Jun	6.4			<0.01	0.20	<1.0	<2.0	32	<0.03	<0.01	<0.10	0.10	0.010	<0.005	<0.05	<0.002	23
L-15	Tin That		11-Nov	7.8	16.7	107	<0.01	0.15	2.8	<2.0	104	0.08	0.07	<0.02	0.25	<0.002	<0.005	-	-	3
			19-Jan	7.4	0.2	103	<0.01	0.10	2.9	<2.0	90	0.04	0.02	<0.10	0.10	0.010	<0.005	<0.05	0.003	5
			9-Feb	7.5	0.8	135	<0.01	<0.10	<1.0	<2.0	92	0.03	<0.02	<0.10	0.12	<0.002	<0.004	<0.05	0.003	16
			24-Jun	7.0			<0.01	0.13	<1.0	<2.0	71	0.04	<0.01	<0.10	0.12	0.009	<0.005	<0.05	<0.002	23
L-21 & L-12	Daen Kang / Hoai Mo		11-Nov	7.9	11.6	113	<0.01	0.09	8.5	<2.0	114	<0.03	0.06	<0.02	0.33	0.012	<0.005	-	-	2
			18-Jan	7.5	0.2	132	<0.01	0.10	3.7	<2.0	126	<0.03	<0.02	<0.10	0.10	0.030	<0.005	<0.05	<0.002	2
			10-Feb	7.8	1.8	174	<0.01	<0.10	<1.0	<2.0	124	0.10	<0.02	<0.10	0.20	<0.002	<0.004	<0.05	<0.002	10
			24-Jun	7.1			<0.01	0.21	<1.0	<2.0	59	0.41	0.02	<0.10	0.20	<0.002	<0.005	<0.05	0.004	43
Dug Well and Borehole																				
H-3	Nam Ngao	#1	1-Mar	6.1	0.3	170	<0.01	10.00	1.6	2.4	64	<0.03	<0.02	<0.02	0.10	<0.002	<0.001	0.01	<0.001	7
			11-Jun				0.20	4.90	8.1	<2.0	72	<0.03	<0.02	<0.10	0.41	0.004	<0.005	<0.05	<0.002	0
		#2	1-Mar	6.3	50.0	248	0.08	26.00	14.0	12.0	88	0.70	<0.02	0.02	0.10	<0.002	<0.001	<0.05	<0.001	6
			11-Jun				<0.01	7.10	11.2	<2.0	118	<0.03	0.02	<0.10	0.24	0.005	<0.005	<0.05	<0.002	23
H-9	May Phattana		1-Mar	7.1	50.0	657	<0.01	0.40	1.2	145.0	325	0.09	<0.02	0.02	0.20	0.010	<0.001	<0.05	<0.001	16
			12-Jun				<0.01	0.21	<1.0	99.0	264	<0.03	0.01	<0.10	0.42	0.003	<0.005	<0.05	0.004	0
H-37	Leang		1-Mar	7.1	10.0	560	<0.01	0.40	6.0	186.0	258	1.10	<0.02	0.02	0.20	<0.002	<0.001	<0.05	<0.001	16
			12-Jun				<0.01	0.22	8.8	106.0	214	0.05	0.20	<0.10	0.10	0.0008	<0.005	<0.05	<0.002	0
Drinking Water Quality Standards																				
Nam Saat			6.5 - 8.5	5	1,200	2	40		250	300		0.40	0.50	1.0	1.0	0.01	0.01	0.05	0.003	10
Nam Papa			6.5 - 8.5	5		1	10	250	250	500		0.30	0.10	1.0	1.0	0.05	0.05	0.05	0.010	0
WHO			6.5 - 8.5	5		3	50	250	200	500		0.30	0.50	2.0	1.5	0.01	0.01	0.05	0.003	0
Japan			5.8 - 8.6	2		10		200	200	300		0.30	0.05	1.0	0.8	0.05	0.01	0.05	0.010	0

2) Groundwater Development

The pilot study for groundwater development included 2 boreholes and 2 dug wells in Houayxai District of Bokeo Province. The digging of dug wells at (H-3) Nam Ngao started at the end of December 1999 based on the agreement due to the community dialogue. At the beginning, the villagers of Nam Ngao refused to receive the dug well in favor of the GFS. Although they wanted the GFS, the results of technical survey showed that the location of the village was higher than the water source, and so the villagers agreed to the dug well. As for the villagers who would receive boreholes, they were willing to accept the borehole because they wanted to improve the present conditions of fetching water from dug wells with buckets. Groundwater development was successfully completed at the beginning of March 2000, and three types of handpumps, namely Lao-99, Tara and Afridev, were installed at the sites.

The dug wells and boreholes had sufficient discharge for pumping water using handpumps. Samples of the groundwater were collected and analyzed in the laboratory, and the results of analyses on water quality are shown in the attached table on the previous page.

2.3 Pilot Study Implementation

2.3.1 Implementation Program Considerations

The overall pilot study implementation program was based on the program prepared by Nam Saat and elaborated through by the JICA Study Team in consideration of the following conditions:

(1) Considerations on staging of the implementation: The pilot study should be organized into stages to cover the following with focus on capacity building at every level:

Stage A:	Preparations and training of trainers
Stage B:	Participatory village activities
Stage C:	Preparation for construction
Stage D:	Construction works
Stage E:	Monitoring

(2) Social considerations: The actual implementation details will be finalized upon dialogue at the villages and animation/education to the villagers. The final confirmation involves (1) whether the facilities chosen at the time of the village field survey are actually their final choice or not; (2) the level of willingness to contribute to the construction; (3) plans for organization of water and sanitation committees; (4) awareness on operation and maintenance of the facilities, including establishing an accounting system. These and any other matters related to the implementation must be clearly understood and agreed by the villagers of the selected villages.

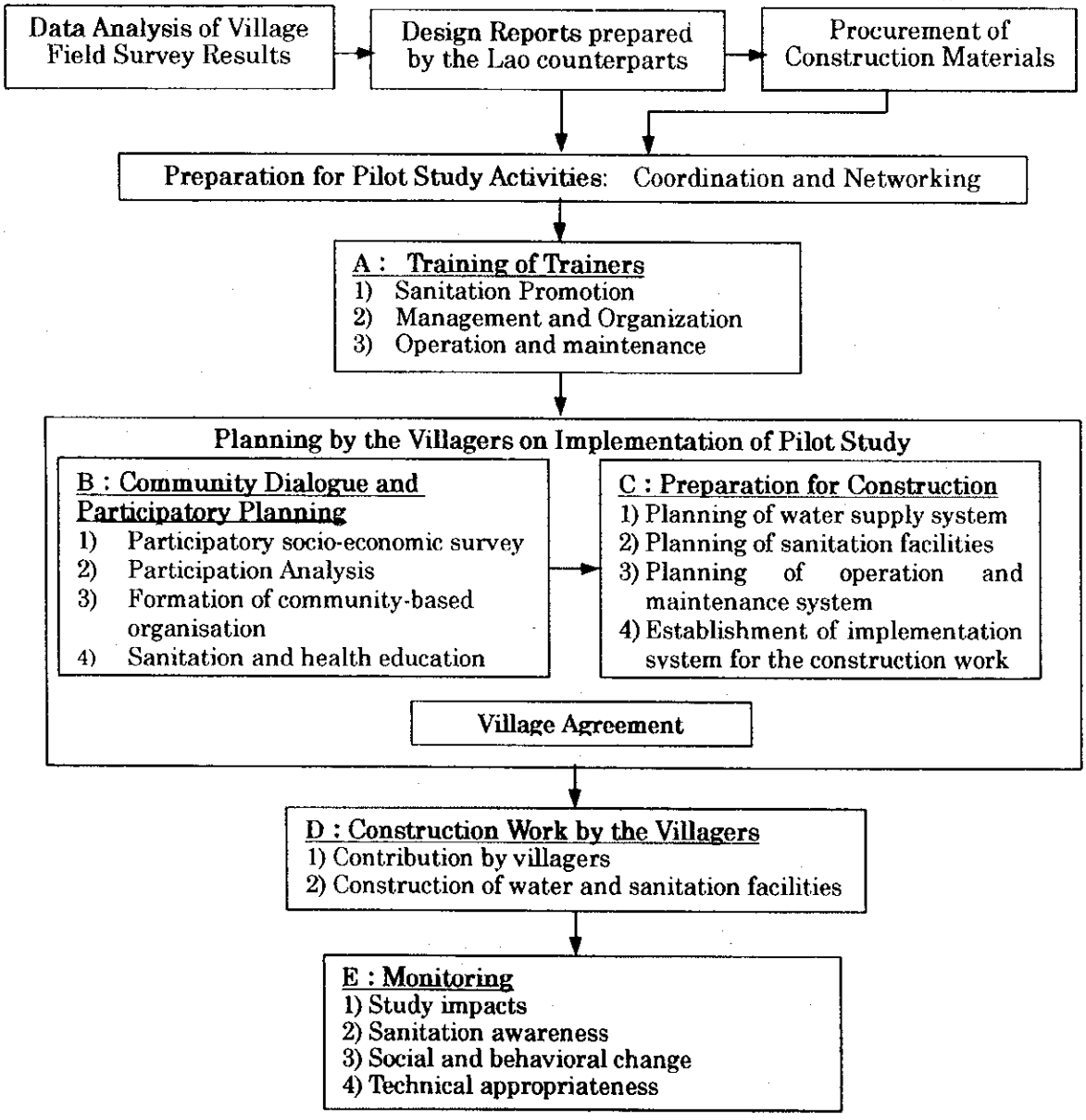
(3) Technical considerations: The designs of the facilities must be reconfirmed and any modifications should be cleared. The technically feasible locations for installations need to be agreed with the villagers. All other technical matters concerning the construction must be fully recognized and consented by the villagers.

(4) Time constraints: Preparations for the pilot study started from the middle of October 1999 and implementation of all pilot study villages should be completed by the beginning of March 2000. Then, monitoring, which will be carried out for each village as soon as its construction works is completed, for all of the pilot study villages needs to be finalized by the beginning of July 2000 so that data can be compiled, analyzed and evaluated to be reflected in the development plan.

(5) Budget constraints: The total cost of the pilot study implementation including preparation, training, community participation matters, animation/education activities, materials cost, construction works, monitoring and all other related costs must be within the allotted budget. Moreover, once the budget is fixed, it cannot be increased.

2.3.2 Flow of Pilot Study Activities

The flow of activities for implementation of the pilot study is depicted below.



2.3.3 Staging

The pilot study program was divided into five stages from A to E aiming for capacity building of counterparts and communities at each stage of the program. Stage A was the introductory stage in preparation for the pilot study, where coordination and networking were emphasized and potential trainers trained so that they will be able to carry out the implementation in the subsequent stages. In Stage B, village participatory organization and planning kicked off the implementation at the villages selected for pilot study with aims to organize village committees and prepare their plans of action using the demand responsive approach and community dialogue. The objectives of Stage B were to establish a consensus within the village and make an agreement with the village. During Stage B, in addition to the method familiar with Nam Saat, the study team employed another participatory method called PCM (Project Cycle Management) at selected villages, which is appropriate to facilitate dialogue with the villagers, to assure the feasibility of the implementation, to strengthen the sustainability and to minimize negative impacts. Stage C aimed at formulating a plan for construction of water supply and sanitation facilities and for operation and maintenance. According to the plans formulated at this stage, the water supply and sanitation facilities were constructed with community participation and villagers' contributions in the form of labor, materials and cash in Stage D. The facilities constructed and operation and maintenance system established in Stage D were monitored during Stage E soon after completion of the construction works for each pilot study village.

Stage	Description
A: Training of Trainers (TOT)	1. Sanitation and hygiene promotion 2. Management and organization 3. Operation and maintenance
B: Participatory Village Activities	1. Community dialogue 2. Socio-economic assessment 3. Participation assessment 4. Community organization 5. Sanitation and hygiene promotion
C: Preparation for Construction	1. Participatory facilities planning 2. Operation and maintenance planning 3. Village action plan 4. Village agreement
D: Construction Works	1. Village contributions 2. Construction of water schemes 3. Construction of latrines
E: Monitoring	1. Study impacts 2. Technical appropriateness 3. Behavioral change 4. Sanitation awareness

The survey items and activities carried out during each stage of the pilot study implementation are listed in the following page.

2.3.4 Team Formation

Facilitating teams were formed for each of the target Districts along with Provincial staff from Bokeo and Luang Namtha to conduct the activities from Stage B to Stage E. The team members consisted of participants from the training of trainers held in Stage A. One facilitating team consisted of a sub-team A to facilitate village participation and community dialogue with emphasis on demand responsiveness for village organization and planning at Stage B, and a sub-team B to supervise the construction stage. The composition of the teams is shown in the following table.

