

V. Study on Rice-Fish Farming Tradition and Current Practices in Northwestern Vietnam

Appendices to Report

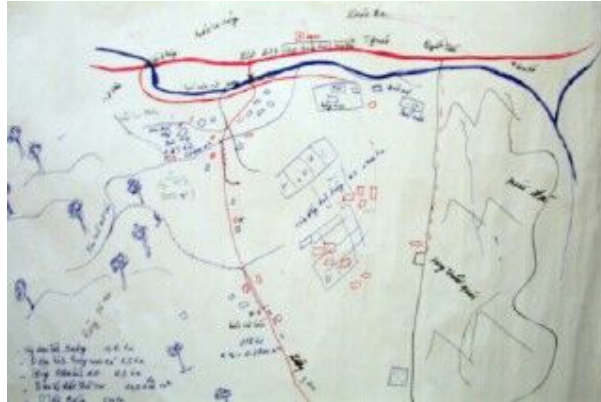
Appendix A Village-level Participatory Activity Results

- [Bung Village](#), Bung Lao Commune, Tuan Giao District,
Lai Chau Province
- [Tong Village](#), Son La town, Son La Province
- [Mon Village](#), Thom Mon Commune, Thuan Chau District,
Son La Province
- [Van Mai Commune](#), Mai Chau Distirct, Hoa Binh Province

Appendix B List of aquatic organisms

Village Mapping Activity

Bung Village, Bung Lao Commune, Tuan Giao District, Lai Chau
24 February 2002



A mixed group of villagers, both men and women, developed the map based on their impression of their village. A lot of detail was given for water sources including the various irrigation systems that provide water to the village. Other features included were roads, water bodies (ponds and streams), agricultural land (rice fields and upland areas) and community managed forestland. They also included houses, the school and the clinic.

Statistics included on the map include:

Area of rice field	42 ha
Area of rice/fish culture	2.5 ha
Total area of ponds	2.3 ha
Total area settled as homesteads	10,440 m ²
Community managed forest land	500 ha
No. of households	261
Total population	1269 individuals
Area of upland crops	12 ha
length of irrigation system	1400 m

Village History Time-Line Activity

Bung Village, Bung Lao Commune, Tuan Giao District, Lai Chau

24 February 2002

This activity was conducted by a mixed group of villagers (both men and women) and recorded on a time-line for presentation. Important dates included in and discussed during the presentation include the following:

Political and social events 1945-2002

- 1945: 30 households
Japanese-French conflict devastates village paddies
- 1951: 1st liberation of the village
- 1952: 2nd liberation of the village
40 households, about 300 villagers
Bung Lao commune founded, containing Bung village
- 1953: French parachute-troops land in Dien Bien
Villagers flee into forest
French army burns all the houses and kills 2 villagers and 10 communist soldiers
- 1954: Dien Bien Phu victory
Renovation of the village faces many difficulties in agriculture production and infrastructure
Paddy area: ≈12.7 ha
- 1958: Upgrade of Highway 279 (6th Highway) from Tuan Giao to Dien Bien
Inauguration of Road Construction Site 426
Shifting work-teams formed
- 1959: Birth of the Bung Lao cooperative
Democratic reform takes place
Confiscation of landlords' tenure
- 1962: Communist Cell of the Commune founded
- 1964: American airplanes start bombing the North
Daylight farming transformed to night-time
Village guarding team established
- 1964-1972: Villagers live in mountain caves to avoid bombs
- 1968: An F105 air-craft brought down in the commune
- 1975: Reunification of the country
Agriculture production is remained with cooperative model
- 1984: Ban Bung cooperative is split into 2 smaller ones, Ban Bung and Noong Den
- 1986: Ban Bung cooperative, accordingly, separated into Ban Bung and Na Lau cooperatives

Natural calamities

- 1959: Huge flood eradicates rice paddies and Road Construction Site 426
- 1967-1968: Yellow leave epidemic breaks out in rice fields

Infrastructure

- 1932: Road built from Son La to Dien Bien
- 1952: Primary school established
- 1968: Hydro-power site Lai-Van (under cooperation between Lai Chau province of Vietnam and Yunnan of China) provides electricity to the commune
Motor road to the village constructed
- 1970: Floods remove the hydro-electric dams
Lower-secondary school established
- 1972: Public health station founded
- 1974: Irrigation system built¹
- 1977/78: Government constructs a school building for the commune
- 1996: German NGO helps upgrade the public health station
Operation of mini hydro-electric works

Production

- 1959: Land reform
People start practicing two-crop rice production
- 1980: Contractual mechanism pursuant to the Communist Party's Directive No.10
hands agricultural land over to each group of farming households
- 1986: Contractual mechanism pursuant to the Communist Party's Directive No.100
allows each family to take farming activities on their private plots

¹ It was noted during discussion and by cross-checking with the village map that the first irrigation system was build long before memory, all people know are the stories handed down from older generations. No estimate of the dates constructed could be given.

Activity listing and prioritization

Bung Village, Bung Lao Commune, Tuan Giao District, Lai Chau

24 February 2002

During this activity, villagers were asked to brainstorm “activities” that take place in the village. This is intended to include both economic activities such as agriculture and non-economic activities such as national holidays. As activities were brainstormed, they were written on a card and attached to a board for participants to review and comment on.

Activities listed in Bung Village included:

- Rearing pigs and poultry
- Making alcohol
- Herding cattle and buffalo
- Hunting (rats)
- Rice production
- Collecting bamboo shoots
- Aquaculture
- Guarding fish ponds
- Social activities
- Weaving
- Taking care of children
- Sewing cloths and bedding
- Growing vegetables
- Trading agricultural products
- Bathing (personal hygiene)
- Processing agricultural products (rice, maize, cassava)
- Fishing
- Protecting forests
- Housework (including cooking)
- Taking children to school
- Weddings
- Festivals (national day, Tet)
- Upland crops (cassava, maize, rice, peanuts, etc.)
- Maintaining roads and irrigation canals
- Leisure activities (watching television, reading newspaper)
- Making tofu
- Carpentry
- Raising silk worms
- Carry water
- Mechanical work
- Collecting fire wood
- Hired labor within the village (plowing and harrowing)
- Planting fruit trees
- Housing
- Teaching children
- Weaving traditional ethnic garment
- Funerals
- House warming parties
- Operating small trade shop
- Killing pigs
- Repairing simple machinery
- Carpentry

Prioritization of list of activities²

<u>Women's priorities</u>	<u>Men's priorities</u>
1. Housing 2. Rice production 3. Housework 4. Taking care of children 5. Teaching children 6. Taking children to school 7. Herding cattle and buffalo 8. Raising pigs and poultry 9. Upland crops 10. Fruit trees 11. Vegetables 12. Maintaining roads and irrigation canals 13. Carrying water 14. Aquaculture 15. Hired labor within the village (plowing and harrowing) 16. Sewing cloths and bedding 17. Personal hygiene 18. Social activities 19. watching television, reading newspaper 20. Forest protection 21. collect wood) 22. Making alcohol 23. Weddings 24. Processing agricultural products (rice, maize, cassava) 25. Weaving traditional ethnic garments 26. Guarding fish ponds 27. Making tofu 28. Festivals (national day, Tet) 29. House warming party 30. Cultural activities (singing dancing) 31. Funeral 32. raising silk worms 33. Trading agricultural products 34. Fishing 35. Operating small trade shop 36. Collect bamboo shoots	1. Housing 2. Carrying water³ 3. Rice production 4. Upland crops 5. Maintaining roads and irrigation canals 6. Raising pigs and poultry 7. Herding cattle and buffalo 8. Housework 9. Collecting fire wood 10. Taking care of children 11. Taking children to school 12. Teaching 13. Planting of fruit trees 14. Growing vegetables 15. Aquaculture 16. Forest protection 17. Weaving 18. Sewing cloths and bedding 19. Weaving traditional ethnic garments 20. Trading agriculture products 21. Making alcohol 22. Raising silk worms 23. Making tofu 24. Collecting bamboo shoots 25. Fishing 26. Processing agricultural products (rice, maize, cassava) 27. Cutting wood 28. Off farm trade 29. Operating small trade shop 30. Carpentry 31. Killing pigs 32. Hired labor within the village (plowing and harrowing) 33. Repairing simple machinery 34. Social activities 35. Weddings 36. Funerals 37. Watching television, reading newspaper 38. Festivals (national day, Tet)

² The groups only included those activities relevant to their group, some activities were omitted by both groups (i.e. women didn't include carpentry because it is a men's occupation)

³ This was interpreted to mean "providing for water" including irrigation, etc, as water is a very important need for life

Aquatic resource prioritization

Bung Village, Bung Lao Commune, Tuan Giao District, Lai Chau

24 February 2002

Aquatic resources identified by Bung Village

- Culture fish:
- Wild fish:
- Shrimp
- Shellfish
- Amphibians
- Plants

Prioritized list of aquatic resources**Men**

Fish captured from the river	Cultured fish	Organisms captured in other water bodies	Aquatic plants
1. <i>Nay</i> (Common carp) 2. <i>Khinh</i> , 3. <i>Mon</i> , 4. <i>Bu</i> (<i>Bong</i>) 5. <i>Pan</i> 6. <i>Mun</i> 7. <i>Sam</i> 8. <i>Tet</i> 9. <i>Lat</i> (Spiny eel), 10. <i>Pem</i> 11. <i>Di</i> , 12. <i>Khe</i> 13. <i>Pha</i> (Soft-self turtle) 14. <i>Tau</i> (turtle) 15. <i>Lot</i> 16. <i>Con</i> (Snake-head)	1. Grass carp 2. Common carp 3. Mrigal 4. Silver carp 5. Tilapia 6. Crucian carp 7. Catfish	1. Frogs 2. <i>Niao</i> 3. <i>Hoi Bom</i> (short shellfish) 4. paddy crab 5. stream crab 6. pond shrimp 7. stream prawn, swamp eel 8. <i>Hoi Nam</i> (long shellfish) 9. water snake 10. snail	1. Water morning glory 2. local celery 3. stone moss, duckweed, 4. azolla, 5. <i>Phac Phum</i> , 6. Japanese duckweed, <i>rau lap</i> 7. <i>rau ram</i> 8. <i>rau ngo</i>

Women

Natural species (organisms Capture or collected)	Culture species	Plants
<u>Fish:</u> 1. <i>Poc</i> 2. <i>Khe</i> 3. <i>Tet</i> 4. <i>Nay</i> 5. <i>Khinh</i> 6. <i>Mun</i> 7. <i>Lat</i> 8. <i>Pem</i> 9. <i>Sam</i> 10. <i>Pan</i>	12. Grass carp 13. Mrigal 14. Silver carp 15. Tilapia, 16. Crucian carp 17. Common carp 18. Catfish	Water morning glory, local celery, <i>rau lap</i> , <i>rau ngo</i> , azolla, <i>beo cai</i> , <i>rau ram</i> , <i>phac phum</i> , stone moss

Appendix A: Bung Village, Bung Lao Commune, Tuan Giao District, Lai Chau

11. <i>Bu</i> 12. <i>Di</i> 13. <i>Con</i> 14. <i>Duc</i> 15. <i>Mon</i> 16. Stream prawn 17. <i>Ve</i> <u>Bivalves, shellfish,</u> <u>amphibians and others:</u> 1. Turtle 2. Soft-shell turtle 3. Frog 4. Stream crab 5. paddy crab 6. swamp eel 7. <i>Niao</i> 8. Pond shrimp 9. Snail 10. <i>Hoi Nam</i> (long shellfish) 11. <i>Hoi Bom</i> (short shellfish), mussel		
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Appendix A: Bung Village, Bung Lao Commune, Tuan Giao District, Lai Chau

Annual Calendar Activity: Agriculture activities

Bung Village, Bung Lao Commune, Tuan Giao District, Lai Chau
25 February 2002

Month	January	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
Weather ⁴	Cool 10-15°C	Cool 12-17°C	Dry	Rain						Less rain	Dry	Dry cool
Paddy rice	plowing	planting ⁵	Management (water management, weeding, etc.)	Management (water management, weeding, etc.)	Harvest and plowing	planting	Management (water management, weeding, etc.)	Harvest				
	Spring rice crop (irrigated)			Wet-season rice crop (rain fed)								
Upland rice	Clearing land	Preparing soil	Planting (broadcast)	Management (weeding, etc)	Harvest							
Corn	Preparing soil	Planting	Management (weeding, etc)	Harvest	Preparing soil	Planting	Management (weeding, etc)	Harvest				
Cassava	Preparing soil	Planting	Management (weeding, etc)	Harvest	Preparing soil	Planting	Management (weeding, etc)	Harvest				
Peanuts and beans	Preparing soil	Planting	Management (weeding, etc)	Harvest	Preparing soil	Planting	Management (weeding, etc)	Harvest				
Vegetables	Planting cabbage, mustard, lettuce	Planting eggplant and morning glory	Planting morning glory	Planting morning glory	Planting morning glory	Planting morning glory	Planting morning glory	Planting morning glory	Planting cabbage, mustard, lettuce	Cabbage and tomato	Various vegetables and tomato	

⁴ During discussion it was pointed out that there is little annual variation in the weather patters.

⁵ Planting is done by broadcasting and then transplanting to adjust the spacing.

Seasonal Calendar showing historical changes
Before and after 1956

Month	January	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
Before 1965												
Paddy rice ⁶	Fallow (dry season)				plowing		transplant	Management and Care-taking (weeding, water management, etc)		Harvest		
Corn		Preparing soil	Planting	Management and care taking (weeding, etc.)			Harvest					
Upland rice ⁷		Clearing land		Planting	Management and care taking (weeding, etc.)			Harvest				
From 1956 to 2002												
Cassava	Preparing soil	Preparing soil	Planting	Management and care taking (weeding, etc.)				Harvest				
Paddy rice being grown ⁸												
Dong Lua 47	Plowing	planting	Management and Care-taking (weeding, water management, etc)		Harvest							
Djong Lua I1				plowing		transplant	Management and Care-taking (weeding, water management, etc)		Harvest			
IR 203	Plowing	planting	Management and Care-taking (weeding, water management, etc)		Harvest		transplant	Management and Care-taking (weeding, water management, etc)		Harvest		
Tap Giao I	Plowing	planting	Management and Care-taking (weeding, water management, etc)		Harvest		transplant	Management and Care-taking (weeding, water management, etc)		Harvest		

⁶ At this time there were 2-3 varieties of sticky rice being cultivated in paddies.
⁷ 5-6 varieties of both normal and stick rice were grown as upland rice. There has been very little change in either the varieties or the cropping patterns over the years.
⁸ Please note that all the paddy rice varieties mentioned are non-glutinous varieties. Improved (non-glutinous) varieties and double cropping was introduced in 1959 as part of an over-all policy to improve production.

Annual Calendar Activity: Aquatic Resources

Bung Village, Bung Lao Commune, Tuan Giao District, Lai Chau
25 February 2002

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
WEATHER	SEASON	Winter		Spring		Summer				Autumn		Winter	
	TEMPERATURE	4-18°C (average 6-20 °C)		16-23 °C	20-28 °C	24-33 °C				20-30 °C		4-18 °C	
	RAINFALL	Dry	Start raining		Heavy rain		Little rain		High humidity		Dry		
POND CULTURE	POND PREPARATION	Draining, dredging, reinforcing dikes, liming, manuring, filling water											
	STOCKING		Stocking/ Re-stocking										
	MANAGEMENT		Feeding, manuring, supplementary feed, etc.										
	HARVEST	Partial/complete harvest	Partial harvest										
RICE-FISH CULTURE	SPRING RICE CROP	Start of rice crop	Management (feeding, manuring, etc.)		Harvesting fish								
			Stocking fish		Harvesting rice								
	SUMMER-AUTUMN RICE CROP			Management (feeding, manuring, etc.)									
								Stocking fish			Harvesting rice		

Appendix A: Bung Village, Bung Lao Commune, Tuan Giao District, Lai Chau

FISHING IN STREAMS, RIVERS ⁹ (<i>Pa Khinh, Pa Mom are the most common</i>)		Fishing with cast/lift nets		Intensive fishing		Peak season (fishing with all means)	Fishing with cast/lift nets
FISHING IN OTHER WATER BODIES			Stream crabs, <i>Pa Dun</i>			Eels, crabs, frogs	
PLANTS	NATURAL PLANTS	<i>Rau Lap, Phac Phum</i> (all seasons, where water is available)					
	CULTURED PLANTS	Local celery		Morning glory			Local celery

⁹ Women and children do a lot of fishing during the winter months (Dec.-Feb.) when the water level is low.