Composition of the Facilitating Team

Implementation Stage			
Sub-Team A :	**Village Participatory Organization/Planning**	**Sub-Team B :**	**Supervision of Construction Works**
Senior Facilitator	: 2 from each Province, 4 in total	Supervision Patrol	: 1 from each Province, 2 in total
Facilitator	: 3 from each District, 12 in total	Supervision Assistant	: 2 from each District, 8 in total
Supervisor	: 1 from Nam Saat Central	Supervisor	: 2 from Nam Saat Central
Advisor	: 1 JICA Study Team member	Advisor	: 1 JICA Study Team member
Monitoring/Evaluation Stage			
Monitoring Team			
Monitoring Staff : 2 from each District, 8 in total (minimum) Monitoring Patrol : 1 from each Province, 2 in total (minimum)			

Implementation Activities for Each Stage

Stage	Survey Item	Activity
Stage A Preparation and Training of Trainers	1) Preparatory Work	□ Coordination and networking □ Review of sector strategy and other implementation related concepts □ Mutual understanding on objectives of implementation of pilot study
	2) Sanitation and Health Promotion	□ Education on sanitation, health and hygiene □ Animation on proper water use and sanitation
	3) Basic Management of Water Supply and Sanitation	□ Participatory planning □ Personnel management □ Total management □ Monitoring and evaluation
	4) Operation and Maintenance	□ Community operation and maintenance of water supply and sanitation facilities □ Community management □ Community participation □ Water fees and accounting
Stage B Village Participatory Organization/ Planning	1) Socio-Economic Assessment	□ Socio-economic analysis (diversity of the community, power relationship, etc.) □ Household analysis (time and energy spent for collecting water, household economy) □ Village demand assessment
	2) Participation Analysis	□ Participatory problems analysis □ Participatory objectives analysis
	3) Formation of Community-Based Organization	□ Formation of community-based organization □ Organization analysis □ Understanding of pilot study
	4) Sanitation and Hygiene Education	□ Understandings and consensus building related to health □ Sanitation education and hygiene promotion
Stage C Preparation for Construction	1) Planning of Water Supply Facilities	□ Review on the problems and objectives analysis □ Financial discussion □ Final decision on the water source (GFS or others) □ Final confirmation of the pipeline routing and location of communal taps
	2) Planning of Sanitation Facilities	□ Establishing operation and maintenance system and other rules and regulations □ Establishing the organization for operation and maintenance □ Establishing operation and maintenance system of sanitation facilities
	3) Planning on Operation and Maintenance	□ Establishing operation and maintenance system and rules and regulations for water supply system □ Establishing community-based organization for operation and maintenance of the facilities, and operation system □ Establishing operation and maintenance system for sanitation facilities
	4) Establishment of Implementation System for Construction Works	□ Establishing implementation system and organization for the construction works □ Review on the implementation schedule and period (water supply system and sanitation facilities) □ Final confirmation on materials and human resources to be contributed by the village □ Reviewing issues related to the agreement
Stage D Construction Works	1)Construction of Water Supply Facilities	□ Contributions from the villagers □ Operation of community-based organization for the construction works □ Guidance and support for the community-based organization in construction method, and operation and maintenance
	2) Construction of Sanitation Facilities	
Stage E Monitoring	1) Water Use	□ Study impacts □ Social and behavioral change □ Sanitation awareness □ Technical appropriateness
	2) Sanitation	
	3) Environment	
	4) Society	

2.3.5 Schedule and Strategy

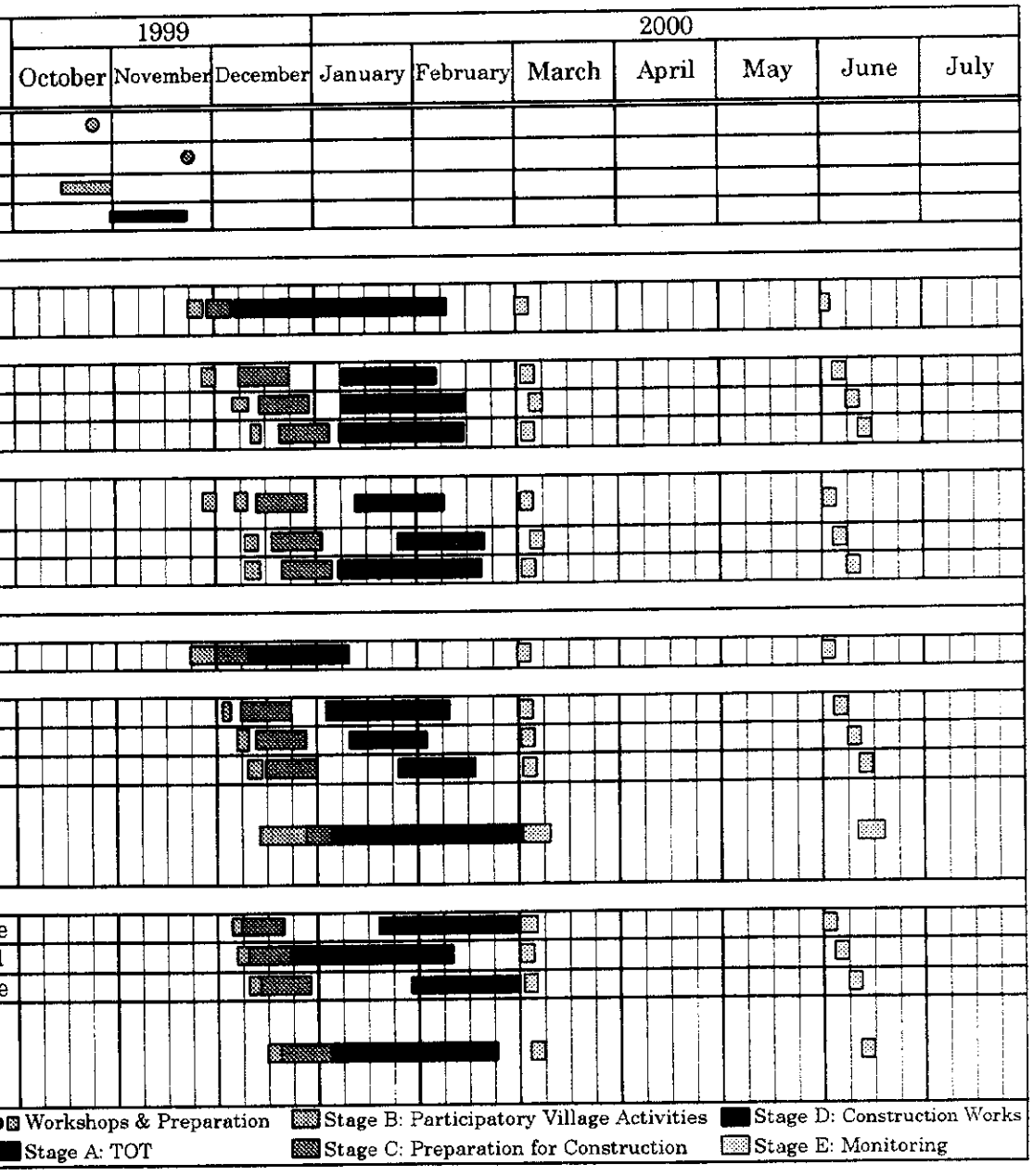
The implementation schedule for the Pilot Study in the target villages was divided into five stages as described above. The basic survey period for each stage is listed below and the implementation schedule is shown on the next page:

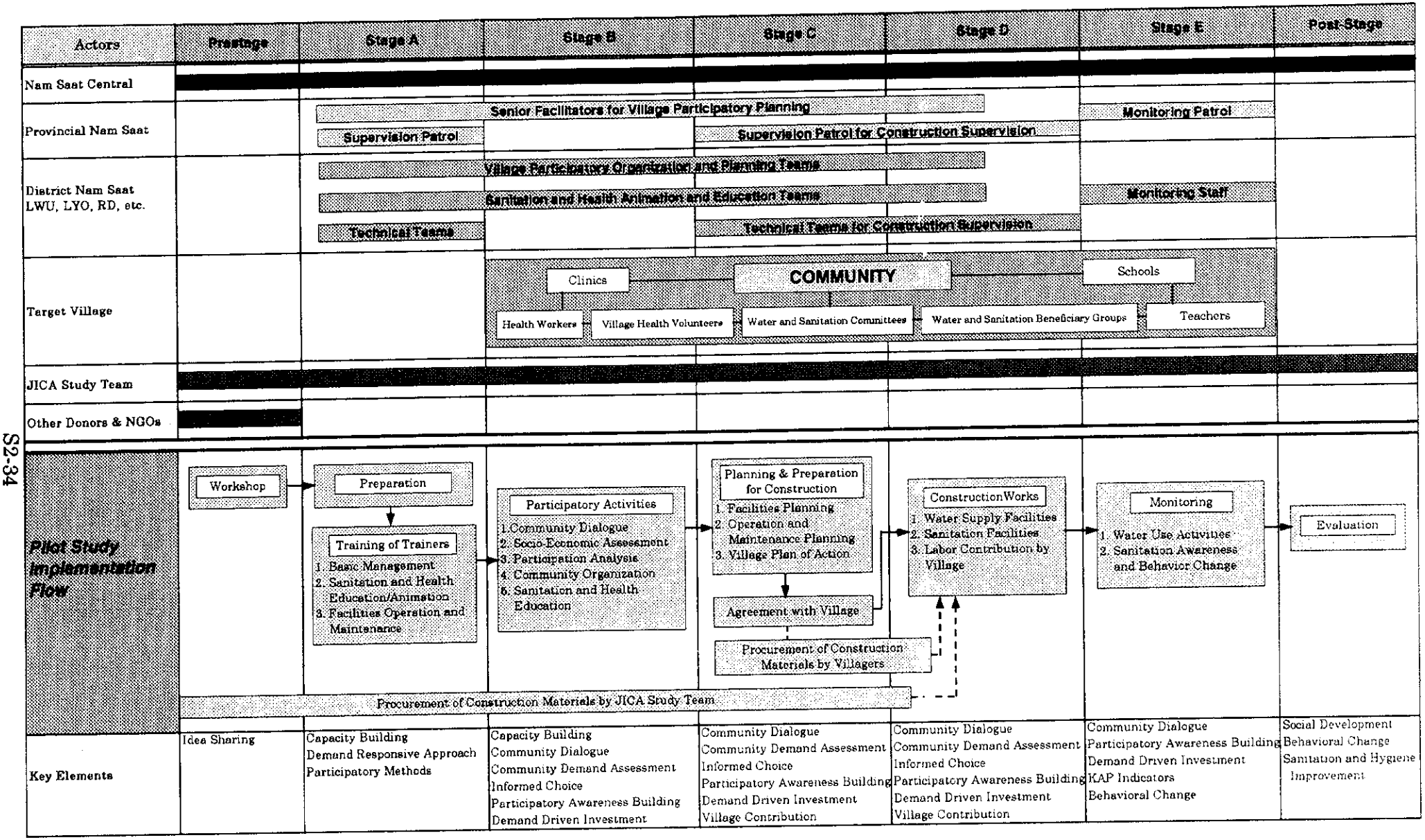
Stage A	Training of Trainers:	Three weeks
Stage B	Participatory Village Activities:	From two to six days per village for community dialogue, and one or two days per village for sanitation promotion
Stage C	Preparation for Construction:	About three days per scheme
Stage D	Construction Works:	Three to five weeks per scheme
Stage E	Monitoring:	One or two days per village

The implementation strategy for the pilot study is depicted in the page following the schedule. The implementation was centered around the Provincial and District personnel under the overall guidance of Nam Saat central with advise from the JICA Study Team. Importance was placed on close interrelationship with each component for effective progress and maximum opportunity for sharing experiences. The implementation of the pilot study was conducted in line with the sector strategy along the concepts based on informed choice and appropriate local resource contribution to ensure sustainability through a sense of ownership.

Pilot Study Implementation Schedule

No.	Village Name	Total No. of Villages	No. of Water Schemes	No. of Latrine Villages	Type of Water Scheme
Workshop		Phase I Results			
		Pilot Study Implementation			
Preparation for Pilot Study					
Training of Trainers (TOT)					
Luang Namtha Province					
Long/Viengphouka Joint Team					
L-1 L-2	Xiengkok May Xiengkok Kao	2	1	2	GFS
Viengphoukha Team					
L-15	Tin That	1	1	0	GFS
V-6	Pangxai	1	1	1	GFS
V-8	Nam Seua	1	1	0	GFS
Long Team					
L-21 L-12	Daen Kang Hoai Mo	2	1	0	GFS
L-13	Chamkhamping	1	1	0	GFS
L-4	Luang	1	1	0	GFS
Bokeo Province					
Houayxai/PhaOudom Joint Team					
H-1	Poung	1	1	1	GFS
Houayxai Team					
H-31	Done Keo	1	1	1	GFS
H-7	Nam Ma	1	1	1	GFS
H-32	Hat Phouan	1	1	0	GFS
H-17,H-18 H-19,H-20,H-21 H-22,H-23 H-24,H-25	Maynignom, Thongsengchan Xiengnam, Nongneum, Nale Chomchouk, Paksang Mayphoukha, Namhotay	9	1	5	GFS
Pha Oudom Team					
H-37	Leang	1	1 well	0	Borehole
H-3	Nam Ngao	1	2 wells	0	Dug Well
H-9	May Phatthana	1	1 well	0	Borehole
P-1, P-2 P-3, P-4 P-5, P-6, P-7 P-8, P-9	Phiengkham, Thinkeoneua Thinkeokang, Thinkeotay Phaoudom, Nathong, Phonexay Somsavang, Sonexay	7	1	1	GFS
Total		34	16	12	





Pilot Study Implementation Strategy

2.4 Staging Activities

2.4.1 Stage A: TOT (Training of Trainers)

1) Objectives

As the first stage of the pilot study, a training of trainers (TOT) was held as a follow-up to the training session conducted in Phase I. The training in Phase I had the purpose of identifying the actual village conditions of the target villages using participatory methods through community dialogue and technical field surveys of potential water sources, and facilities designing. The foremost objective of the training of trainers carried out in Phase II was capacity building of Provincial and District personnel so that the participants can become trainers themselves. The aim of the training program was to introduce participatory techniques for sanitation promotion, community management and education on operation and maintenance of water supply and sanitation facilities. The actual use of their trained knowledge was tested at the pilot study villages.

2) Methodology and Schedule

In continuation to the training session conducted in Phase I, the TOT of Phase II also followed the concepts of the Sector Strategy and National Guideline being promoted by the Ministry of Public Health and Nam Saat. In this respect, capacity building and institutional strengthening through technology transfer to Provincial and District level personnel using lectures and on-the-job training was emphasized.

The TOT stage was divided into three sessions as follows.

1) Sanitation Education and Hygiene Promotion
2) Project Management, Organization and Monitoring/Evaluation
3) Community Management, Operation and Maintenance

The trainees were participants from Provincial and District level health department, Lao Women's Union, youth organization and education. Preference was placed on personnel who received training in Phase I, but some could not participate due to their own commitments during this period, and therefore some new trainers also attended the TOT. The trainers were staff of Nam Saat central who have previous experience in similar training programs with other projects. Wherever required, the JICA Study Team gave guidance and support. At various times during the training, the trainees were given many chances to practice their acquired knowledge in the form of group presentation sessions

which applies to the "learning-by-doing dynamics" as given in the Sector Strategy.

Since each session lasted about a week, the location of the TOT was shifted from one session in one Province to another session in the other Province, in consideration of avoiding homesickness by the participants. However, the last two session was conducted at the same location due to the continuity of the training subjects. The training was held for three weeks in November 1999. The schedule of the TOT program is presented below.

Session	Period	Location
1. Sanitation Promotion	1 November to 5 November	Luang Namtha
2. Management and Organization	8 November to 12 November	Houayxai
3. Operation and Maintenance	15 November to 19 November	Houayxai

3) Training on Sanitation Promotion

A training on sanitation and hygiene promotion was held in Luang Namatha aiming to teach the participants the basics of sanitation related to water supply and living environment through lectures, group discussions and a preparatory OJT. Twenty-three participants from Provincial and District level Nam Saat, Lao Women's Union, Lao Youth Organization and Education with diferent backgrounds attended the training session. The list of participants is shown in the Data Book. The trainers were Nam Saat Central staff members, as listed below, who have experience in sanitation training with other projects. This session was presided by Dr. Manivan Savadie, Deputy Director of the Provincial Public Health Department of Luang Namtha.

In presence

Dr. Manivan Savadie	Deputy Director, Luang Namtha Provincial Public Health Department

Trainers from Nam Saat Central

Dr. Bouakeo	Chief of Environmental Health Division
Mr. Khonekeo	Engineer of Water Supply Division
Ms. Keodok Mai	Planning and Statistics Section, Administrative Division

JICA Study Team Observers

Mr. Shoji Fujii	Team Leader
Mr. Sybounheung	Team Member

The program for this session was prepared by the trainers using reference programs and materials from other projects such as those of WB/UNDP and UNICEF. Awareness posters and picture-card shows were used as materials for the trainees to use to promote hygiene to the villagers. An on-job-training (OJT) was held during the session at a nearby village that already implemented water supply and sanitation facilities by another donor agency. The OJT gave the trainees a chance to observe and learn about the actual attitudes toward water and sanitation, and to practice awareness campaigning. The agenda of the session is given below.

Agenda for TOT on Sanitation Promotion

Date	Day	Program
1 November	Mon	Opening Ceremony Introduction Guideline for Training Objectives for Training Hygiene Promotion: Knowledge, Activities, Techniques
2 November	Tue	Hand Washing Facilities Using Clean Water Use of Latrine and Food Hygiene Household Hygiene, Personal Hygiene
3 November	Wed	Diarrhea, Malaria, Respiratory Diseases Water Source Protection Latrines and Waste Disposal Group Session on Guideline for Hygiene Promotion (GFS, handpump, dug well, environmental sanitation) Preparation for Field Visit
4 November	Thu	OJT (Field visit to village to practice village organization) Reporting and Feedback on OJT Monitoring and Evaluation
5 November	Fri	Planning, Budgeting, Management Group Discussion and Presentation Closing Ceremony

4) Training on Management and Organization

The second TOT involved subjects on administrative management, participatory planning and monitoring. This session was held in Houayxai of Bokeo Province. Training the participants on project management and planning placing importance on village participation was the main objective. Twenty-six participants having various backgrounds from Provincial and District level Nam Saat, Lao Women's Union, Lao Youth Organization, Education and a participant from an NGO attended the second training session. The list of participants is presented in the Data Book. The trainers whose names are listed below came from Nam Saat Central and they have experience in similar training of other donors. Dr. Nounchanh, Deputy Director of the Provincial Public Health Department of Bokeo presided over this session.

In presence

Dr. Nounchanh	Deputy Director, Bokeo

Trainers from Nam Saat Central

Dr. Tayphasavanh	(Former) Deputy Chief of Administrative Division
Dr. Khonethip	Head of Planning and Statistics Section, Administrative Division
Dr. Bounphone	Monitoring/Evaluation, Planning and Statistics Section, Administrative Division

JICA Study Team Observers

Mr. Shoji Fujii	Team Leader
Mr. Sybounheung	Team Member

The training program for this session was prepared by the trainers from Nam Saat through their experience in other externally supported project training programs as well as their own training received in foreign countries. Since participatory management and planning was the key to this session, group discussions and group presentation was focused on as tools for participation by the trainees. The agenda for this second training session is described in the table below.

Agenda for TOT on Management and Organization

Date	Day	Program
8 November	Mon	Opening Ceremony Introduction Objectives for Training Schedule and Logistics Concepts of Administrative Management
9 November	Tue	Participatory Planning: Problems Analysis, Objective Analysis, Log Frame, PDM Working Group on Planning Group Presentation
10 November	Wed	Structural Organization Group Discussion and Presentation Personnel Management Decision Making Process Facilitation
11 November	Thu	Direction Taking Effective Monitoring and Evaluation Group Discussion
12 November	Fri	Group Discussion and Presentation Summarize Closing Ceremony

5) Training on Operation and Maintenance

The third and last TOT session was held on community management and operation and maintenance of water supply and sanitation facilities. As a continuation of the second session, his session was held in Houayxai of Bokeo Province. The importance of community management as well as operation and maintenance for sustainability was emphasized during this session. The same twenty-six participants who attended the previous session continued to attend this session as well. The below listed trainers are the same Nam Saat Central staff members who facilitated the second TOT. The opening ceremony of this session was held in the presence of Dr. Nounchanh, Deputy Director of the Provincial Public Health Department of Bokeo, while the closing ceremony was presided over by Dr. Pheng Sy Viensavan, Director of the Provincial Public Health Department of Bokeo.

In presence

Dr. Pheng Sy Viensavan	Director, Bokeo Public Health Department
Dr. Nounchanh	Deputy Director, Bokeo

Trainers from Nam Saat Central

Dr. Tayphasavanh	(Former) Deputy Chief of Administrative Division
Dr. Khonethip	Head of Planning and Statistics Section, Administrative Division
Dr. Bounphone	Monitoring/Evaluation, Planning and Statistics Section, Administrative Division

JICA Study Team Observers

Mr. Shoji Fujii	Team Leader
Mr. Shigeyoshi Kagawa	Team Member
Mr. Sybounheung	Team Member

Similar to the previous session, the program for this session was also prepared by the same trainers. Again, the session focused on group discussions and group presentation to emphasize participation by the attendants. The agenda of the last session is given below.

Agenda for TOT on Operation and Maintenance

Date	Day	Program
15 November	Mon	Opening Ceremony Introduction Objectives for Training Schedule and Logistics Concept on Sustainability Relationship between Water, Sanitation and Environment Community Management: Concept and Components
16 November	Tue	Community Management: Group Discussion Group Presentation Concept on Operation and Maintenance Need for Operation and Maintenance Group Discussion
17 November	Wed	Group Discussion Group Presentation Revolving Fund for Maintenance
18 November	Thu	Gender in Water Supply and Sanitation Group Discussion and Presentation Review of Village Participatory Planning
19 November	Fri	Monitoring and Evaluation Community Management Review Summarize Closing Ceremony

6) Results

Owing to the experienced and capable trainers, the TOT sessions proceeded smoothly with enthusiastic and active participation by the attendants. At the end of the training sessions, the participants made evaluations on their improvement in knowledge as a result of the TOT, the level of benefit, the quality of the trainers and the time allocated for the sessions. Most of the participants felt that the training was handled effectively and that they have improved their knowledge through this training. For the sanitation promotion, the knowledge of the subject before the training was 32% of the participants replying higher than average, and this increased to 63% of them after the training. Likewise for the other sessions, their knowledge improved from 21% of the attendants to 71% of them. More than about 60% of the participants thought they benefited on a level more than average. The trainers were rated good or excellent by 72% of the participants for the sanitation promotion session, and by 85% for the other sessions. As for the time allocated for the sessions, about 60% felt it was appropriate, while 9% replied that the sanitation promotion session was too short (21% for the other sessions). These results are summarized in the table below and refer to the tables in the following pages for the actual results of evaluation on the TOT sessions by the participants.

Parameter	Sanitation Promotion		Organization; Management, O & M	
Knowledge Improvement (Higher than Average)	Before	After	Before	After
	32%	63%	21%	71%
Benefit (Above average)	59%		66%	
Trainers (Good to excellent)	72%		85%	
Time Allocation Appropriate	64%		58%	

2.4.2 Stage B: Participatory Community Activities

1) Community Dialogue

Objectives and Methodology

The first activity to be done at the village is making dialogue with the villagers. The main objective of community dialogue is participation and involvement of the villagers in the activities of the pilot study. Through this procedure, the villagers can express their actual needs and desires so that they can become important actors in the planning, organizing and constructing of water supply and sanitation facilities. This is a necessary process to invoke a sense of ownership of the facilities to the villagers.

The period of the community dialogue varied from one village to another as shown in the table below. The participation of women as well as vulnerable groups such as the disabled and poor households were also encouraged.

Period of Community Dialogue

Village Name	Period
L-1 Xiengkok Mai, L-2 Xiengkok Kao	25 November to 28 November
L-4 Luang	9 December to 8 December
L-13 Chakhamping	9 December to 11 December
L-15 Tin That	29 November to 39 November
L-21 Daen Kang L-12 Hoai Mo	29 November to 30 November and 6 December to 8 December
V-6 Pangxai	6 December to 8 December
V-8 Nam Seaua	9 December to 11 December
H-1 Poung	25 November to 30 November
H-3 Nam Ngao	7 December to 9 December
H-7 Nam Ma	8 December to 11 December

H-9 May Phattana	10 December to 12 December
H-17 Maynignom, H-18 Thongsenchan, H-19 Xiengnam, H-20 Nongneun, H-21 Nale, H-22 Chomchouk, H-23 Paksang, H-24 Mayphoukha, H-25 Namhotay	13 December to 26 December
H-31 Done Keo	4 December to 6 December
H-32 Hat Phouan	11 December to 14 December
H-37 Leang	6 December to 8 December
P-1 Phiengkham, P-2 Thinkeoneua, P-3 Thinkeokang, P-4 Thinkeotay P-5 Phaoudom, P-6 Nathong, P-7 Phonexay, P-8 Somsavang, P-9 Sonexay	15 December to 18 December and 12 January to 14 January

The subjects listed below are samples of items discussed during the community dialogue.

1) Review of JICA Study activities: Phase I results, pilot study planning
2) Formation of village committees: Committee members, responsibilities, functions
3) Contributions from the village: Materials, labor, cash
4) Community management
5) Rules and regulations on water use: Water fees, repair procedures, measures against breakage, treatment of non-payers
6) Rules on latrine use: Use of water jar, washing hand, cleaning bowl
7) Sanitation promotion
8) Storage of construction materials
9) Village agreement

Furthermore, as a demonstration and introduction of a participatory planning method used by JICA as well as other organizations, PCM (project cycle management) workshops were held at villages selected out of the pilot study villages in consideration of obtaining varied reactions from different ethnic minority groups.

Organization of Village Committees

For sustained use of the facilities, the village must form committees to control the activities related to water supply and sanitation. A water committee should be in charge of water supply activities, and a sanitation committee should be responsible for sanitation activities. The two committees can be a joint committee for which Nam Saat calls a WATSAN (water and sanitation) committee.

The minimum members required for the committees are as follows:

- Chief
- Deputy chief
- Assistant
- Accountant
- Village caretaker

The conditions for selecting the above members are the following:

1) Must be a permanent resident of the village
2) Must be willing to serve the community on a voluntary basis
3) Inclusion of women as representing the users is preferable
4) Should be able to read and write
5) Should have leadership qualities
6) Should be willing to receive training

The main functions and responsibilities of the water committee are listed below.

1) Clean and maintain the water supply system
2) Supervise and advise on use of taps
3) Collect water fees and keep accounting
4) Organize meetings and discussions to resolve problems related to water use
5) Distribute work responsibilities among men and women
6) Make small repairs
7) Monitor and promote sanitation

The important functions and responsibilities of the sanitation committee are the following.

1) Promotion for sanitation and hygiene
2) Supervise and advise on use and maintenance of latrines
3) Control waste into water sources
4) Prevent contamination of the environment

PCM Workshop

PCM (Project Cycle Management) workshops were conducted in L-21 Daen Kang Village (Hmong tribe) and Hoai Mo Village (Akha tribe) from 7 to 10 December and in L-13 Chakhamping Village (Akha tribe) from 14 to 17 December. The preparations for the workshop were done on 6 December in Daen Kang and Hoai Mo, and 13 December in Chakhamping, respectively. The participation analysis, the problems analysis on the water and sanitation which also include socio-economic-cultural issues, and consecutively the objective analysis were conducted.

Based on these analyses, the necessary measures and actions were organized into the format of the Project Design Matrix. The workshop was conducted mainly by a local moderator and sub-moderator from a local consultant firm contracted with the JICA study Team. This firm has a record of experiences in organizing PCM and ZOPP participatory planning methods. District level officials as local language communication facilitators helped communication among villagers and moderators. The workshops also aimed to demonstrate and share the knowledge on participatory village planning to Nam Saat personnel from central down to district levels. The PCM team members and the schedule are shown below.

PCM Team Members and Their Affiliation

Role	Affiliation	Name
Team Supervisors	JICA Study Team	Ms. Noriyo Aoki Mr. Sybounheung
Nam Saat Observers	Central Nam Saat Provincial Nam Saat District Nam Saat	Ms. Keodokmai Mr. Suriwong Mr. Somchit*
Moderator Sub-moderator	JICA Study Team contracted local consultant	Ms. Thips Phetmany Ms. Somchay Soulitham
Communication Facilitators	District Health Dept. District Culture and News Dept.	Dr. Norine Mr. Phetsawan

* He participated only a few days due to his duel responsibilities also as a member of the construction supervisor team.

PCM Schedule for Each Village

Session	1st Day	2nd Day	3rd Day	4th Day
Morning Session	Self Introduction	Problems Analysis	Objectives Analysis	Project Design Matrix
Lunch Break				
Afternoon Session	Participation Analysis	Problems Analysis	Objectives Analysis	Wrap-up Meeting

On the preparation day in each village, the village headman and group representatives attended the preparation meeting with the PCM team. During the workshop, the villagers continued to attend the workshop enthusiastically. The moderators had good technique in handling participatory workshops by using simple words for explanation and letting the villagers brainstorm and express their ideas. The moderator inserted educational games and quizzes related to water and sanitation improvement, which made the atmosphere enjoyable.

The PDM (project design matrix) for Daen Kang and Hoai Mo villages is presented in the following page along with the participation analysis results.

Effects of the four-day workshop are summarized as follows.

(1) Involvement of villagers, both men and women, in this participatory workshop encouraged villagers to have a feeling of ownership in order to implement and sustain the project.
(2) The workshop helped village women and other vulnerable people to articulate their daily problems and issues related to water, and to get more confidence to participate in the project.
(3) A team working spirit and solidarity among villagers was created.

Another effect observed was that local officials who attended the workshop were very pleased to join in the PCM workshop and appraised its effectiveness for building the integration and raising their potential ability to participate, which was contrary to their expectation that the four-day workshop would be boring. They said they would like to learn how to conduct this kind of workshop with full villagers' participation.

On the other hand, the constraints and difficulties could be pointed out that the majority of the participants, especially women, do not have a good command of the Lao language, and so it is hard to understand the Lao language without a language translator. The Daen Kang Village headman, who has a strong leadership amongst the villagers, played a fine role in coordination of translating languages for the villagers. Akha tribes are considered to be much more difficult than Hmong tribes to reach an adequate understanding due to their illiteracy, their own religious and cosmic beliefs, and their indigenous culture.