History of Aquatic Resource Management (matrix)

Bung Village, Bung Lao Commune, Tuan Giao District, Lai Chau Province

25 February 2002

This activity was conducted by a mixed group of villagers (both men and women) and recorded on a matrix. The participants defined the dates that would be used as benchmarks for comparison and issues that would be compared.

General Aquaculture

Before 1980	1980-1999	1999-2000
Fish were cultured for household consumption.	People started growing fish for sale.	There was a reduction in the number of ponds.
In 1946 there were 6 household fishponds (out of 30 households). During the time from 1945 to 1980 there were two community ponds.	70% of the people had household ponds. Two community ponds.	20% of the households culture fish. 2.3 ha of ponds, 35-36 ponds.
Ponds were used for holding wild fish that had been caught. Wild fish seed were captured and stocked.	Ad hoc management of ponds. Little regular care such as feeding. Those culturing grass carp were the exception in that they regularly fed grass.	People manage ponds following technical recommendations.
Stocked wild caught common carp, crucian carp, catfish (Clarias), and snakehead. Some people purchased grass carp for culture.	Stocked grass carp, silver carp, common carp, mud carp (mrigal). Seed purchased from traders.	Stock grass carp, silver carp, common carp, mud carp (mrigal), and catfish (Clarias)
Private production was limited.	A lot of water bodies were stocked.	
Natural water bodies were used. There were no disease problems.	Flooding. Drought. Family ponds were developed. No disease problems.	Water plentiful. No threat of floods. There are disease problems in grass carp and mrigal in July and August.

Rice/fish Culture

Before 2000	After 2000
• (Originally)No stocking, no culturing, capturing wild fish from nature • (More recently) Heightened dikes • (More recently)Stock common carp brood fish for natural spawning from ponds	Grow fish in paddies following new techniques

Village Mapping Activity

Tong Village, Son La

28 February 2002



A mixed group of villagers, both men and women, developed the map based on their impression of their village. Features included were roads, water bodies (ponds and streams), and agricultural land (rice fields and upland areas). They indicated which rice fields received irrigation and which mini-water shed surrounding the village provided water to the various production areas. They also included houses, the school, community meeting hall and the sports field.

Statistics included on the map include:

Total land area of village:	1703.3 ha
Area of rice fields:	33 ha (5 ha not irrigated [one crop])
Ponds (area):	2 ha
Economic forests;	48 ha (10 ha of upland crops [cassava, corn])
No. of households:	185
Total population:	827
Rice fish culture:	18 ha (90 households)

Village History Time-Line Activity

Tong Village, Son La

28 February 2002

This activity was conducted by a mixed group of villagers (both men and women) and recorded on a time-line for presentation. Important dates included in and discussed during the presentation include the following:

Political and social events

- 1952: Liberation of the northwestern region
Distribution of rice production land to the people
- 1954 Liberation of Dien Bien Phu
- 1960 Establishment of Ban Tong Cooperative
- 1963 Tong Cooperative incorporated into Phoung Dong Cooperative
- 1965 Phoung Dong Cooperative split back into two smaller cooperatives
Bombardment by American Airplanes
- 1975 Establishment of Tong Panh joint-cooperative
- 1983 Tong Panh cooperative divided
- 1994 Policy on self-determining households
- 1998 Transformation of old to new cooperative

Natural disasters

- 1953 fire and flood
- 1966 fire
- 1991 huge flood demolishes the bridge to the village

Infrastructure

- 1961 Water pump for irrigation
- 1968 A larger water pump was installed
- 1969 mini-hydro power
- 1971 hydropower station
- 1988 First construction of the Tong Panh bridge and car-road to village
- 1991 School constructed
- 1996 Clean water supply
- 1997 Second construction of the Tong Panh bridge
- 1998 Electricity is provided from national grid

Production

- 1955 Shift working teams formed
- 1962 2 crop production of rice started with irrigation
- 1984 Contractual mechanism in agriculture according to 10th directive
- 1999 Hand over of agricultural land to farmers

Activity listing and prioritization

Tong Village, Son La Town

28 February 2002

During this activity, villagers were asked to brainstorm “activities” that take place in the village. This is intended to include both economic activities such as agriculture and non-economic activities such as national holidays. As activities were brainstormed, they were written on a card and attached to a board for participants to review and comment on.

Activities listed in Tong Village included:

- Rearing pigs
- Raising buffalo and cattle
- Rice production
- Fish Culture
- Social activities
- Taking care of children
- Planting vegetables
- Basket weaving
- Fishing
- Cooking
- Weddings
- Upland crops
- Going to the market
- Sawing wood
- Carry water
- Collecting fire wood
- Planting fruit trees
- Study
- Funerals
- Running a small shop
- Personal hygiene
- Teaching
- Metal work
- Sports and music
- Brick making
- Independence day
- Making alcohol
- Housing
- Collecting bamboo shoots
- Help each other build houses
- Weaving
- Making bedding (blankets, mattresses)
- Raising ducks
- Raising chickens
- Planting forest trees
- Barber
- New Year holiday
- Road maintenance
- Making tofu
- Motor bike service
- Contract plowing
- Keeping pets
- Making traditional scarf
- Artistic performances in other areas
- Killing pigs
- Carpentry
- Irrigation maintenance
- Herbal medicine
- Driving a tractor
- Selling meat
- Joining club meetings
- Collecting sand

Prioritization of list of activities

<u>Women's priorities</u>	<u>Men's priorities</u> ¹¹
37. Housing 38. Help each other build house 39. Rice production 40. Upland crops 41. Raising pigs 42. Raising buffalo and cattle 43. Raising ducks 44. Raising chickens 45. Planting vegetables 46. Keeping pets 47. Fish culture 48. Making tofu 49. Making alcohol 50. Taking care of children 51. Going to the market 52. Weaving 53. Collecting fire wood 54. Study ¹⁰ 55. Personal hygiene 56. Carry water 57. Cooking 58. Irrigation maintenance 59. Planting fruit trees 60. Road maintenance 61. Teaching 62. Basket weaving 63. Planting forest trees 64. Funerals 65. Making bedding (blankets, mattresses) 66. Weddings 67. Herbal medicine 68. Making traditional scarf 69. Carpentry 70. Running a small shop 71. Metal work 72. Driving tractor 73. Social activities 74. Contractual plowing 75. Sports and music 76. Selling meat (buffalo and pork) 77. Sawing wood 78. Brick making 79. Joining club meetings 80. New Year holiday 81. Independence day 82. Collecting bamboo shoots	<u>Economic activities:</u> 39. Rice production 40. Planting forest trees 41. Irrigation maintenance 42. Raising pigs 43. Fish culture 44. Raising poultry 45. Planting vegetables 46. Upland crops 47. Road maintenance 48. Raising buffalo and cattle 49. Housing 50. Planting fruit trees 51. Weaving 52. Basket making 53. Collecting sand 54. Making traditional scarf 55. Carpentry 56. Metal work 57. Making tofu 58. Making bricks 59. Sawing wood 60. Collecting fire wood 61. Carrying water 62. Help each other build house 63. Fishing 64. Herbal medicine 65. Making alcohol 66. Running a small shop 67. Keeping pets 68. Collecting bamboo shoots 69. Going to market 70. Selling meat 71. Cooking 72. Driving tractors 73. Killing pigs 74. Motorbike service 75. Barber 76. Contractual plowing <u>Social activities</u> ¹² : 1. Security 2. Study 3. Teaching 4. Medical care 5. Environment Protection 6. Taking care of children

¹⁰ Study for both children and adults¹¹ Men classified activities as “economic” and “social” for classification.¹² Men added the three activities of “security”, “medical care”, and “environmental protection”

83. Collecting sand	7. Joining club meetings
84. Killing pigs	8. Independence day
85. Fishing	9. New Year holiday
86. Artistic performances in other areas	10. Sports and music
87. Barber	11. Artistic performances in other areas
88. Motor bike service	12. Weddings
	13. Personal hygiene
	14. Funerals