Participation Analysis of PCM Workshop Articulated by Villagers at Daen Kang and Hoai Mo Villages

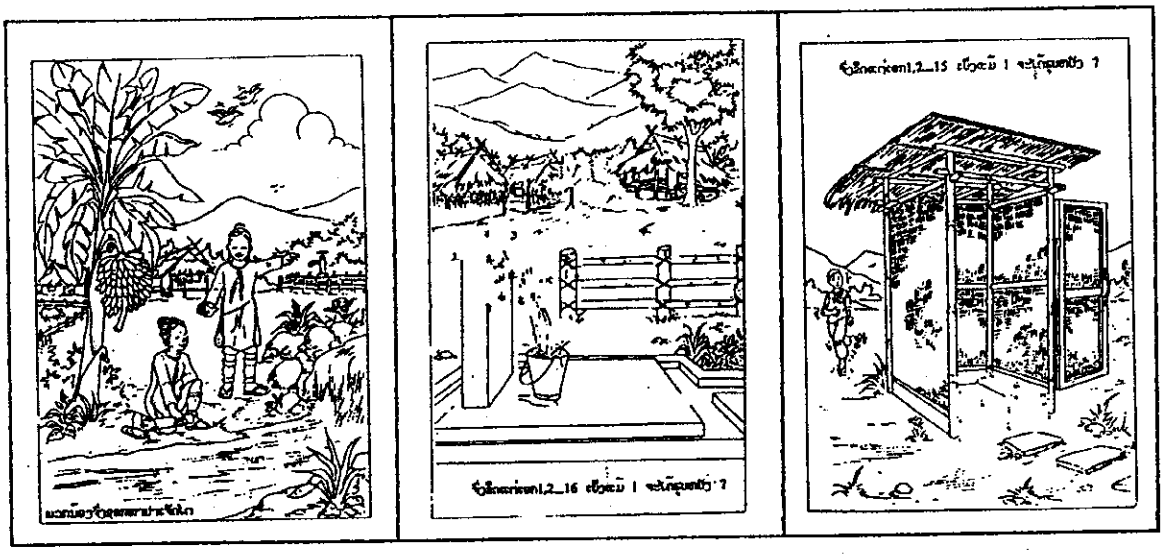
Participants	Interests	Potential Contribution
☐ *Village Committee*	- reduction in water fetching time - latrine - water for daily use such as cleaning house & dishes, bathing - irrigation - decreasing water-borne diseases such as diarrhea	• education to villagers on using clean water • preparation of space for storing construction materials • protection of materials • encouragement towards villagers' contribution to the project
☐ *Villagers*	- clean water supply - latrine - healthy life - improvement of productivity	- being laborers for all activities of construction - procurement of local materials
☐ *Senior Organization*	same as committee and villagers	- inculcating and supervising villagers
☐ *Youth Organization*	same as committee and villagers	- labor, wood, gravel and sand
☐ *Women's Organization*	- reduction in water fetching time - latrine - having time to do other things such as taking rest, sewing and feeding animals	- caring for the people during the construction - participating in the water supply project
☐ *Security Organization*	same as committee and villagers	- security during construction

Project Design Matrix Articulated by Villagers at Daen Kang and Hoai Mo Villages

Project Design Matrix	Person in Charge
Project Objectives : ☐ Clean water will be sufficiently and conveniently supplied to the villagers of Ban Daen Kang and Hoai Mo ☐ Sanitation conditions of the villages in Ban Daen Kang and Hoai Mo will be improved	
Means : 1. Villagers of Ban Daen Kang and Hoai Mo will jointly contribute to the construction. 2. Villagers of Ban Daen Kang and Hoai Mo learned about and will implement the sanitation principles 3. Gravity Fed System will be maintained.	Mr.Yachong Mr. Touly Water Committee Water Committee
Activities : 1.1 Collection of Gravel and Sand in: - Daen Kang Village - Hoai Mo Village 1.2 Preparation of Wood for Construction for: - Daen Kang Village - Hoai Mo Village 2.1 Education to Villages on Sanitation 3.1 Education to Villagers on Maintenance (so that they will not break the facilities) 3.2 Organize the Village Water Committee* 3.3 Draft the facilities management rules - Inspection: 3 times/month - Cleaning/Clearance of surrounding area: 3 times/month - Monthly Maintenance Fee: 100 kip/person	Mr.Lee Her Mr. Mea Thou Mr.Vangmenglee Mr. A-Lee District Officers District Officers Water Committee Water Committee
Inputs by Villagers : - Sand: 4.4t - Gravel: 9t - Laborers - Timber (20cm × 5cm × 2cm): 32 pieces - Timber (4cm × 8cm): 26 pieces - Timber (round log): 26 pieces - Cash 20,000 kip/Household (for Construction)	

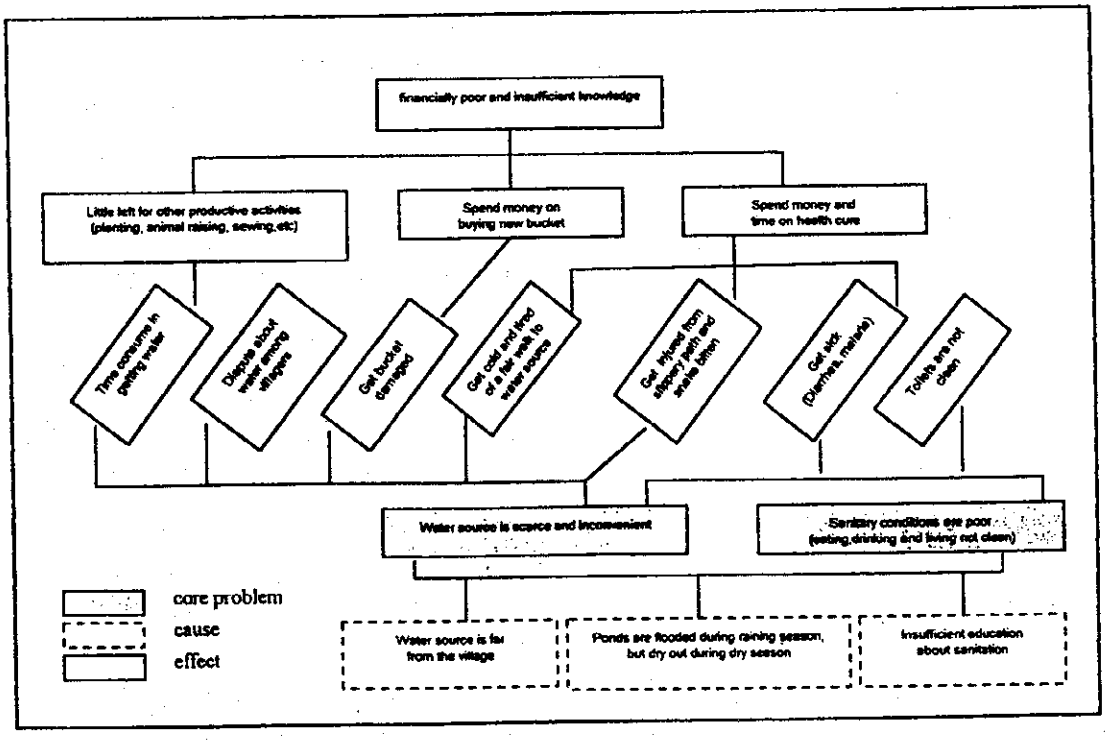
* the committee is already organized, consisting of Mr.Vangmenglee, Mr.Jurva and Ms. Jurya of Daen Kang; Mr.Paou and Ms. Bouxe of Hoai Mo

Educational Quiz and Game During PCM Workshop*



*Using Namsaat Manual for Women and Clean Water for Health and Environment (Lao Version)

Problem Analysis
in PCM Workshop by Dean Kang Villagers



Social Assessment by RRA

The RRA (Rapid Rural Appraisal) method enables the survey to rapidly and intensively assess the features of the living conditions of the rural population for the diagnosis of issues and problems. The basic concept underlying RRA is that the people know their own life best and have empirical wisdom concerning their living environment. RRA is designed as an on-going learning process for both local as well as external team members in a more cross-sectional way. Since they evaluate local know-how and conduct relevant technology transfer to the communities, the assessment has to be conducted basically by an inter-disciplinary team. Similar approaches such as the Action Learning Research are applied in the development field in such a way as to adjust its own field. When it is applied in a more participatory way involving the community, it is called PRA (Participatory Rural Appraisal) which was conducted in the baseline survey of Phase I.

Based on the objectives and basic concept of the RRA, an inter-disciplinary team is usually formulated. In a more idealistic sense, it should consist of such specialists as hydrogeologists, environmental analysts, sociologists, facilities designers, sanitation education specialists, and operation and maintenance specialists. However, since the team members were assigned non-concurrently and had to survey sites separately, it was difficult to form one team for a real RRA survey in the field. It is noted that the RRA for this Study was initiated basically by sociologists. In the actual field, tools are applied in a flexible way according to the members' creative expertise. The members who have deep insights and abundant respect for villagers life and wisdom have to be carefully selected by avoiding bias such as urban bias, ethnic bias and so forth. Wherever possible, gender bias, if any, should be offset by including female in the appraisal team.

In Phase I, physical layout mapping including infrastructure, water resources and land utilization mapping has been drawn by the villagers and survey team, and other basic village social-economic data were collected through interviews. In Phase II, social assessment was conducted in the three villages of Daen Kang and Hoai Mo villagers on 7 December 1999, and Chakhamping village on 15 December for the purpose of preparation for monitoring. The reason for selecting these villages is that these villages are regarded as the most difficult pilot villages due to the features of their ethnic affiliation, and their perception on water and sanitation related issues. The survey was done for the more precise items: time-line village development history, religious and festival calendar including beliefs and taboos on water related practice, information on historical

background of water-related rights, life time survey including water fetching time, examination of payment capability and willingness and their understanding of cost effectiveness as well as other items.

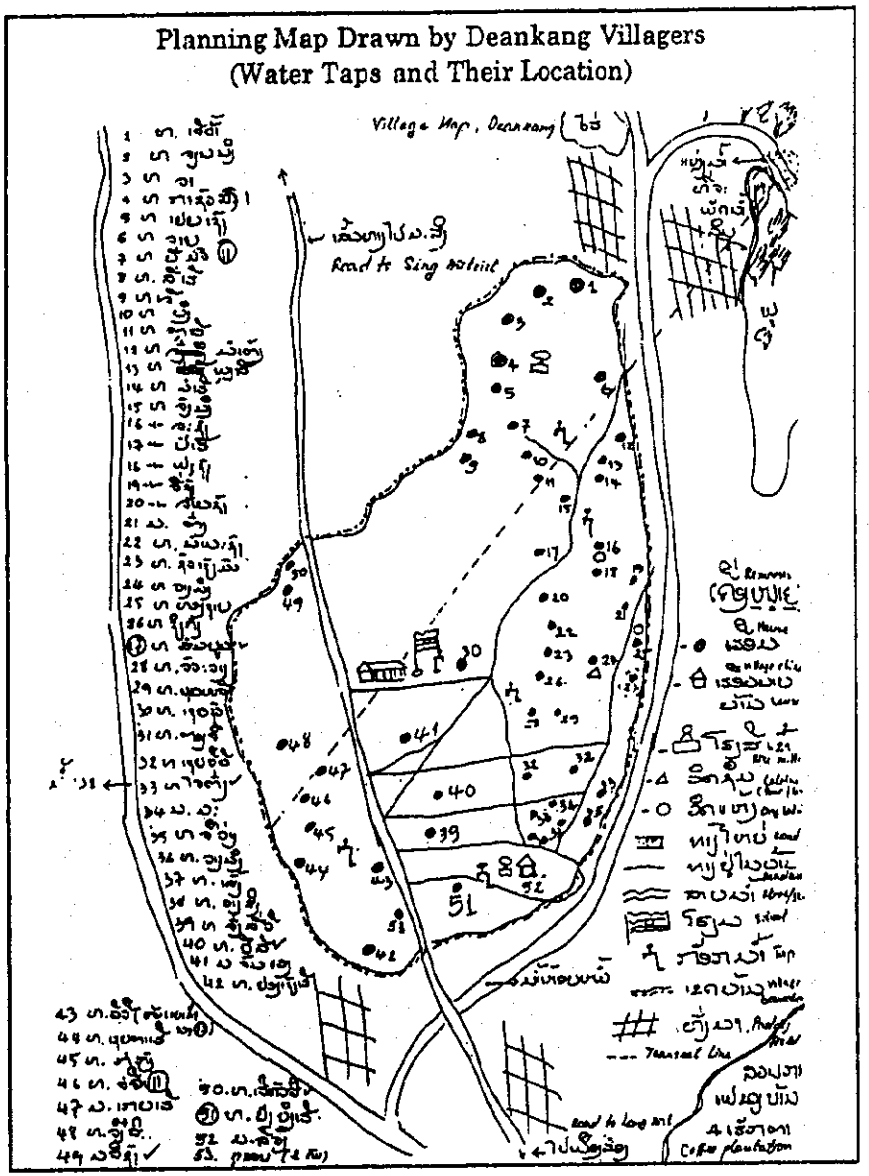
Case of Daen Kang/Hoai Mo Village

For the purpose of sharing the same water source by two villages, even though they have different languages and cultures, Hoai Mo village (Akha) was added to the water supply scheme design for Daen Kang village (Hmong). Moreover, the opium-addicted population in Hoai Mo was found to be larger than the number of addictions previously surveyed in Phase I. Furthermore, due to the insufficient unity and group conflicts inside Hoai Mo, it was considered difficult for all of the villagers in Hoai Mo to participate in the implementation to a full extent. In this predicament, the PCM workshop enhanced the villagers' awareness towards the necessity of integration and brought an agreement of each activity in consideration of these issues which has to be solved. However, although the Hoai Mo village headman agreed to no longer cultivate poppy, there is still concern that even after stopping opium cultivation, the addictive customs might persistently remain, which could affect the village economy for a time being. By following the results of the Rapid Rural Appraisal, which was conducted in December 1999, the consequences of these issues can continue to be examined in Phase III. Some of the results of RRA survey such as the planning map drawn by the villagers and seasonal calendar are shown in the following page.