Aquatic resource prioritization

Tong Village, Son La Town

28 February 2002

Aquatic resources identified by Ban Tong Village

- Culture fish:
- Wild fish:
- Other aquatic organisms
- Plants

Prioritized list of aquatic resources**Men**

Fish	Other aquatic organisms	Aquatic plants
1. Grass carp 2. Common carp 3. Mrigal 4. Silver barb 5. Tilapia 6. Silver carp 7. Big-head carp 8. Crucian carp 9. Catfish (clarias) 10. Snakehead 11. Swamp eel 12. Spiny eel 13. Pa Pom 14. Pa Chat 15. Pa Sam 16. Stream goby 17. Pangasius 18. Ca Co	1. Shrimp 2. Otter 3. Tiger frog 4. Turtle 5. Clams 6. Crab 7. Oyster 8. Frog 9. Mussel 10. Water snake 11. To Niao 12. Niang Nieng 13. Toad 14. King fisher (bird) 15. Chao Chuoc 16. Ngam ngoi	1. Water crest 2. Local celery 3. Water morning glory 4. Co Bo (phac ben) 5. Cu au 6. Azolla 7. Duckweed 8. Moss 9. Phac num 10. Weed? 11. Phac phum 12. Xay grass 13. Dua grass 14. Chat 15. Mac 16. Beo to ong

Women

Wild fish	Cultured aquatic organisms	Other aquatic organisms	Aquatic plants
1. Common carp 2. Pa Pom 3. Pa Chat 4. Pa Cao 5. Ca Co 6. Snakehead 7. Pa Sam 8. Pa Bu (stream goby) 9. Swamp eel 10. Spiny eel	1. Grass carp (big size) 2. Common carp (good price) 3. Catfish (good price) 4. Mrigal (disease limited) 5. Silver barb (rapid growth) 6. Silver carp (rapid growth) 7. Tilapia (rapid growth) 8. Pa Li (dong dong) (good price) 9. Crucian carp (rapid growth) 10. Fresh water oyster (good price) 11. Hoi Huoi (good price) 12. Shrimps (good price)	1. Tiger frogs 2. Mussel 3. Paddy crab 4. Frog 5. Toad 6. clams	1. Water crest 2. Local celery 3. Water morning glory 4. Duckweed 5. Xay grass 6. Phac ben 7. Ma hueu 8. Weed 9. azollae

Most important aquatic organisms

	Fish	Other aquatic organisms	Aquatic plants
Capture	• Common Carp* (good price, high availability) • Swamp eel* (good price, high availability) • Pa Pom (good price, high availability) • Pa Sam (family consumption)	• Tiger frogs* • Shrimp* • mussel	• Phac Ben* • Duckweed* • Xay grass* (as a grass carp feed)
Culture	• Grass carp • Common carp* • Mrigal* • Silver barb/tilapia* • Crucian carp*		• Water crest • Celery* • Morning glory*

* Organisms associated with rice fields.

The top five aquatic organisms

1. Grass carp
 2. Common carp
 3. Mrigal
 4. Tilapia
- Crusian carp¹³

¹³ There was some degree of discussion between men and women about whether or not a vegetable should have this spot over crucial carp.

Ban Tong Village, Son La Town

29 February 2002

Month	January	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	
Weather	Cold, 12-15°C		Cold	Hot, Rainy, Lao monsoon		Heavy rains, floods		Cool		17°C Cold			
Rice (2 crops)	plowing	Seed bed preparation	transplant	Management and protection		harvest	plow	transplant	Management and protection		Harvest		
	Spring-summer rice crop Varieties: San Uu 63, CR203, N352						summer-autumn rice crop Varieties: N352, Bac Uu, Bao Thai, local glutinous variety						
Rice (1 crop, rain fed)	Management												
Cassava Local varieties and san cau	Land preparation	Planting	Weeding		Management		transplant	Management		harvest			
Corn VN 10 and local variety	Land preparation		Planting		Weeding		Harvest		Weeding		Management	Harvest	
Soy bean	Land preparation	Planting	Weeding	Harvest 1 st crop	Land preparation	planting	management		Harvest 2 nd crop				
Peanut	Cutting grass		Planting										Cutting grass
Economic forest	Mustard, cabbage, water crest		Beans	Morning glory		Sweat potato	beans	Turnip, cabbage		Onion, garlic	Water crest, celery		
Vegetables	1 st crop												
Pigs	2 nd crop												
Poultry			Good time for incubation		Local chicken (all year)								Industrial ducts and chicken
Cattle and buffalo	Reserving feed and keeping warm		warm herding		vaccination		herding		vaccination				
Silk	Start raising	Plant new trees, harvest apricot		Harvest, weeding, raising, harvest, weeding		Management and manure		Harvest		Cut-down mulberry			
Fruit trees			Plant new trees, harvest apricot		Management and manure		Harvest		Management and manure				

Seasonal Calendar – Aquatic resources

Month	January	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.		
Weather	15-20°C			20-27°C, rainy			25-30°C, rainy-floods			20°C			15-20°C	
	Lao monsoon													
Pond culture	Harvest, pond preparation (dredging, cleaning dikes, liming, drying, filling with water)	Stocking (common carp, grass carp, silver barb, tilapia) purchased seed	Stocking and management Species: common carp, tilapia, crucian carp, mrigal) Feeding: bran, manure, fertilizer guarding			Harvest -consume -restocking in paddy -move to pond			Management			Harvest		
	Land preparation (plowing and harrowing, manuring) Harvest													
Rice/fish culture	Regular fishing			Catching (by men and women) - Pa Pom, Pa Chat, Pa Xam, common carp, etc. - Fish traps, cast net, lift net, by hand, fishing rod etc.			Regular fishing - Mussel, clam, shrimp, swamp eel, etc (very few in paddy)			Harvest				
Fishing in stream														
Naturally spawning fish ¹⁴	Spawning season - Crusian carp, common carp, Pa Pom, Pa Chat, etc. - Spawning in paddy	Nursing in paddy			Move to pond			Back to paddy, care taking			Harvest			

¹⁴ “traditional” culture of fish

History of Aquatic Resource Management (matrix)

Tong Village, Son La Town

28 February 2002

This activity was conducted by two mixed groups of villagers (both men and women) and recorded on a matrix.

Group 1

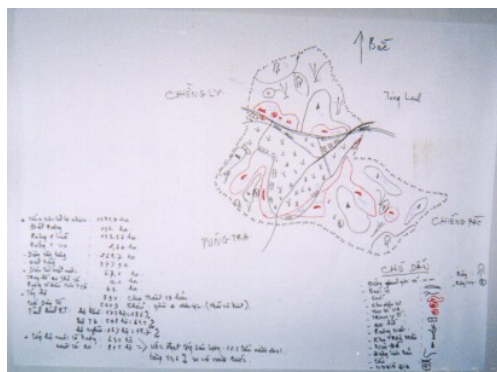
			Before 1960	After 1996
Rice/fish	Rice production and varieties		1 crop: tan ngan (glutinous) 2 crops: Tan chuem (glutinous), 47 (ordinary)	1 crop: N352, San Uu 63, CR203 2 crops: N352, Bac Uu 63, San Uu 63, CR203, local sticky variety
	Stocking	Species	Common carp, cucian carp, local catfish (silurid?)	Local and hybrid common carp, mrigal, tilapia, crucian carp, silver barb, silver carp
		Size	No information	4-6 cm (good qality selected)
		rate	No information	Based on paddy area
		time	Feb - March	April
	Management and care		Natural feed (no supplementary feeding) No guarding required No pesticides used No trenches or refuges Water level maintained and weeding were conducted	Starched (?) feed is added, as well as manure Field houses for guarding built Some pesticides used Trench and refuge system designed and constructed Water level maintained, no weeding
	Harvest		1 crop: harvest in Oct. 2 crop: harvest in June and November Fish for family consumption	Harvest times the same as before 1960 Fish are used for both consumption and sale More and bigger fish are produced
Pond culture	preparation	Dredging, and clearing dikes	Dredging, liming, cleaning dikes	
	stocking	Wild caught fish seed	Purchased form hatcheries	
	feeding	No seed	Feeding with supplementary feed	
Capture fisheries			Fish were plentiful Species: common carp, crucian carp, shrimp, crab, eels, frogs Gears: lift net, cast net	Few fish available Species: common carp, shrimp, eels, crabs Gears: lift net, cast net, hand net, electricity, etc.

Group 2

		Before 1960	After 1996
Rice/fish	Rice varieties	Tan gnan, Khan La, Khau pot, Khau Bong Long stem: 1.2-1.5 meters	CR203, N352, Bao Thai, IR64 Short stem: 0.9-1.2 meters
	Transplanting and broadcasting densities	Low density: 20-30 plants/m ²	High density: 40-45 plants/m ²
	Rice productivity	3-4 tons/ha	6-10 tons/ha
	Fish species	Common carp, crucian carp, snakehead, catfish (silurid?)	Common carp, crucian carp, mrigal, tilapia, silver barb
	Management activities	Fish fed on plants in the rice field No guarding except to check the water level No fish poaching	Supplementary feed (grass, bran, manure) Trenches dug around fields Fish poaching is dealt with by building field houses and guarding
Pond culture		Crucian carp and common carp eggs were gathered from streams Brood fish were retained all year Fish were raised for family consumption	Common carp, crucian carp, mrigal, silver barb, silver carp, tilapia Seed purchased from hatcheries, middlemen, some locally produced Feed grass, manure, bran, compost, corn Fish mainly sold

Village Mapping Activity

Mon Village, Thom Mon Commune, Thuan Cha District, Son La
3 March 2002



A mixed group of villagers, both men and women, developed the map based on their impression of their commune. The map was drawn at the commune level because the group previously done a commune mapping exercise as part of the participatory planning activity of the project. After some discussion, the group chose to also develop a map that only included Mon Village.

Because of the previous planning activity the group had a number of statistics on hand and were included on the map. These statistics include:

Commune level information:

Land area (total)	1333.9 ha
Area of rice field	136 ha
	(2.64 ha – 1 crop, 133.36 ha-2 crops)
Annual crop area (upland)	268.7
Forests	977.94
Total area of water (ponds)	67.1 ha
Rice/fish culture	4.1 ha
No. of households	890
	Well off: 175 (19.6%)
	Medium: 548 (61.5%)
	Poor: 167 (18.7%)
Total population	5409 individuals
Ethnic groups	Kinh and Thai
Rice fish farming	630 households
Pond culture	815 households
(2001 production of fish was 12.5 tons, an increase of 10.6% compared to 2000)	

Village level information:

Production area:	92 ha
2 crop paddy:	32 ha
pond area:	16 ha
No. of households:	197
Population:	1242

Village History Time-Line Activity

Mon Village, Thom Mon Commune, Thuan Cha District, Son La

3 March 2002

This activity was conducted by a mixed group of villagers (both men and women) and recorded on a time-line for presentation. Important dates included in and discussed during the presentation include the following:

Political and social changes

- 1954: 58 households
Dien Bien Phu victory
- 1958: Fire
- 1960: Democratic reform
Agricultural cooperative founded
67 households
- 1967: Fire
- 1976: United cooperative
120 households
- 1997: Split cooperative
176 households
- 2002: 197 households

Infrastructure

- 1960: Irrigation system up-graded
- 1964: rice-drying court built
Kindergarten built
Primary school built
Cross-commune road
Public health station
- 1976: Mini hydropower station built
Irrigation system upgraded
- 2001: clean water supply
road reinforced

Production (economic)

- 1957: Area under production: 92 ha (one, rain-fed crop)
Mainly produced agricultural items (agricultural economy)
- 1960: Area under production: 92 ha
two crop production starts
- 1962: Bad cop
- 1976: Cooperative run pig farm and fish ponds developed
family fish ponds developed 70m²/household
New varieties of rice planted yielding 6 tons/ha
- 1997: Hand over of agricultural land for household management
Reforestation of upland crop land
Paddy area = 32 ha (2 crops)

Activity listing and prioritization

Mon Village, Thon Mon Commune, Thuan Chau District, Son La Province
3 March 2002

During this activity, villagers were asked to brainstorm “activities” that take place in the village. This is intended to include both economic activities such as agriculture and non-economic activities such as national holidays. As activities were brainstormed, they were written on a card and attached to a board for participants to review and comment on.

Activities listed in Mon Village included:

- Raising pigs
- Herding buffalo and cattle
- Rice production
- Fish Culture
- Civil service
- Taking care of spouse and children
- Planting vegetables
- Weaving bamboo items
- Longevity parties
- Raising rabbits
- Mushroom culture
- Upland crops
- Carpentry
- Cooking
- Crop processing
- Collecting fire wood
- Planting fruit trees
- Children’s studies
- Sawing lumber
- Small shop
- Guarding forests
- Educating and nursing children
- Tailor
- TV, radio, etc.
- Stone collection
- Cotton processing for making blankets
- Raising silk
- Weddings
- Repairing watches and clocks
- Spiritual priest (shaman)
- Making alcohol
- Housing
- Drinking alcohol
- Housework
- Wage labor in town
- Making blankets and mattresses
- Raising ducks
- Raising chickens
- Planting forests
- First child parties
- House warming parties
- Handicrafts
- Husking rice
- Agricultural input transactions
- Sewing traditional scarves
- Paddy management
- Making traditional garments
- Artistic performances
- Killing pigs
- Construction
- Irrigation maintenance
- Medical care
- Security
- Fish seed nursing
- Dancing
- Sand collection
- Raising goats
- Repairing bicycles and motorcycles
- Motorcycle taxi

Prioritization of list of activities

<u>Women's priorities</u> <i>The women placed activities in 6 major groups based on importance and then ranked within the groups.</i> <u>Most important activities:</u> 89. Housing 90. Rice production 91. Paddy management 92. Taking care of spouse and children 93. Educating and nursing children 94. Medical care 95. Children's studies 96. Making traditional garments 97. Sewing traditional scarves 98. Planting vegetables <u>Second most important</u> 99. Upland crops 100. Planting fruit trees 101. Herding buffalo and cattle 102. Fish culture 103. Raising ducks 104. Raising pigs 105. Raising chickens 106. Making alcohol 107. Raising silk 108. Raising goats <u>Third most important</u> 109. Security 110. Planting forests 111. Guarding forests 112. Irrigation maintenance 113. Stone collection 114. Sand collection 115. Cotton processing for making blankets 116. Fish seed nursing 117. Making blankets and mattresses <u>Fourth most important</u> 118. House warming parties 119. First child party 120. Weddings 121. Longevity party 122. Raising rabbits 123. Tailor 124. Collecting fire wood <u>Fifth most important</u> 125. Crop processing	<u>Men's priorities</u> <i>The men grouped activities in 9 groups based on importance and then ranked within groups</i> <u>Most important activities:</u> 77. Housing 78. Upland crops 79. Rice production 80. Children's studies 81. Medical care 82. Planting fruit trees 83. Planting forests 84. Irrigation maintenance 85. Security <u>Second most important</u> 86. Herding buffalo and cattle 87. Raising pigs 88. Raising chickens 89. Raising ducks 90. Fish culture 91. Planting vegetables 92. Raising silk 93. Making traditional garments 94. Sewing traditional scarves 95. Agricultural inputs transactions 96. Stone collection 97. Sand collection 98. Raising rabbits <u>Third most important</u> 99. Collecting fire wood 100. Paddy management 101. Taking care of spouse and children 102. Weaving bamboo items 103. Guarding forests 104. Fish seed nursing 105. Crop processing 106. Handicrafts 107. Carpentry 108. Cotton processing for making blankets 109. Construction 110. Sawing lumber <u>Fourth most important</u> 111. Cooking 112. Weddings 113. Making blankets and mattresses 114. House warming party 115. Longevity party <u>Fifth most important</u>
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Appendix B: Mon Village, Thom Mon Commune, Thuan Chau District, Son La

126. Civil service	116. TV, radio, etc.
127. Housework	117. Civil service
128. Killing pigs	
129. Small shop	<u>Sixth most important</u>
130. Agricultural input transactions	118. Repairing bicycles and motorcycles
131. Husking rice	119. Killing pigs
	120. Wage labor in town
Sixth in importance (least important)	121. Husking rice
132. TV, radio, etc.	122. Mushroom culture
133. Weaving bamboo items	123. Small shop
134. Mushroom culture	124. Repairing watches and clocks
135. Artistic performances	125. Making alcohol
136. Dancing	126. Tailor
137. Drinking alcohol	
138. Wage labor in town	<u>Seventh most important</u>
	127. Motorbike taxi
	128. Housework
	129. Artistic performance
	130. First child party
	<u>Eighth group</u>
	131. Spiritual priest (shaman)
	<u>Final group</u>
	132. Drinking alcohol

Aquatic resource prioritization

Mon Village, Thon Mon Commune, Thuan Chau District, Son La Province

3 March 2002

Aquatic resources identified by Mon Village

- Culture fish:
- Wild fish:
- Other aquatic organisms
- Plants

Prioritized list of aquatic resources

Both the men's and women's groups chose to place in groups as well as prioritize. (The groups are separated by a space.)