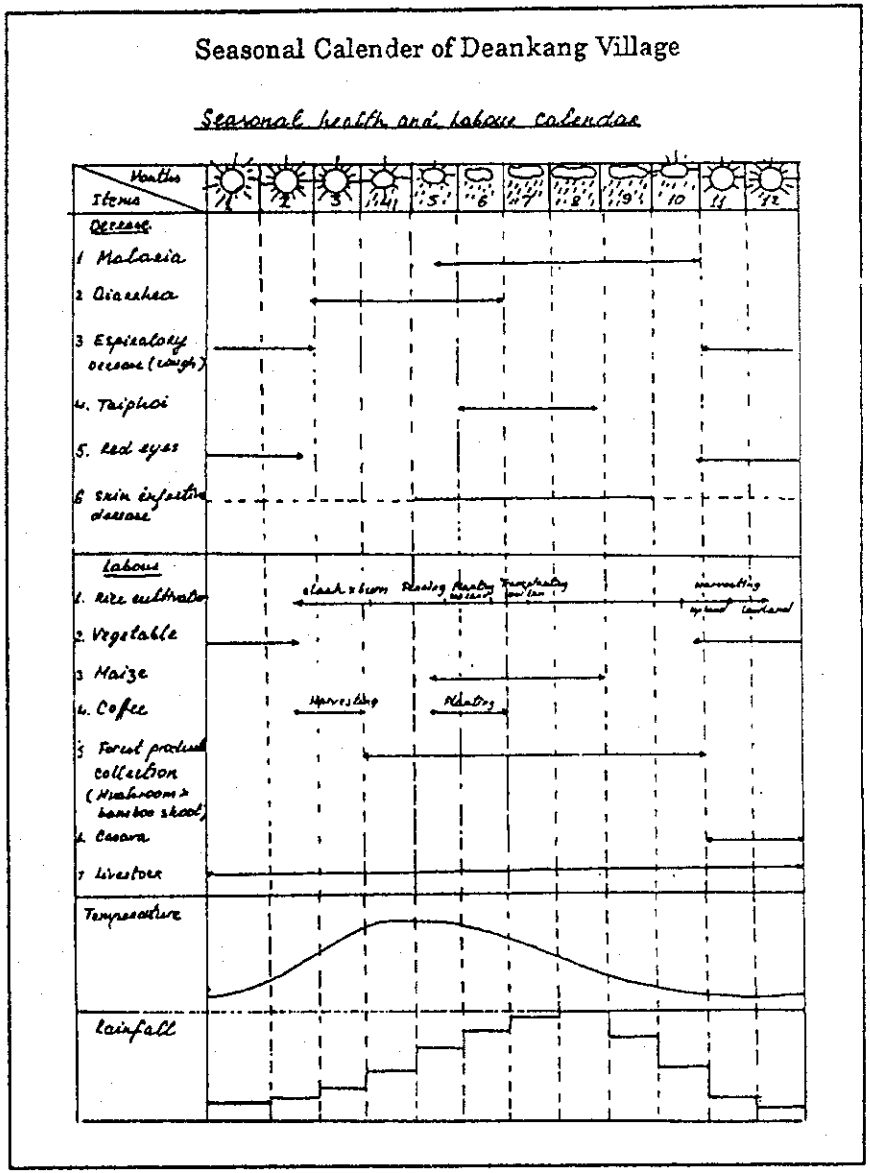
Case of Chakhamping Village

Due to the land-related conflict among Chakhamping villagers for the past few years, it was divided into two groups with different geographical locations, which is highlanders consisting of 17 households and lowlanders consisting of 14 households. As planned, two taps for GFS is being installed in the lowland area of the village to benefit all 31 households. However, the 17 highlanders' households have to move down and join with the lowlanders as one village or else the project would not be cost effective and sustainable in a practical sense. For the highlanders who just moved up to the highland area, it is not easy to accept moving down again because they had some emotional misunderstanding and conflict towards the lowlanders. After the participatory workshop, the situation gradually changed and the relation between the two groups became eased much more than before. The village headman who lives in the highland came to understand the necessity for unity and cooperation of the village to the project. Finally the consensus plan for the project was made among villagers. Actually, the construction was completed with villagers' cooperative work.

Planning Map Drawn by Deankang Villagers
(Water Taps and Their Location)



Seasonal Calender of Deankang Village



2) Sanitation Education and Hygiene Promotion

Fundamental Concept

One of the characteristics of rural Lao is that people are living in remote villages under rather isolated circumstances. They are living with their own languages, cultures and lifestyles, which vary significantly from the ordinary or average pattern of the Lao. The uniqueness may sometimes hinder even local health staff to communicate effectively. The staff may find some difficulties to using available health promotion materials, which are mostly designed for average people in this country.

It is generally believed that it requires certain skills and talents to develop educational materials such as posters or visual aids for public health promotions. If we could have specifically designed visual aids for a target village, the health message shall have more reality and stronger impact to the people. This is the fundamental concept of this activity to challenge.

This can be realized by modern digital technology, i.e. a portable computer, a digital camera and an LCD projector.

On-site Material Development Process

The "On-site material development" is a new concept that needs close cooperation between the local health staffs and the study team. The local health staffs have the detailed and practical information on local epidemiological situation and are capable of communicating to the local villagers effectively. We introduce modern digital equipment to them to make them able to organize health messages into a form of slide presentations. There are several key concepts to realize it.

Local epidemic episodes

People in a village will definitely be interested and accept a message if they think it is useful. That is the core assumption of this activity. The message should be based on a "here and now" inspiration rather than an old medical textbook.

We began to search for a recent and nearby epidemic episode from local health staffs who have witnessed, or hopefully participated in that health event. If he/she could remember the outbreak control operation that he/she had attended, he/she has a good potential to tell the episode vividly to the villagers.

Health message organization

Based on the real episode, the course of the event, the control measures taken and the preventive measures which are specifically appropriate to the target village, are to be organized in a slide presentation format in order to persuade the people to avoid similar disease outbreaks again.

Visualization

We have two kinds of image sources. One is already the existing posters, flips and leaflets etc., and the other is the actual village scene. According to the health message developed by the local health staffs, most appropriate images are selected for the presentation. Using letters should be minimized in order to communicate with illiterate villagers.

Rehearsal

Along with the organized slide images, verbal presentation is to be organized. A presenter should be familiar with the local language spoken in the target village. For trained personnel with a "health education", we gave some advice as not to be in a textbook style, or not to use any technical terms.

Feedback

The team reviews the Rehearsal and makes necessary amendments in the slide sequence and verbal presentation.

Local Epidemic Episodes

The local epidemic episodes we chose for the presentations are as follows. It does not necessary have to be a Cholera outbreak, but all four districts and provincial health staffs raised Cholera episodes by chance. However, any water related health event would be acceptable.

Long District: Cholera, 1997

In July, an old traditional healer died on the way back from Myanmar border to his village[1] in Muang Long. After his relatives took his body to the village, the Cholera outbreak happened. The district hospital staffs became aware of the situation when the first four patients visited the hospital. There were 29 Cholera patients.

[1] Ban Nongkham

Viengphoukha District: Cholera, 1994

In a village[2], an outbreak started after some villagers ate dead water buffalo meat. The epidemic ended two weeks later with 78 patients and 38 deaths.

Pha-Oudom District: Cholera, 1994

The outbreak occurred in Pha-Oudom resulting in 34 patients and 21 deaths. We have used this episode at the presentation in both Pha-Oudom and Houayxay Districts.

Louang-Namtha District: Cholera, 1997

The epidemic lasted three weeks with 38 patients and 6 deaths in a village[3].

Daily Activities

After fixing infrastructure for the on-site material development, we designed the daily routine work as follows.

Village walk

Every morning the team has spent a couple of hours or more to investigate real people's life in the target village, with a digital camera in the presenter's hand. Although it could not appear on the screen, odors and sounds in the village has been also inputted in the presenter's mind.

Once a presenter, who is a health promotion officer in Nam Saat, confessed that he now realized the actual health situation of the village which even he himself did not realize although living in a nearby village. Two hours walking in a village while taking pictures of life and water related live scenes, surely makes him conscious as well as sensitive to the water and sanitation issues in that particular community.

By using actual scenes in the village as the materials for the show, we tried to avoid the show becoming a one way communication, which merely tells them what to do like an ordinary textbook. This village walk always gives us important messages from the villagers with words as well as without words.

---

[2] Ban Phonethong
[3] Ban Nongbua

Getting pictures into PC

The picture files created by the digital camera are transferred into the PC. A device named "compact flash memory card" has been used for this process. It takes about one to two hours. The rechargeable battery for the digital camera is set in a battery charger in preparation for use the next morning

Editing

Based on feedback from the last show, new findings or impressions of the village walk, any amendments would be discussed among the presentation team. For example, in order to make our health message clear and understandable, changing the order of the components, adding or deleting pictures, adjusting picture quality such as brightness or contrast, and modifying the manner of presentation have been considered. It takes about one hour, sometimes two hours.

Rehearsal

The presenter will play his role and the rest of the team will listen to his presentation. The slide change timings, appropriateness of the expressions such as use of difficult technical terms, and smooth flow of the messages are the main focus of attention. An inexperienced presenter can get certain confidence in him/herself by doing a rehearsal.

Slide-show

Shortly before sunset, we start preparations and set up the show ground by hanging the screen, setting the generator and extending the wire. The actual show begins around 7 o'clock in the evening. This is the time for most villagers to have dinner. However, if we have well informed them and the show is attractive enough, the villagers can arrange their time and come to gather at the show ground. The show ends at 8 or half past 8.

Feed back

Not always but sometimes we have time to talk with the villagers after or during the show. Those are the valuable chances to get direct feed back from the real audience. The comments from the villagers are considered for the next slide show.

Slide Show

The actual show consists of the following eight components.

(1) Pre-attraction

After setting up the show ground, while waiting for the adult villagers to come, particularly for the children who have been watching our preparation activities with their utmost curiosity from the very beginning, we show series of simple clips, animation, introduction of Japan and the village pictures. Although it has no guidance or explanation with it, it is designed to imply health and water issues to the audience. When they start enjoying and laughing, other people from nearby houses run to see the show with their dinner in their hands.

(2) Introduction

This component responds to the villagers' two major questions: who we are, and why we are here on that night. This introduces the objectives of the show and gives brief orientation of the project.

(3) Epidemic Episodes

The locally experienced real epidemic episodes organized by the local health staffs are presented to the audience.

(4) UNICEF #6

Within the school health programme run by Nam Saat-UNICEF, a series of short stories has been provided. This "Story #6" is the funniest one among all. A schoolboy was seeking around for a comfortable place for evacuation and finally settled in the school latrine.

(5) UNICEF #8

This is another short story from the Nam Saat-UNICEF school health programme, with a theme on clean river.

(6) Pictures of Village Life

This component shows some 30~50 pictures taken in the village in the morning during the village walk by the presenter himself. It has two conceptual themes: people's life and water. The presenter is to add some comments on the pictures occasionally.

At the first time, people seem to be surprised with their own familiar figures on the screen. Then they start enjoying and become excited with the show. We are expecting through this stage that the audience may be reminded that all the pictures or messages that have appeared on the screen are as real as their every days life.

(7) UNICEF #7

This is yet another short story from the Nam Saat-UNICEF school health programme. A village woman negotiates with a spirit "Meikala" for super medicine to cure diarrheas. The relationship between villagers and Meikala can be interpreted as the relationship between villagers and outside supporters such as Nam Saat or donors. The underling message is "the movement you need is on your shoulders".

(8) Project Information

At the end of the show, pilot study information such as materials delivery schedule or communal labour is given to the audience by showing related pictures. It will encourage all the villagers to participate.

Tools and Equipment

The tools and equipment used in the health promotion activities are listed in the following box.

Portable PC[4]	Generator (1.5kw)	Screen	Laser pointer
Digital camera	Stabilizer	Pins & Clips	Lamp
LCD[5] Projector	Fuel tank (10 liters)	Rope	Amplifier

Presentation Record

The presenters who have been working with us during Phase II are listed below.

Area	Presenters	Date
Long District	Dr. Ounkham of Long District Hospital	12/22
Pha-Oudom and Houayxai Districts	Mr. Xaiyaphone of Bokeo Provincial Nam Saat	12/26, 1/4-6, 1/8-16, 1/18
Viengphoukha District	Dr. Keo and Daengkam of VP District Hospital	1/20-21
Louang-Namtha District	Dr. Buvan of LN Provincial Nam Saat	1/24

[4] Personal Computer
[5] Liquid Crystal Display

The villages covered by our health promotion activity during Phase II are listed below.

Code	Village Name	Date	Presenter	Note
L-1	Xiengkok Mai	12/22	Dr.Ounkham	6:30 p.m. ~
L-2	Xiengkok Kao	12/22	Dr.Ounkham	7:30 p.m. ~
H-1	Poung	12/26	Mr.Xaiyaphone	
P-2, 3, 4	Thinkeo 3 villages	1/4	Mr.Xaiyaphone	
P-6, 7	Nathong, Phonexay	1/5	Mr.Xaiyaphone	
P-8, 9, 5	Somsavang, Sonexay, Phaoudom	1/6	Mr.Xaiyaphone	Requested by Phaoudom chief
H-22	Chomchouk	1/8	Mr.Xaiyaphone	
H-18	Thongsenchan	1/9	Mr.Xaiyaphone	
H-19, 20	Xiengnam, Nongmeum	1/10	Mr.Xaiyaphone	
H-21, 23	Nale, Paksang	1/11	Mr.Xaiyaphone	
H-24	Mayphoukha	1/12	Mr.Xaiyaphone	
H-25	Namhotay	1/13	Mr.Xaiyaphone	
H-17	Maynignom	1/14	Mr.Xaiyaphone	
H-32	Hat Phouan	1/15	Mr.Xaiyaphone	
H-7	Nam Ma	1/16	Mr.Xaiyaphone	
H-31	Done Keo	1/18	Mr.Xaiyaphone	
Non Study	Phonethon	1/20	Dr.Keo	Requested by Dr. Keo. Cholera 1994
V-6	Pangxai	1/21	Dr.Keo	
Non Study	Nam Lue	1/24	Dr.Buvan	Requested by the WB project

2.4.3 Stage C: Preparation for Construction

Preparatory Activities

The main activities required during this stage in preparation for the subsequent construction stage are listed below along with their descriptions. These activities are elaborated hereafter.

Preparatory Confirmation Activities

Activity	Description
1. Review of issues related to the Village Agreement	The items agreed during the community dialogue in Stage B and the participatory planning in Stage C must be finally confirmed with the village.
2. Formation of an organization for construction works and allocation of construction supervision team	A village organization needs to be formed to control the construction works. Technicians, supervisors and other construction management staff must be allocated and the village must agree to give cooperation to the supervision team.
3. Final confirmation of participatory planning	The plans for construction of the water and sanitation facilities concerning the items listed below must be finalized through participation of the village. • Water source (GFS) • Pipeline routing (GFS) • Location of water storage tank (GFS) • Allocation of taps (GFS) • Well location (Dug well and borehole) • Number and location of latrines
4. Education on operation and maintenance	The proper operation and maintenance procedures need to be conveyed to the villagers for sustained usage of the facilities.
5. Final confirmation of contributions by village	Contributions in materials, human resources and cash from the village must be confirmed. Also, a person from the village to be in charge of the construction must be selected.
6. Final confirmation of implementation schedule for construction and plan of action	The implementation schedule for construction of the facilities needs to be confirmed before commencing the construction and the village must prepare a plan of action.

The experiences of the target villages concerning construction are varied, and most of the villagers are farmers. Therefore, in order to supervise the villagers on construction works, formation of a supervising team and allocation of capable construction supervisors is inevitable.

The supervising team is composed of technicians and supervisors to support the villagers and control the work. The team supervised the works throughout the period of the construction. A patrol member was also assigned to go around to the construction sites to confirm the progress of the works and existence of any problems, and to report to the Provincial and Central offices of these situations. Furthermore, the patrol acts as a messenger to report information from the Provincial and Central offices to the construction sites.