<u>Men</u>	<u>Women</u>
1. Common carp	1. Common carp
2. Grass carp	2. Grass carp
3. Migal	3. Mrigal
4. Silver barb	4. Tilapia
5. Tilapia	5. Silver barb
6. Shrimp	6. Shrimp
7. Catfish	7. Crab
8. Swamp eels	8. Catfish
9. Snails	9. Snails
10. Oysters	10. Oysters
11. Snake-head	11. Mussels
12. Spiny eel	12. Crucian carp
13. Crucian carp	13. Goby
14. Mussel	14. Pa Mom
15. Tiger frog	15. Tiger frog
16. Snake	16. Frog
17. Frog,	17. Spiny eel
18. Crab	18. Pa Pan
19. Big duck weed	19. Pa Sam
20. Azolla	20. Snakehead
21. Japanese duckweed	21. Celery
22. Submerged weed (algae?)	22. Morning glory
23. Moss (algae?)	23. Watercress
24. Tiny duckweed	24. Phac Ben
25. Morning glory	25. Snake
26. Celery	26. Moss
27. Watercress	27. Bogao
28. Moss ?	28. Azolla
29. Phoc Xom	29. Phac Xam
30. Pa San	30. Submerged weed
31. Pa Li	31. Phac Ngum
32. Pa Pan	32. Pa Li
33. Pa Mom	33. Big duckweed
34. Bo	34. Tiny duckweed
35. Gao	35. Japanese duckweed
36. Phac Ben	
37. Phac Ngum	

Most important aquatic organisms

<u>Fish and other aquatic animals</u>	<u>Vegetables and aquatic plants</u>
1. Common carp 2. Grass carp 3. Mrigal 4. Silver barb 5. Tilapia 6. Shrimp 7. Catfish 8. Swamp eel 9. Snails 10. Mussels	1. Morning glory 2. Celery 3. Watercress

Of the aquatic animals:

- common carp, mrigal, silver barb, tilapia, snails, and mussels can all be found in both ponds and ice fields
- grass carp, catfish and shrimp (as by-catch) only in ponds
- swamp eels and captured in ponds and rice fields to be fattened in concrete tanks.

Of the aquatic plants:

5. Morning glory and celery can be grown in both the ponds and paddies. In case of morning glory different types are grown in ponds and rice fields.

Appendix B: Mon Village, Thom Mon Commune, Thuan Chau District, Son La

Annual Calendar Activity: Agriculture activities

Mon Village, Thom Mon Commune, Thuan Chau District, Son La Province
4 March 2002

Month	January	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	
Weather	Winter 8-12 C		Spring 18-26 C			Summer 28-36 C			Autumn 25-32 C		Winter 12-17 C		
	Dry	Drizzly		Rainy (Lao monsoon)		Heavy rain, floods		Cool	Humid		Dry, foggy		
Rice (2 crops)	plowing	Seed bed preparation	Transplant (10 March)	Management (weeding, pesticides, fertilizer, rat control)	Harvest/ plow	transplant		Management	Harvest				
	Spring-summer rice crop Varieties: Chinese hybrid, CR203, N44, fragrant sticky rice						summer-autumn rice crop Varieties: Bao Thai, CR 203						
Vegetables	Winter vegetables (Onion, garlic, cabbage, turnip, beans, cauliflower, mustard)		Morning glory						Winter vegetables				
			tomatoes				Local mustard						
Cassava	Celery, watercress			Planting and managing cassava								Celery, watercress	
	Land preparation											Harvest	
Corn (other upland crops)	Land preparation		Planting and managing corn			harvest	Supplementary upland crop of soy bean, peanut or corn						
Cattle and buffalo	Grazing in forest all year												
Pigs (hybrid and local)	End of 1 st round						1st round (feed corn, cassava, vegetable wastes, duckweed)						
							2 nd round of pigs						
Poultry (chickens and ducks)	1 st round						2 nd round		3 rd round				

Seasonal Calendar – Aquatic resources

Month	January	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	
Weather	Winter 8-15 C		Spring 15-30 C			Summer 30-35 C			Autumn 17-30 C			Winter 8-15 C	
	Dry			Rainy			Heavy rains			Dry			
Pond culture	Very cold			Lao Monsoon, hail			Floods			Very cold with fog			
	Pond preparation: draining, dredging, cleaning dikes, liming, manuring, seed procurement	Stocking: common carp 4-6 cm grass carp 8-12 cm Silver barb 4-6 cm Mrigal 6-8cm Shrimps, snails, mussels	Limiting (to prevent disease) Feeding (cassava and corn meal, vegetables and grass, rice bran)			Management and protection:			Partial harvest: Some fish are harvested, larger fish are sold		Harvest		
	Land preparation	Transplant spring-summer rice	Stocking and management: Common carp 8-10 cm Silver barb 8-10 cm Mrigal 10-12 cm Crucian carp, tilapia, etc.			Harvest fish and rice. Transplant second crop		Restock fish and management		Harvest fish and rice and prepare for next crop			
Fish seed nursing		Common carp		Mrigal and silver barb									
			Grass carp										
		Tilapia											
Aquatic vegetables	Celey, duckweed, watercress	Morning glory (paddy and pond)											Celery (paddy and pond)
Fishing and foraging		Collecting stone moss in stream		Shrimps, crabs, snails, mussels in paddies						Shrimps, crabs, snails, mussels, eels in paddies			
	Fishing all year in canals and stream (crucian carp, common carp, snakehead, catfish, Pa Mom, Pa Bu, Pa Sam, crabs, snails, mussels, eels)												

History of Aquatic Resource Management (matrix)

Mon Village, Thom Mon Commune, Thuan Chau District, Son La Province

4 March 2002

This activity was conducted by two mixed groups of villagers (both men and women) and recorded on a matrix.

Group 1

(The group chose not to use a matrix format)

1. Rice fish culture

Before 1957

1 rice crop (varieties: Tan gnan, Tan nhe, Tan lanh, Tan tac)

Traditional fish species: common carp, crucian carp, snakehead, catfish

Wild fish/animals: Pa Mom, Pa Xam, Pa Ly, shrimp, crab, mussels, eels, etc.

1957-1979

2 crops of rice. (varieties: Tan chiem, Tan Lai [spring - summer crop], Nam ninh [2nd crop])

- Fish culture
- stocking broodstock to breed in January
 - collect fingerlings in April to nurse in pond
 - stock fish in paddy in July
 - harvest in October
 - (same species as previous period)

1979-2001

- 2 crops of rice - spring/summer varieties: Chinese hybrid, CR203, IR64, 357, 87, etc.
- summer/autumn varieties: Chinese hybrid, fragrant sticky rice, CR203, etc

fish species: common carp, crucian carp, silver carp, mrigal, tilapia

2001-2002

Rice (same as previous period, 1979-2001)

- Fish culture
- species: common carp, crucian carp, silver carp, mrigal, tilapia, silver barb
 - field modification: refuges and trenches dug
 - feeding with starch feed (corn and cassava meal)

2. Pond Culture

Before 1957:

- There were few ponds
- No care-taking of fish (ie management or inputs)

1957 – 1979

- Community and private ponds co-existed
- Species included: common carp, crucian carp, mrigal, grass carp, silver carp
- Management: feeding with bran and manure

Appendix B: Mon Village, Thom Mon Commune, Thuan Chau District, Son La

1979-2001

- Species included: common carp crucian carp, grass carp, mrigal, tilapia
- Feeding: grass, manure, bran
- Partial harvest in Aug. – Sept, complete harvest in Dec.

2001-2002

- Pond preparation is applied
- Species: similar to previous period (1979-2001)
- Harvest: similar to previous period (1979-2001)

Group 2

		Before 1960	After 1996
Pond culture	Fish species	Common carp, crucian carp, snakehead, catfish (Clarias?)	Common carp, grass carp, mrigal, tilapia, silver barb
	Fish seed	Natural source (eggs collected from a stream)	Fish seed purchased
	Pond preparation	Dredge every 1-2 years, no treatment	Draining, dredging, liming, manuring, drying
	Culture methods	No care-taking,; keeping fish 1-2 years before harvest	Care-taking: Feeding with: vegetables, grass, leaves, cubes (?), fruits, corn meal, cassava meal, rice bran, etc. Regular liming to prevent disease.
Rice/fish culture	Rice production	• 1 crop of rice is most common • Time: April to October • Species: Common carp and crucian carp (natural) • Stock broodfish right after plowing and harrowing • Heighten dikes • Roughly in June, move fish from paddy to pond for rice flowering. Fill water back in July and stock the fish again.	• 2 crops of rice • Species: Common carp, crucian carp, mrigal, silver barb, tilapia (seed mainly purchased) • In April after the flowering of rice, filling water and stocking fish. • 15 June-15 Aug: Moving fish from paddy to pond in the interval o two rice crops, then moving back to rice fields
	Fish culture methods	No care taking except guarding	Care-taking: • Feeding with supplementary feeds • Manuring (for both rice and fish) • Covering the surface with duckweed • Liming to prevent disease • Reducing chemical use (IPM)

Village Mapping Activity

Van Mai Commune, Mai Chau District, Hoa Binh Province
24 March 2002



A mixed group of villagers, both men and women, developed the map based on their impression of their commune. The map was drawn at the commune level because the group of participants included individuals from 4 of the communes 7 villages, and thus represented the commune better than any single village.

Various types of information and features were included on the map such as the location of the school, residential areas, the People's Committee Office, health station, bridge, road, stream, forests, and rice fields. Various detailed information was also included on the map as follows:

Commune level information:

Land area (total)	3,936 ha
Agricultural area	177 ha
Area of rice field	83 ha
	(2 ha – 1 crop, 83 ha-2 crops)
Annual crop area (upland)	268.7
Forests	2,800 ha
Planted forests	500 ha
Aquaculture area	5.9 ha
Residential land area	21.6 ha
No. of households	658
Total population	2,883 individuals

Village History Time-Line Activity

Van Mai Commune, Mai Chau District, Hoa Bin Province

24 March 2002

This activity was conducted by a mixed group of villagers (both men and women) and recorded on a time-line for presentation. Important dates included in and discussed during the presentation include the following:

1926	Road 15 to Mai Chau was constructed
1945	The August Revolution
1954	Battle of Dien Bien Phu
1958	Labor exchange groups formed Built primary school
1961	Commune cooperative was organized
1962	Luong irrigation dam was constructed, irrigating 30 ha of rice land
1965	American bombing targeting a bridge
1968	Continued bombing from Americans, many deaths among the villagers Khan mini-hydroelectric dam was built to power the commune
1970	Local market was established
1975	flooding
1983	New varieties o rice introduced and used
1985	Nghe irrigation dam was constructed
1988	Households were taxed on production
1993	Fish disease in grass carp
1994	Cooperative was divided
1995	flooding
1997	Road through the commune improved
1998	Land reform that gave households the right to manage agricultural land
2000	Built new school, communication tower, and health station.

Activity listing and prioritization

Van Mai Commune, Mai Chau District, Hoa Binh Province

24 March 2002

During this activity, villagers were asked to brainstorm “activities” that take place in the village. This is intended to include both economic activities such as agriculture and non-economic activities such as national holidays. As activities were brainstormed, they were written on a card and attached to a board for participants to review and comment on.

Activities listed in Mon Village included:

- Raising pigs
- Raising cattle and buffalo
- Rice production
- Fish Culture
- Local government jobs
- Weddings/funerals
- Planting vegetables
- Weaving baskets
- Transplanting rice
- Deliver post and newspapers
- Plowing
- Upland crops
- Raising silk worms
- Cooking
- Trading
- Collecting fire wood
- Planting fruit trees
- Education
- Cutting lumber
- Selling goods
- Road maintenance
- Take care of children
- Exploiting rock and sand
- Making alcohol
- Housing
- Cutting grass for fish
- Teaching
- Hired labor
- Sports and cultural events
- Raising ducks and chickens
- Washing
- Planting forests
- Community organization activities
- Help build house
- Raising bees
- Milling rice
- Marketing
- Visit ill people
- Collect bamboo
- Weaving cloth
- Hunting
- Lorry for hire
- Motorcycle for hire
- Irrigation maintenance
- Medical care
- fishing

Prioritization of list of activities

<u>Women's priorities</u>	<u>Men's priorities</u>
139. Housing	133. Rice production
140. Rice production	134. Plowing
141. Plowing	135. Transplanting rice
142. Transplanting rice	136. Raising cattle and buffalo
143. Raising cattle and buffalo	137. Fish culture
144. Fish culture	138. Raising pigs
145. Raising pigs	139. Raising ducks and chickens
146. Raising ducks and chickens	140. Cooking
147. Upland crops	141. Education
148. Collecting fire wood	142. Teaching
149. Cooking	143. Upland crops
150. Washing	144. Housing
151. Education	145. Take care of children
152. Take care of children	146. Washing
153. Teaching	147. Irrigation maintenance
154. Medical care	148. Road maintenance
155. Planting forests	149. Collecting fire wood
156. Planting fruit trees	150. Weddings/funerals
157. Community organization activities	151. Local government jobs
158. Help build house	152. Community organization activities
159. Road maintenance	153. Milling rice
160. Irrigation maintenance	154. Planting vegetables
161. Weddings/funerals	155. Cutting grass for fish
162. Weaving cloth	156. Help build house
163. Weaving baskets	157. Marketing
164. Cutting grass for fish	158. Weaving cloth
165. Planting vegetables	159. Weaving baskets
166. Sports and cultural activities	160. Planting forests
167. Deliver post and newspapers	161. Planting fruit trees
168. Make alcohol	162. Medical care
169. Marketing	163. Hired labor
170. Local government jobs	164. Trading
171. Milling rice	165. Selling goods
172. Raising bees	166. Lorry for hire
173. Raising silk worms	167. Exploiting rock and sand
174. Selling goods	168. Fishing
175. Visit ill people	169. Hunting
176. Trading	170. Motorcycle for hire
177. Collecting bamboo	171. Deliver post and newspapers
178. Hunting	172. Sports and cultural activities
179. Lorry for hire	173. Visit ill people
180. Motorcycle for hire	174. Collect bamboo
181. Hired labor	175. Cutting lumber
182. Fishing	176. Make alcohol
183. Exploiting rock and sand	177. Raising bees
184. Cutting lumber	178. Raising silk worms

Aquatic resource prioritization

Van Mai Commune, Mai Chau District, Hoa Binh Province

24 March 2002

Aquatic resources identified by members of Van Mai Commune

- Culture fish:
- Wild fish:
- Other aquatic organisms
- Plants

Prioritized list of aquatic resources

<u>Men</u>	<u>Women</u>
<i>The men prioritized within each groups (ie. fish, other aquatic animals, aquatic plants), rather than doing an over-all prioritization.</i>	<i>The women prioritized everything together in an over-all prioritization.</i>
1. Ca Bong	36. Ca Bong
2. Grass carp	37. Ma River mud carp
3. Common carp	38. Grass carp
4. Ma River mud carp	39. Common Carp
5. Mrigal	40. Bighead carp
6. Rohu	41. Silver carp
7. Tilapia (sex reversed)	42. Mrigal
8. Crucian carp	43. Silver barb
9. Catfish (Clarias)	44. Crucian carp
10. Silver carp	45. Catfish (Clarias)
11. Bighead carp	46. Tiger frog (ech)
12. Ca chay dat (round eye carp)	47. Roho
13. Spiny eel (trach trau)	48. Tilapia (sex reversed)
14. Goby	49. Spiny eel (trach bun)
15. Swamp eel	50. swamp eel
16. Spiny eel (trach bun)	51. Climbing perch
17. Ca Co	52. shrimp
18. Pa Khinh	53. snail
19. Pa Pun	54. soft shelled turtle
20. Pa Pan	55. Ca chay dat (round eye carp)
21. Pa Be	56. Pa Khinh
22. Pa Xam	57. Pa San Cay
23. Pa Set	58. goby
24. Pa siu (small cyprinids ie Rasbora)	59. spiny eel (trach trau)
25. Pa San Cay	60. snake head
26. Ca Chien	61. Pa Xam
27. Ca Lang (yellow mystus)	62. Pa Set
28. snake head	63. Pa siu (small cyprinids ie Rasbora)
29. Pa Khi Muc	64. Pa Be
30. Pa Khe Nhanh	65. Pa Khi Muc
31. Climbing perch	66. Pa Pun
32. Catfish (ca nheo)	67. Pa Pan
33. Silver barb	68. Catfish (ca nheo)
34. Ca Chim trang	69. Ca Co
35. Pa Ca	70. Ca Chien
36. Pa Ba	71. Ca Lang (yellow mystus)
37. Pa Pim	72. Pa Pem
	73. Pa Khe Nganh
	74. Pa Ca