An advisory board consisting of representatives from Provincial and District Public Health Department as well as Provincial Nam Saat was provided to handle major problems related to the construction.

The members of the supervising team are composed of personnel from Nam Saat Central, Provincial Nam Saat, District Nam Saat as well as Public Health Department representatives, who were selected upon careful discussions in consideration of locality and previous experience. The numbers of persons involved in the activities for both Provinces are listed in the table below.

Composition of Construction Supervising Team

Function and Affiliation			Number Assigned	
			Bokeo	Luang Namtha
Advisory Board	Prov./Dist. Public Health Department		5	3
	Provinical Nam Saat		1	1
Supervisor	Senior Supervisor	Nam Saat Central (Provincial Nam Saat)	2	2 (3)
	Assistant Supervisor	Private	0	3
Technician	Engineer	Prov./Dist. Nam Saat	3	3
	Construction Facilitator	Prov./Dist. Nam Saat	4	4
Patrol	Senior Patrol	Nam Saat Central	1	
	Assistant Patrol	JICA Team contracted local consultant	1	

The roles and responsibilities required for the member of the supervising team are tabulated below.

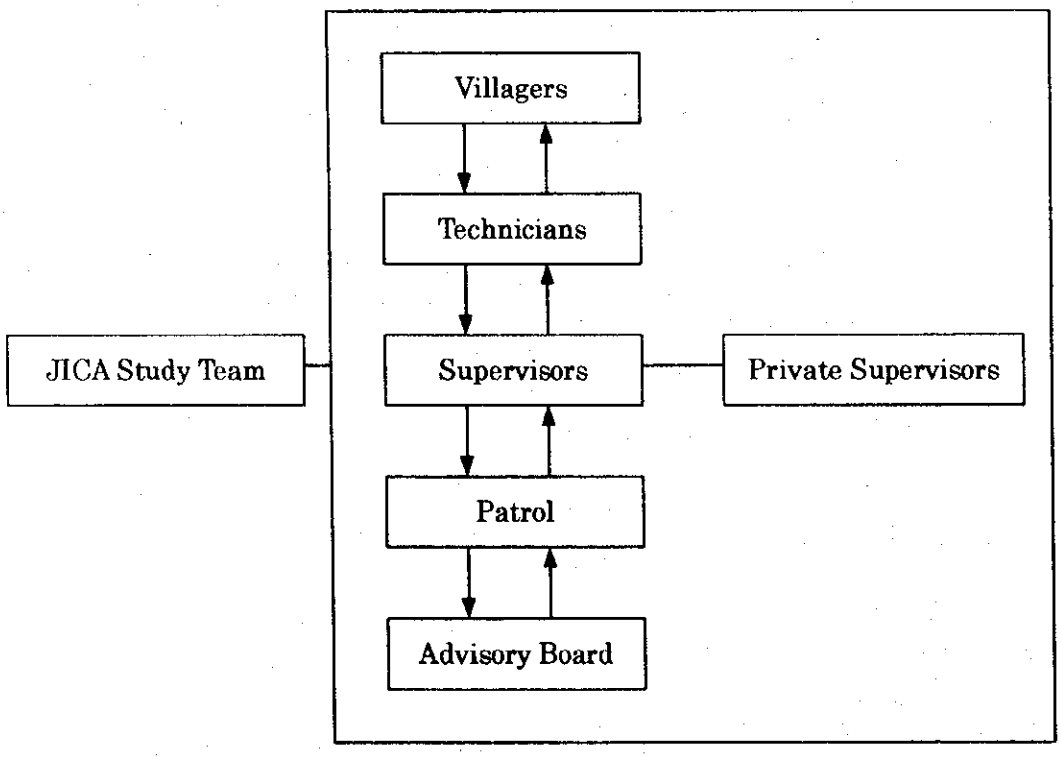
Roles and Responsibilities of Supervising Team Members

Person in Charge	Roles and Responsibilities
Advisory Board	1. Advise on administrative matters 2. Solve major problems 3. Control overall action
Supervisor	1. Prepare schedule, and confirm design, water quality and discharge rate 2. Supervise work 3. Report progress of work 4. Trouble shooting
Technician	1. Make village plan 2. Mobilize villages to implement plan 3. Supervise construction 4. Report progress to supervisor
Patrol	1. Coordinate overall activities (form an information network) 2. Inspect work progress and update schedule 3. Report on progress and problems to Provincial and District offices 4. Convey messages from Provincial and District offices to sites

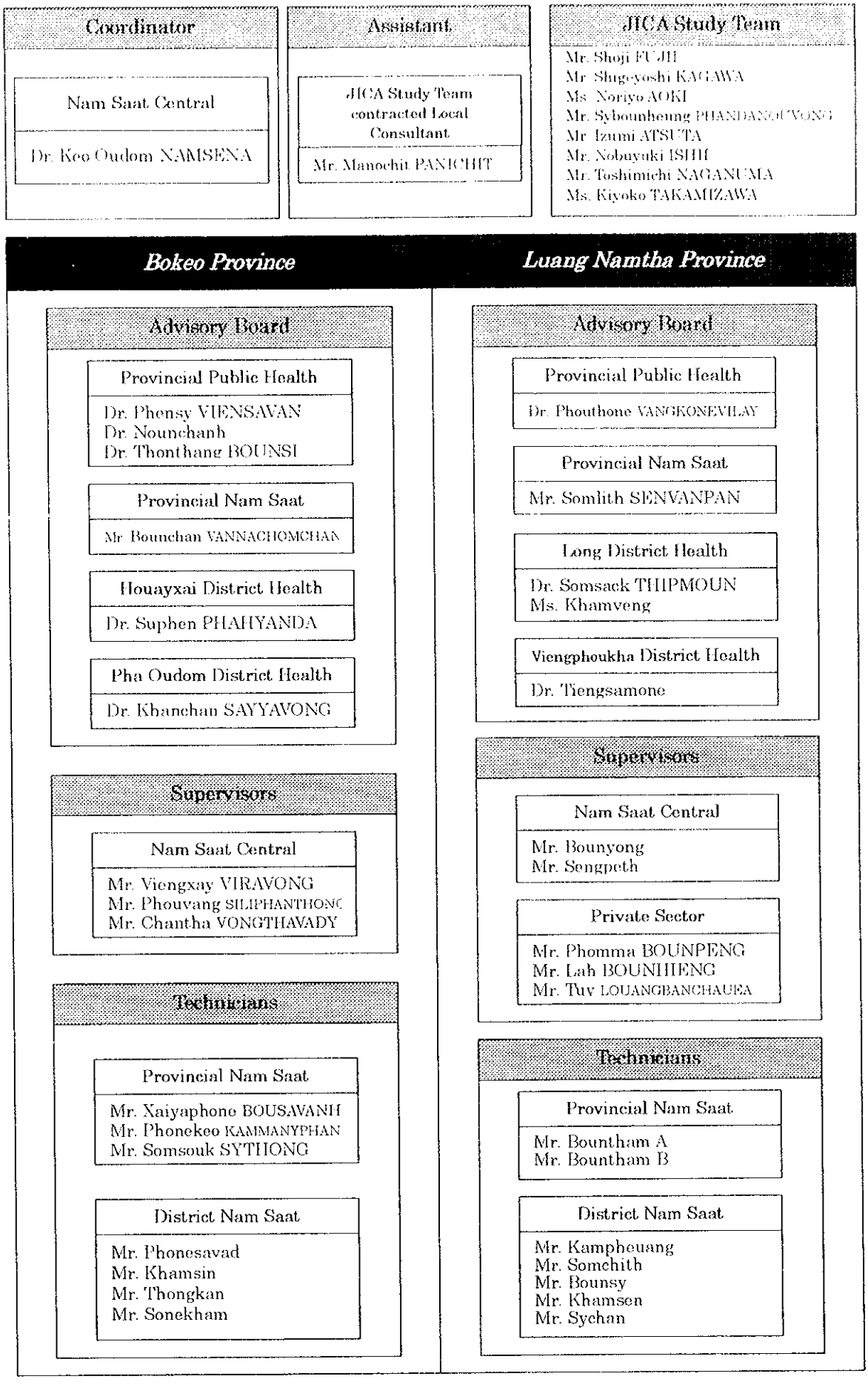
The localities of both Provinces were significant points for consideration in forming the supervising team. In Bokeo Province, a major portion of the construction materials is imported from Thailand. In addition to skilled workers such as masons and carpenters, many workers who have experience in construction of small-scale reinforced concrete structures such as residences and shops are readily available in Houayxai. Therefore, it was judged that supervisors and technicians from Central, Provincial and District Nam Saat were sufficient to manage the supervision including support to the villagers in Bokeo Province.

On the other hand, workers experienced in construction are very scarce in Luang Namtha Province. Since the vast majority of the people in Luang Namtha are farmers, experienced private supervisors were included in the team as assistants to supervise the construction of the GFS (gravity fed system) in addition to supervisors and technicians from Nam Saat.

In preparation for the construction works, the supervising team in collaboration with the villagers carried out the construction. The construction of facilities for this study was implemented through participation and contributions by the villagers. The villagers have contributed wood, sand, gravel and other locally procurable materials as well labor force during the construction works. The organization structure is depicted below as a flow diagram.



The organization chart of the supervising team for construction of the GFS and latrines in Bokeo and Luang Namtha Provinces is illustrated in the following page.



Organization Chart for GFS and Latrine Construction

A rough draft of the entire construction schedule was prepared at the beginning of this stage through discussions with concerned personnel at the central level. Then the schedule was revised upon discussions with the villagers in consideration of actual conditions. Thereafter, the schedule was modified and updated in accordance with the progress of the construction works. The estimated dates for delivery of construction materials were marked in the schedule along with proposed dates for sanitation promotion and monitoring, and these were updated as necessary. The schedule was posted on the wall of Nam Saat Central during the course of the construction works where modifications could be made easily whenever required. Confirmation of the progress of the construction work was the responsibility of the patrol and he was also responsible for updating the schedule.

Participatory Planning

The planning concerning construction of water supply and sanitation facilities was finalized through participatory discussions with the villagers. The main items for confirmation were as follows.

- Water source and intake point (GFS)
- Pipeline routing (GFS)
- Location of water storage tank (GFS)
- Allocation of taps (GFS)
- Well drilling point (dug well and borehole)
- Number of latrines requested and their location

As a result of the participatory planning, the facilities design concerning the above subjects were modified accordingly. Since the original design was made upon preliminary dialogue with the villagers during the village survey in Phase I, no major modifications were needed. One significant change, however, was the necessity to change the type of pipe material due to the encounter of rock formations in some of the planned pipe routing areas causing difficulties in trenching. Consequently, the pipes had to be laid on the ground which necessitated using galvanized iron pipes instead of the HDPE (high-density polyethylene) pipes as originally planned. To solve this problem, the necessary quantity of iron pipes were additionally procured using a fund which was fortunately available due to the fluctuation in the exchange rate.

In order to achieve a sense of ownership of the completed facilities by the villagers, they must be willing to contribute to the construction works. The contributions are in the form of materials, human resources and cash. Materials can be locally available ones such as wood, sand and gravel. Human resources contributions are village labor force to provide transportation of materials, trenching for pipelaying, clearing and leveling areas for facilities erection, and whatever construction assistance possible. The cash contribution involves partially paying for the materials and construction works. During the community dialogue and meetings on participatory planning, the villages were asked what contributions they are willing to give. The amounts of cash contributions from the village towards the construction works were included in the village agreement.

Operation and Maintenance Guidance

As part of the preparation for the construction work, explanation of operation and maintenance of the facilities to be constructed was given to the villagers. The proper operation and maintenance of facilities assures long life of the components and reduces the requirements for repairs. Education and guidance was given to the villagers with the objective of understanding the importance and benefits of operation and maintenance for sustainability of the water supply and sanitation facilities.

Operation and maintenance requires great efforts by the community since the activities must be on a regular basis with cooperative support from all concerned. Regular inspections are needed as a means for preventive maintenance, and minor repairs and replacements have to be made as soon as possible to sustain reliability of the facilities. Village committees must have an appropriate fee collection method and properly keep an accounting system to pay for the required efforts. The main activities required for proper operation and maintenance of each of the water supply and sanitation facilities, were explained by the facilitators and these were understood by the villagers.

Each person involved in the operation and maintenance of the facilities has his own responsibility. However, they must have minimum skills and knowledge related to their responsibilities in order to properly fulfil their responsibilities. The table shown below was used by the facilitators to outline the skills and knowledge required by each of the responsibles. Since high level knowledge and skills are not required by the villagers, they were warned not to neglect periodic maintenance activities, unless they do not want to prolong their conveniences.

Village Agreement

The topics discussed and agreed during Stages B and C were finalized through the signing of the Village Agreement. Nam Saat prepared separate village agreement formats for GFS, wells and latrines. These formats were used as documents to bind the village to comply with their agreed proposals concerning the topics listed below. The agreement also itemizes the roles and responsibilities of the village committees, caretakers (volunteers) and government authorities.

(1) Preparation of the construction work area
(2) Support to workers
(3) Organization of village committees
(4) Organization of village volunteers
(5) Contributions to the construction works in labor, materials and cash
(6) Collection of water fees
(7) Proper operation and maintenance
(8) Proper sanitation and hygiene practices as well as sustained promotion of these practices
(9) Prevention of water source and conservation of surrounding areas

The agreement was signed by the five (5) parties listed below. One copy each of the agreement is kept by each of these parties.

(1) District governor
(2) Chief of District Public Health Office
(3) Chief of village
(4) Director of Provincial Public Health Department
(5) Chief of Provincial Nam Saat

2.4.4 Stage D: Construction Works

Progress of Works

After completing the preparatory works, the construction of the water supply and sanitation facilities commenced in the middle of December 1999 even before all the materials arrived at the villages. The progress of the construction was supervised and controlled by the supervising team described in the previous chapter. The

actual schedule of the construction was periodically updated through the network of the supervising team. The construction works were completed at the beginning of March 2000. For the villages which completed the construction, ceremonies were held to hand over the facilities to the village committee.

Procurement of Materials

The materials required for the construction works were procured in accordance with the bill of quantities listed in the design reports. Due to regulations in budgeting of JICA, the procurement had to be separated into two packages. The first package included materials needed for construction of facilities at the first two sites to be constructed, namely Xiengkok Mai/Xiengkok Kao in Long District and Poung in Houayxai District. The other package included the remaining materials for the other construction schemes.

Every effort was made to procure locally available materials as much as possible. In this effect, the HDPE pipes were initially purchased from a manufacturer in Lao PDR. However, since this manufacturer could not keep up with the required quantity of order, some pipes were later procured from a manufacturer in Thailand. Other materials were mostly imported from Thailand, but since these are readily available for the target area villages, the materials can be easily procured in the future whenever repairs or replacements are required.

The procurement procedures started in November 1999 and the first batch of materials arrived at the beginning of December 1999. Due to delays in manufacturing of certain sizes of HDPE pipes and in purchasing imported materials from Thailand, the materials were not delivered all at one time, but in stages. The procurement of all the materials was completed at the middle of February 2000.

The lessons learned concerning materials procurement for remote mountainous areas such as the north-west region are as follows.

1) The distribution network in Lao PDR cannot function effectively due to heavy reliance on imported materials.
2) The suppliers of Lao PDR have not yet been exposed to situations where large orders are required to be procured within a given time limit.

3) There is neither quality regulations nor a list of dependable manufacturers to determine the reliability of materials.
4) Transportation companies should be advised in advance on the delivery conditions, where in this case, the final destinations were mountainous areas having extremely poor road conditions.
5) Accessibility has a large influence on the delivery time.

In response to the above situations, some considerations are given below.

1) Procurement by Provincial routes may be more effective.
2) More involvement of the original designers of the facilities during the whole procurement process is required.
3) The procurement procedures need to be inspected with more attentiveness at every stage.
4) The suppliers should become more prepared making use of this experience.

Water Supply Facilities Construction

1) Gravity Fed System

For the pilot study villages, 13 GFS (gravity fed system) schemes were constructed. These were distributed as follows.

Province	District	No. of GFS Schemes
Luang Namtha	Long	5
	Viengphoukha	2
Bokeo	Houayxai	5
	Pha Oudom	1
Total		13

The construction components consist of the following works, and the design specifications of the facilities are compared with the actually constructed faculties in the attached table.

(1) Water intake facility construction
(2) Distribution pipeline laying
(3) Storage tank and break pressure tank construction
(4) Communal tap stand construction

Particulars of GFS Facilities

Village Number and Name	No. of Break Pressure Tank	Water Storage Tank Capacity (m3)		Pipeline Length (m)		Number of Tap Stands	
		Design	Actual	Design	Actual	Design	Actual
Luang Namtha Province							
Long District							
L-1 Xiengkok Mai L-2 Xiengkok Kao	0	None		4,550	5,117	12	14
L-4 Luang	0	None		2,200	2,600	6	6
L-13 Chakhamping	0	None		380	480	2	2
L-15 Tin That	0	None		2,650	3,250	7	7
L-21 Daen Kang L-12 Hoai Mo	0	None		3,330	3,730	8	8
Viengphoukha District							
V-6 Pangxai	0	10	10	1,100	1,320	3	3
V-8 Nam Seaua	0	6	6	950	1,150	4	5
Sub-Total	*0*	*16*	*16*	*15,160*	*17,647*	*42*	*45*
Bokeo Province							
Houayxai District							
H-1 Poung	0	20	24	6,736	7,250	12	14
H-7 Nam Ma	0	6	18	2,950	3,248	6	8
H-17 Maynignom H-18 Thongsenchan, H-19 Xiengnam H-20 Nongneun, H-21 Nale H-22 Chomchouk, H-23 Paksang H-24 Mayphoukha, H-25 Namhotay	0	32,5	32.5	14,819	15,519	48	56
H-31 Done Keo	1	6	6	2,611	2,392	3	5
H-32 Hat Phouan	0	6	6	1,363	1,618	2	4
Pha Oudom District							
P-1 Phiengkham, P-2 Thinkeoneua P-3 Thinkeokang, P-4 Thinkeotay P-5 Phaoudom, P-6 Nathong, P-7 Phonexay, P-8 Somsavang P-9 Sonexay	0	25	30	8,350	8,490	17	21
Sub-Total	*1*	*95.5*	*116.5*	*36,829*	*38,517*	*88*	*108*
Grand Total	**1**	**111.5**	**132.5**	**51,989**	**56,164**	**130**	**153**

The construction periods for the GFS schemes were as follows.

Commencement and Completion Dates of GFS Schemes

Village Number and Name	Commence Date	Completion Date
L-1 Xiengkok Mai, L-2 Xiengkok Kao	10 December	7 February
L-4 Luang	8 January	18 February
L-13 Chakhamping	27 January	20 February
L-15 Tin That	8 January	6 February
L-21 Daen Kang, L-12 Hoai Mo	13 January	11 February
V-6 Pangxai	8 January	15 February
V-8 Nam Seaua	8 January	12 February
H-1 Poung	9 December	13 January
H-7 Nam Ma	13 January	3 February
H-17 Maynignom, H-18 Thongsenchan, H-19 Xiengnam, H-20 Nongneun, H-21 Nale, H-22 Chomchouk, H-23 Paksang, H-24 Mayphoukha, H-25 Namhotay	3 January	10 March
H-31 Done Keo	3 January	11 February
H-32 Hat Phouan	25 January	12 February
P-1 Phiengkham, P-2 Thinkeoneua, P-3 Thinkeokang, P-4 Thinkeotay, P-5 Phaoudom, P-6 Nathong, P-7 Phonexay, P-8 Somsavang, P-9 Sonexay	3 January	28 February

For the construction of the first two schemes, namely Xiengkok Mai/Xiengkok Kao (Luang Namtha Province) and Poung (Bokeo Province), on-the-job training was carried out through Provincial teamwork to transfer technological knowledge to Provincial and District personnel. That is, the supervising teams from each District gathered together at the designated village of their Province as shown below for the on-the-job training, where the teams jointly supervised the construction works while learning necessary techniques from experienced supervisors from Nam Saat central. After the initial work training, the teams used their acquired knowledge to supervise the works at their assigned villages.

Province	On-the-Job Training Village	Supervision Teams
Luang Namtha	Xiengkok Mai/Xiengkok Kao	Long Viengphoukha
Bokeo	Poung	Houayxai Pha Oudom

Some of the significant problems faced during the construction period involved the following incidents.

Problem	Cause	Solution
Trenching for underground pipelaying is difficult	Hard rock formations in some areas	Used galvanized iron pipes and laid on ground
Lack of construction materials	Villagers requested modifications in design, especially increase in number of communal tap stands	Villagers procured needed materials through their own funds, or if the materials were not readily available, alternative methods were conceived
Delay in schedule for scheme supplying many villages from one source	Difficulties in supervision and organization of labor force, due to large coverage area	Enforcement of supervision staff and better coordination of staff with better cooperation from village
The water source of one scheme has potential of becoming turbid due to mixture of mining wastewater	The intake area coincides with exploration area for gem mining	Discussions between Provincial Public Health Department and gem mining company agreed as follows: 1. If potential for gem mining in this area is found to be low, mining will move to a different area. 2. If potential is high, mining company will compensate for moving intake to a location upstream. However, if new intake cannot be used, will build a dam to redirect the flow of mining wastewater.

Some minor details that required modifications are listed below. When the reasons for their non-standard qualities were pointed out, common sense justified their remedies.

- Water meter was making negative readings (installed in reverse direction)
- Rocks only were used for backfilling trenches in some areas
- Trenching depths for pipelaying were too shallow
- Drainage ditches were used as pipe laying trenches
- Drainage from tap stand was directed to drain out into the drainage ditch where pipe was laid
- Pipes were laid through storm drainage release tunnels to traverse streets
- Pipes were laid bare when traversing across streams

2) Borehole and Dug Well

Boreholes and dug wells were drilled at selected villages in Houayxai District of Bokeo Province as listed below. Due to difficulties in drilling suspected in this area in consideration of past drilling records, and also time restrictions of the Pilot Study, the drilling works were contracted out. The wells were installed with a variety of handpumps.

Site No.	Village Name	Location	Well Type	No. of Wells	Handpump
H-3	Nam Ngao	Bokeo Province Houayxai District	Dug Well	2	Lao-99 Tara
H-9	May Phattana		Borehole	1	Tara
H-37	Leang		Borehole	1	Afridev

Before drilling the wells, geophysical surveys were made to determine the potential of groundwater. Then after the drillings, well loggings and pumping tests were conducted to inspect the available quantity of the water. The pumped water was analyzed to confirm the quality of the water. The specifications for the drilling works are shown below.

Design Specifications for Drilling Works

Site	Site Number		H-3	H-9	H-37
	Village Name		Nam Ngao	May Phattana	Leang
Well Specifications	Type		Dug Well	Borehole	Borehole
	Number		2	1	1
	Drilling Diameter		ϕ 1 m	ϕ 8-1/2"	ϕ 8-1/2"
	Depth (m)		10	50	50
	Casing	Diameter	ϕ 1 m	ϕ 6"	ϕ 6"
		Length		32 m	32 m
		Material	Concrete	PVC	PVC
	Screen	Diameter	ϕ 1 m	ϕ 6"	ϕ 6"
		Length	3 - 4 m	18 m	18 m
		Material	Concrete	PVC	PVC
Geophysical Survey	Geoelectric Prospecting		3 pts/well	5 pts/well	5 pts/well
	Prospecting Method		Wenner	Wenner	Wenner
	Prospecting Depth		12 m	100 m	100 m
Well Logging			Required		
Pumping Test	Step Drawdown Test		Not specified	5 Steps	5 Steps
	Continuous Test			24 Hours	24 Hours
	Recovery Test			12 Hours	12 Hours
Water Quality Analysis	Standard		Drinking Water Standard according to WHO		
	No. of Items		25	25	25

The results of the production wells are presented in the following table.

Details of Production Well

Specifications	H-3 Nam Ngao		H-9 May Phattana	H-37 Leang
Drilling Diameter	ϕ 1 m		ϕ 8-1/2"	ϕ 8-1/2"
Well Depth (m)	8	9	47	60
Casing Depth (m)	8	9	45.4	55
Static Water Level (m)	6.65	6.41	1.5	7.5
Installed Pump	Lao-99	Tara	Tara	Afridev

During the whole process, technology transfer on drilling and construction procedures as listed below was given to Provincial and District level personnel in order for them to supervise similar works in the future.

Items for Technology Transfer on Supervision of Drilling Works

Borehole	Dug Well
• Boring • Well logging • Screen and casing installation • Gravel packing • Well cleaning • Pumping test • Water quality analysis • Water level measurement • Wellhead construction • Hand pump installation	• Digging • Concrete lining installation • Disinfection • Water quality analysis • Water level measurement • Wellhead construction • Hand pump installation

The schedule of the well construction is presented below.

Well Construction Schedule

Activity	H-3 Nam Ngao	H-9 May Phattana	H-37 Leang
Geophysical Survey Period	23 November	23 November	23 November
Commencement of Drilling	22 December	28 January	18 January
Completion of Construction	12 February	1 March	2 March

The components of the well construction works and participation requirements of those involved in the construction process are listed in the table below.

Components of Well Construction and Participation Requirements

Component		Participation Requirements		
		Supervisor	Contractor	Villager
Drilling Point Selection		●	●	●
Drilling	Dug Well	●	●	●
	Borehole	●	●	
Concrete Floor and Drainage Construction		●	●	●
Handpump Installation		●	●	●
Shelter Construction				●

The dug wells were successful in the first drillings, but the borehole drillings were not as successful and had problems as described below.

For May Phattana, the first borehole was drilled and during the reaming process, the well walls collapsed, making difficulties for removing the drill bit. Therefore, upon abandoning the first borehole, a second drilling was attempted at a different location having potential as a result of geophysical surveys and discussions with the village. When drilling the second borehole, hard rock formations were encountered at a depth of 4 m, causing a halt in drilling. Then the drilling point was moved about two or three meters away from the second point and drilling resumed. The third drilling was continued until a depth of 47 m, and pumping tests revealed enough discharge for using by a handpump.

As for Leang, the discharge of the drilled borehole was considered sufficient if a handpump is to be used as the pumping equipment. However, Nam Saat suggested a second drilling in hopes of a higher yield borehole. So the drilling rig tried to go to Leang, but the water level of one of the rivers that has to be crossed to reach Leang became higher than before due to a dam that was built downstream, making access impossible. Therefore, upon discussions with concerned personnel, a handpump was installed in the already drilled borehole in consideration of the discharge being sufficient for handpump use.

The problems encountered during the drilling works are tabulated on the next page with considerations on measures to solve them.

Sanitation Facilities Construction

The pour flush single bowl type latrines were constructed as sanitation facilities. The twelve villages selected for latrine construction are listed below along with their schedule of construction.

Particulars of Latrine Construction

Village Number and Name	No. of Latrines		Commencement Date	Completion Date
	Design	Actual		
L-1 Xiengkok Mai	51	51	20 December	30 January
L-2 Xiengkok Kao	67	67	20 December	30 January
V-6 Pangxai	34	34	10 January	22 February
H-1 Poung	11	11	30 December	10 February
H-7 Nam Ma	41	41	15 January	3 March
H-17 Maynignom	16	16	18 February	8 March
H-21 Nale	49	49	7 March	20 March
H-23 Paksang	35	27	11 February	8 March
H-24 Mayphoukha	66	69	8 February	15 March
H-25 Namhotay	105	117	27 January	8 March
H-31 Done Keo	45	39	3 January	4 March
P-7 Phonexay	77	77	12 January	10 March
Total	597	598		

Considerations for Borehole and Dugwell Construction Works

Activity	Issue	Description	Consideration	Measure
Planning	Selection of water point for May Phatthana	Due to dry hole in the village, borehole was drilled across the main traffic road.	• Possibility for traffic accidents	Need village rule to avoid traffic accidents, especially for children
Operation	Hole collapsing	Drilling period prolonged due to hole collapsing	• Methodology for appropriate action • Strategy to avoid hole collapsing • Strategy to keep schedule	Appropriate action for maintaining schedule
	Machine trouble	Drilling period is extending due to waiting for repair	• Methodology for appropriate action, • Strategy to repair promptly • Strategy to keep schedule	Appropriate action for maintaining schedule
	Delay in schedule	Whole scheduling delayed	• Analyzing reason for delay	Alternative plan to keep schedule
Managing	Insufficient intervention in drilling work	Nam Saat is not managing drilling progress well	• Strategy for supervising work • Experience with objective to be supervised.	Appropriate intervention should be made with the contractor in view of scheduling and completion design.
	Digging depth	How to justify depth of dug well	• Definition of appropriate depth	Approval when reaching the maximized depth. It should be defined in the contract
Community participation	Low community participation for dug well digging and construction	Low community participation for digging and construction due to misunderstanding by all parties involved (Nam Saat, JICA Study Team, contractor, villagers)	• Coordination among all parties (Nam Saat, JICA Study Team, contractor, villagers) before starting construction and also during construction	Proper community participation with proper coordination
	Low community participation for borehole drilling and construction	Borehole drilling does not require much community involvement through whole process, so not enough activity to keep villagers' interest in view of community participation	• Strategy to maximize community participation throughout the work	Continuously motivate villagers to be involved.

The components of latrine construction are shown below.

Component	Procedure
Latrine Bowl	Procured by JICA Study Team and installed by village
Squat Plate	Constructed by village with materials procured by JICA Study Team and village
Under Ground Pit	Constructed by village with materials procured by village as well as JICA Study Team
Ventilation Pipe	Procured by JICA Study Team and installed by village
Superstructure	Constructed by the villagers with their own materials
Water Jar or Storage	Procured or made by concrete by the village

The supervisor in charge demonstrated the construction of a few latrines while transferring that technology to the village. If the supervisor judged that the village is able to construct the latrines by themselves, then they were left alone to continue construction of the remaining latrines for their village under their supervision and any needed advise.

Since the village controlled the finalization of the construction, each latrine had their own peculiarities in design. Most villagers constructed the underground pit beneath the bowl as instructed by the supervisor, while others built the pit to the front of the bowl plate so that the pit would be located outside of the housing. The superstructures to house the bowl and water storage were mostly made of bamboo strips matted together, while some used wood, and others used bricks and concrete. Using an earthen jar was originally advised as storage for water to flush the latrine, but most of the villagers preferred to make their own brick and concrete compartments to be located near the latrine bowl.

The main problem in latrine construction was the delay in construction progress. This was mainly due to the shortage in ring molding frames. Molds were not included in the original plans, but were later requested for inclusion. However, procurement of these molds is very difficult in Lao PDR and the prices are very high. Furthermore, manufacturing of the needed number of molds would not meet the time requirements, in consequence of not being able to complete the construction in time. Molds can be made locally by wood and bamboo, and they do not have to be circular. These locally made molds will suffice, since these are to be used for making underground pits and the appearance is not an important factor. Nevertheless, different sizes of molds were borrowed from the Province or wherever they were available, and construction of latrines progressed slowly but surely.

All things in consideration, the villagers learned to make their own latrines. Minor factors, such as appearance, housing scale and materials used, differed from one to the other. However, most important was that their main function as sanitation facilities was realized, and the construction was done by the villagers themselves.

Handing Over of Facilities

After the construction of facilities was completed, the beneficiary villages organized handing over ceremonies, where the village committee to be responsible for taking care of these facilities were reminded of their duties. Memorandums for handing over of facilities were agreed by the village chief and the District Public Health Office, which included the following items, among others.

- Keeping account of the cash contributions from the villagers
- Setting a penalty rule for facilities destruction
- Collection of water fees and setting rules for non-payment
- Using the collected water fees as fund for maintenance and repairs
- Keeping facilities and surround area clean
- Conserving the environment around the water source

The following villages held hand over ceremonies in February.

H-1 Poung

Location:	Bokeo Province, Houayxai District
Date of Ceremony:	15 February 2000
Main Guests:	Mr. Boualan Silipanya, Governor of Bokeo Province
	Dr. Phen Sy Viensavan, Director of Bokeo Provincial Public Health Department
	Dr. Khemphet Vonthavong, Coordinator of JICA projects, Ministry of Public Health
	Dr. Hiroyuki Amano, JICA expert, Health and Medical Cooperation Planning Adviser, Ministry of Public Health
	Dr. Keo Oudom Namsena, Deputy Chief of Water Supply Division, Nam Saat central
	Mr. Bounchanh Vannachomchan, Chief of Bokeo Provincial Nam Saat
	Mr. Shoji Fujii, JICA Study Team Leader

L-1 Xiengkok Mai and L-2 Xiengkok Kao

Location:	Luang Namtha Province, Long District
Date of Ceremony:	19 February 2000
Main Guests:	Dr. Phouthone Vangkonevilay, Director of Luang Namtha Provincial Public Health Department Dr. Keo Oudom Namsena, Deputy Chief of Water Supply Division, Nam Saat central Mr. Somlith Senvanpan, Chief of Luang Namtha Provincial Nam Saat Mr. Sengpeth, Engineer of Water Supply Division, Nam Saat Mr. Shoji Fujii, JICA Study Team Leader

P-1 Phiengkham, P-2 Thinkeoneua, P-3 Thinkeokang, P-4 Thinkeotay, P-5 Phaoudom, P-6 Nathong, P-7 Phonexay, P-8 Somsavang, P-9 Sonexay

Location:	Bokeo Province, Pha Oudom District
Date of Ceremony:	28 February 2000
Main Guests:	Mr. Xiengkham Boundara, Deputy Governor of Pha Oudom District Dr. Phen Sy Viensavan, Director of Bokeo Provincial Public Health Department Dr. Bounthiem Khounsavanh, Chief of Pha Oudom District Public Health Office Mr. Phouvang, Engineer of Water Supply Division, Nam Saat Mr. Bounchanh Vannachomchan, Chief of Bokeo Provincial Nam Saat Mr. Somvang, Chief of Pha Oudom Region Mr. Manochit Panichit, JICA Study Team contracted local consultant

Other handing-over ceremonies were subsequently held at the other Pilot Study villages.

Comments on Construction Activities

The strong points of the construction works for water supply and sanitation facilities under this Study, which were effective for the smooth progress of the works, are summarized below.

(1) The construction works was collaborated with close cooperation between concerned organizations: Province, District and village.

(2) The Pilot Study was well organized and closely coordinated between central Nam Saat, Provincial Nam Saat, District Nam Saat, the related Public Health Departments and the JICA Study Team to resolve any problems as soon as possible.
(3) The willingness and understanding of the villagers were very high.
(4) The villagers contributed very actively from the beginning to the end in labor, local materials and cash.
(5) The villagers handled the construction works with good harmony and unity.

On the other hand, the weak points of the construction activities held during the Pilot Study, which require consideration for future activities, are listed below.

(1) The work cooperation was sometimes unclear and confusing due to changes in scheduling and resultant delays.
(2) The construction had difficulties or had delays because some of the construction materials did not arrive as scheduled, or were delivered in separate packages not at one time.
(3) Some construction works were hampered due to the limited knowledge of some technicians. This was a result of the time restrictions on construction work, where they gave priority to completion of the works and they could not have enough time to deeply absorb all the required skills.
(4) For large-scale construction works, such as long distance pipelaying, difficulties arose in supervision of not being able to effectively cover the total area. This caused confusion among the workers and ineffective scheduling.
(5) The village requested too many modifications, which included changing the intake point, increasing storage tank capacities, adding more tap stands, replacing pipe diameters with larger ones, and other changes in design. This situation resulted in shortages of materials and extended construction periods with resultant delays in schedule. Also, the supervisors in charge should have been more strict with the village in relation to making significant modifications such as additional tap stands after setting the budget.

Throughout the various stages of the Pilot Study, some distinctive differences between the two target Provinces, Luang Namtha and Bokeo, were noticed as listed below. These distinct features reveal the uniqueness of the two provinces based on such differences as ethnic identity, social status, climate and geography.

Parameter		Luang Namtha Province	Bokeo Province
TOT		Some technical members from Luang Namtha participated only in Luang Namtha sessions.	Both social and technical members participated in all sessions.
Community Dialogue	Duration	Since trainers had experience and received enough training, they thought three days of Community Dialogue were enough.	Since some trainers were new members, they needed at least four days of Community Dialogue to obtain basic information.
	Technical Participation	Some technical members did not facilitate the dialogue.	All technical members wanted to participate in the dialogue.
	Village Participation	Relatively very good participation of villagers.	Not as good as Luang Namtha villages
Contributions	Labor	Good	Not as good as Luang Namtha
	Materials	Good	Good
	Cash	Can't pay immediately	Ratio of already made payments better than Luang Namtha
Request for Additional Taps		7% increase	23% increase
Experience of Villagers		Since villagers were not experienced in construction, some skilled workers were employed as assistant supervisors.	Since skilled workers such as masons and carpenters are available in each village, supervisors and technicians from Nam Saat could manage the supervision.
Construction of GFS		Since hand tools were short in supply, technicians had to wait and came to borrow them from Nam Saat Provincial office.	The shortage of hand tools was solved immediately by technicians where they were borrowed from village people.
Facilities Handing Over Memorandum		Signed agreement	Simple memorandum

2.4.5 Stage E: Monitoring

The final stage of the pilot study is the monitoring survey, where the reactions of the villagers concerning the newly constructed water supply and sanitation facilities were monitored. The two monitoring surveys were conducted during the Study. The facilitators who were trained during the TOT visited the pilot villages to conduct community dialogue aiming to absorb information from the villagers on their present awareness and actual situation. The monitoring format used during the survey is shown in the Data Book. The details and results of the monitoring surveys are explained in Section 5. Monitoring of this Supporting Report.

3. PILOT STUDY EXTENSION

3.1 Purpose of Extension

The pilot study implemented water supply and sanitation facilities at 34 villages out of the total of 81 target villages. According to the monitoring results, they are receiving favorable responses. As a continuum, (1) in order to further strengthen the capacity of Provincial and District level personnel on implementation of water supply and sanitation facilities, and (2) to further expand the coverage of water supply and sanitation to this area, extending the pilot study to additional villages is most effective. Therefore, out of the villages which were not selected for the previous pilot study, a number of villages will be selected in consideration of certain requirements.

3.2 Selected Villages

As a result of selecting the pilot study villages through the elaborate selection process using selection criteria and changes made during the Phase II survey, 34 villages were selected for the pilot study. However, the remaining 47 villages still need to be implemented to improve their living conditions, which makes them the target villages for implementation through the extension of the pilot study. The remaining target villages along with the water supply and sanitation facilities chosen by the villages are listed in the following page. Most of the chosen water schemes are GFS (gravity fed system). As for sanitation facilities, most villages prefer the pour flush single pit latrine, but nine villages that did not respond, are either already content with their existing latrines or are not yet sure if they want latrines or not. This will be confirmed and clarified during community dialogues at stages B-C.

Out of these 47 villages, villages suitable for implementation as pilot study extension villages will be selected in consideration of the following constraints.

(1) Limit in the period of extension
(2) Availability of facilitators and supervisors
(3) Higher point villages as resulting from the selection criteria
(4) Accessibly in relation to time constraints
(5) Priority requirements of District and Province
(6) Available budget for extension

In consideration of the above requirements, 17 villages were selected as candidates for implementation through extension of the pilot study. During the course of the community dialogue with the candidate villages, some modifications in the choice of facilities had to be made due to changes in the concepts of the villagers resulting from lapse of time. The following table lists the selected villages and the facilities chosen during the survey in Phase I along with the finally chosen facilities.

List of Villages and Chosen Facilities for Pilot Study Extension

Code No.	Village Name	Chosen Facilities			
		In Phase I		After Dialogue	
		Water Scheme	Latrine	Water Scheme	Latrine
Houayxai District, Bokeo Province					
H-2	Phokham	GFS/1 scheme	Pour Flush	GFS/1 scheme	Pour Flush
H-4	Hoai Makeo	2 villages	Pour Flush	2 villages	Pour Flush
H-5	Done Phao	GFS		GFS	
H-8	Namphou	GFS	Pour Flush	GFS	Pour Flush
H-26	Phibounthong	GFS 1 Scheme, 5 Villages	Pour Flush	Dug Well	
H-27	Houakhoua		Pour Flush	GFS 1 Scheme, 4 Villages	Pour Flush
H-28	Pakhaotay				
H-29	Thongbia				
H-30	Viengmay		Pour Flush		Pour Flush
Viengphoukha District, Luang Namtha Province					
V-1	Nam Mai	GFS	Pour Flush	GFS	Pour Flush
Long District, Luang Namtha Province					
L-6	Nong Kham	GFS	Pour Flush	GFS	Pour Flush
L-7	Nam Bak	GFS 1 Scheme, 4 Villages	Pour Flush	GFS 1 Scheme, 4 Villages	Pour Flush
L-8	Luang Phokham				
L-9	Phaya Luang		Pour Flush		Pour Flush
L-14	Khok Hin		Pour Flush		Pour Flush
L-11	Nam Ma	Dug Well		Spring Protection	
L-23	Kang	GFS	Pour Flush	GFS	Pour Flush
Total	17 Villages	9 Schemes -8 GFS -1 Dug Well	12 Latrine-Villages	10 Schemes -8 GFS -1 Dug Well -1 Spring Protection	11 Latrine-Villages

3.3 Implementation

The pilot study extension villages followed a similar staging procedure as conducted in the previous pilot study. The stages needed to be modified as described below in order to satisfy the stringent requirements to implement the extension study.

Stage A — TOT (Training of Trainers)

A condensed version with emphasis on review was conducted since the participants were mostly the same as those who participated previously, and this served as a refresher course.

Stage B/C — Participatory Preparation Activities

Preparatory activities such as community dialogue, participatory planning, hygiene promotion, operation and maintenance planning and village agreement were carried out in the same way as was done before, but in a continuous process from Stage B to Stage C.

Stage D — Construction Works

Better coordination and stricter supervision was required than before in order to complete the construction. However, the coordinators and supervisors had gained experience from the previous pilot study to effectively handle this situation.

Stage E — Monitoring

Unfortunately, due to constraints in the time period, monitoring could not be conducted as part of this study, but the Provincial and District staff should make every effort to monitor the results on a continuous, periodic basis by themselves.

Basically, the time required for each stage is as follows. The implementation schedule is depicted in the following page.

Stage A	About one week
Stage B/C	From three to five days per village depending on the participatory level of the village
Stage D	Three to five weeks per scheme

Once again, the implementation was initiated and centralized by the Province and District with guidance from Nam Saat central. Required advice was given by the JICA Study Team. Also, the Sector Strategy concepts of community dialogue and informed choice are always included in the pilot study activities to ensure sustainability through local ownership.

Pilot Study Extension Implementation Schedule

No.	Village Name	Total No. of Villages	No. of Water Schemes	No. of Latrine Villages	Type of Water Scheme	2000 October	2000 November	2000 December	2001 January
Preparation for Pilot Study Extension									
Training of Trainers (TOT)									
Luang Namtha Province									
Viengphoukha									
V-1	Nam Mai	1	1	1	GFS				
Long									
L-6	Nong Kham	1	1	1	GFS				
L-7 L-8 L-9 L-14	Nam Bak Luang Phokham Phaya Luang Khok Hin	4	1	3	GFS				
L-11	Nam Ma	1	1	0	Spring Protection				
L-23	Kang	1	1	1	GFS				
Bokeo Province									
Houayxai									
H-2 H-4	Phokham Hoai Makeo	2	1	2	GFS				
H-5	Done Phao	1	1	0	GFS				
H-8	Namphou	1	1	1	GFS				
H-26	Phibounthong	1	1	0	Dug Well				
H-27 H-28 H-29 H-30	Hoauakhoua Pakhaotay Thongbia Viengmay	4	1	2	GFS				
Total		17	10	11					

Preparation
Stage A: TOT
Stage B/C: Participatory Preparation Activities
Stage D: Construction Works

N.B.: Latrines to be constructed at the underlined villages