Appendix B: Van Mai Commune, Mai Chau District, Hoa Binh

38. Tiger frog (ech)	75. Ca Chim trang
39. Small frog (nhai)	76. Pa Ba
40. Small frog (chau chuoc)	77. Crab
41. Shrimp	78. Water snake
42. Small shrimp	79. Small frog (nhai)
43. Soft shell turtle	80. Small frog (chao chuoc)
44. turtle	81. Ep e
45. Snail	82. Small shrimp
46. Crab	83. small mussel
47. Water snake	84. Giant water beetle
48. Ep e	85. Ca nieng (insect)
49. Small mussel	86. mussel
50. Mussel	87. Bap cay (insect)
51. Dragon fly larvae	88. dragon fly larvae
52. Ca nieng (insect)	89. turtle
53. Bap cay (insect)	90. watercress
54. Giant water beetle	91. moss
55. water morning glory	92. Rong (submerged plant)
56. celery	93. duckweed
57. watercress	94. Beo trau (buffalo or Indian duckweed)
58. Rong (submerged plant)	95. Azolla
59. Moss	96. Celery
60. duckweed	97. Water morning glory
61. azolla	98. Rau Bo (aquatic vegetable)
62. Rau Bo (aquatic vegetable)	99. Wild mustard
63. Local mustard	
64. Beo trau (buffalo or Indian duckweed)	

Most important aquatic organisms

Wild fish	Cultured fish	Other aquatic animals	Aquatic plants
Ca Bong Crucian Carp	Ca Bong Grass carp Mud carp Common carp migal roho crucian carp	Frog Smaller frog Smaller frog Shrimp snail	Ruang Can Cai xong

Appendix B: Van Mai Commune, Mai Chau District, Hoa Binh

Annual Calendar Activity: Agriculture activities
Van Mai Commune, Mai Chau District, Hoa Binh Province
24 March 2002

Month	January	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	
Weather	Winter 10-16 C	Spring 17-20 C		Summer 28-35 C		Fall 18-25 C		Winter 10-16 C					
	Average rainfall				High rainfall		Reducing rainfall		Little or no rainfall				
Rice	Prepare seedlings	transplant	Management	Harvest	Prepare land and seedlings	transplant	Management	Harvest	Prepare land				
	Spring Crop			Summer Crop			Spring Crop						
Cattle and buffalo	Raise all year												
Pigs	Sales	Buy feeder pigs		Fatten on corn and vegetable (investments)									Sales
Poultry	Sales		Buy chicks ducklings		Raise								Sales
Cassava	Harvest	Land preparation		Planting	Management								Sell products
Corn			Land preparation	Planting	Management	Harvest							
Forests	Prepare seedlings		Land preparation		Planting	Management							

Appendix B: Van Mai Commune, Mai Chau District, Hoa Binh

Seasonal Calendar – Aquatic resources

Month	January	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
Weather		Winter 17 C		Spring 25 C		Summer 29 C			Autumn 22 C			Winter 17 C
Pond culture	Pond preparation: draining, dredging, cleaning dikes, liming (10-12kg/100m)		Nursing: Ca' Bong, common carp, grass carp, mud carp		Stocking		Grow out: Feeding twice a day, morning and evening		Harvest			
Rice/fish culture	Prepare land, dig trench /refuge	Stocking: Common carp (10-15 / 100m) Mud carp (4-6 /100m), Tilapia (2-3/100m), Silver barb (4-6/100m)		Grow out: Feed 1-1.5 kg cereal meal / 100 m		Harvest		Second crop		Harvest		

Rice vs. Rice-fish System Comparison (matrix)

Van Mai Commune, Mai Chau District, Hoa Binh Province

25 March 2002

In Van Mai there was no clear concept of “traditional aquaculture” such as existed in the other villages. This being the case it was decided to focus the matrix activity on the differences between rice production and integrated rice/fish production. This activity was conducted in a single group with facilitation of the discussion provided by the National Consultant.

	Rice paddy	Rice cum fish paddy
Paddy preparation	- To harrow; plough; and fill with water. - To manure; lime	- Prepare like rice paddy - Dig fish refuge - Increase paddy bund height (labor increasing, land for transplanting decreasing) - More manure and liming
Transplanting and stocking fish	- Local rice seed and fit with - Medium density	- To select new rice-seed species; criteria: tough stem and pest resistance. - Same density of rice - Stock fish (need capital to buy fingerling)
Management	- Maintain water-level in the paddy - Manure - Weed - Pest prevention (high cost)	1. Water level need to adjust (always keep high level) 2. Manure 3. To use starch feed 4. Need to guard (<u>1+2+3+4 = labor increase leading to increased costs</u>) 5. Decrease the labor of weed 6. To limit disease $\Rightarrow$ decrease pesticide (<u>5+6 = labor decrease leading to less costs</u>)
Harvest	- Harvest rice and transportation - Threshing, - To dry in the sun - To package and consumption	- Harvest rice - Harvest fish (consume easier than rice)
Effect	- Productivity and yield of rice are the only output	For economic: - Over-all productivity increases - Rice yield may decrease a bit or stay the same - Gained fish yield has high value - Income raise about 1.5 or 1.8 times, in general For environment - Paddy environment become better due to limited of pesticide

Appendix B: List of Aquatic Organisms

List of Aquatic Organisms compiled during village activities

Fish				
	Vietnamese common name	Ethnic Thai common name	English common name	Scientific name
1	Ca Chep	Pa Nay	Common carp	<i>Cyprinus carpio</i>
2	Ca Sinh Gai	Pa Khinh		<i>Varichorhinus laticeps</i>
3	Ca mom	Pa Mon		<i>Scaphiodonichthys ssp.</i>
4	Ca bong trang	Pa Bu	Goby	<i>Glosogobius giuris</i>
5	Ca chien suoi	Pa Pan		<i>Glyptostenon hainanensis</i>
6	Ca chien suoi	Pa Pan		<i>Nemachilus pulcher</i>
7	Ca duc cham	Pa Mun		<i>Hemibarbus maculatus</i>
8	Ca Xam	Pa Sam		<i>Barilus macropterus</i>
9	Ca chay dat	Pa Tet		<i>Spinibarbus ssp.</i>
10	Ca chach song Ca trech chau	Pa Lat	Spiny eel	<i>Mastacembellus armatus</i>
11	Ca chach bun	Pa Lot	Spiny eel	<i>Misgurnus anguilicaudatus</i>
12	Ca bam da Lai Chau	Pa Pem		<i>Sinogstromyzon minutum</i>
13	Ca duoi co	Pa Di		<i>Macropodus opercularis</i>
14	Ca chien	Pa Khe		<i>Bagarius yarrelli</i>
15	Ca qua	Pa Con	Striated snake-head	<i>Ophiocephalus striata</i>
16	Ca poc	Pa Poc		<i>Systomus ssp.</i>
17	Ca the be	Pa Ve (Be)		<i>Acheilognathus tonkinensis</i>
18	Ca dam xanh			
19	Ca bong			<i>Spinibarbichthys denticulatus</i>
20	Ca Tram co		Grass carp	<i>Ctenopharyngodon idellus</i>
21	Ca diec	Pa Fac	Crucian carp	<i>Carassius auratus gibelio</i>
22	Ca Troi		mud carp	<i>Cirrhinus molitorella</i>
23	Ca Mrigan		Mrigal	<i>Cirrhinus mrigala</i>
24	Ca Troi An Do, Rohu		Rohu	<i>Labeo rohita</i>
25	Ca Ro phi		tilapia	<i>Oreochromis spp.</i>
26	Ca Tre den	Pa Duc	Black walking catfish	<i>Clarias fuscus</i>
27	Ca Me Trang		Silver carp	<i>Hypophthalmichthys molitrix</i>
28	Ca Me Hoa		Bighead carp	<i>Aristichthys noblis</i>
29	Luon		Swamp eel	<i>Monopterus albas</i>
30		Pa Pun		
31		Pa Set		
32		Pa Siu	Small cyprinids	<i>Rasbora spp, Danio spp. Esomas spp</i>
33		Pa San Cay		
34	Ca Lang	Pa Cheung		<i>Hemibagrus elongatus</i>
35		Pa Khi Muc		
36		Pa Khe Nhanh		

Appendix B: List of Aquatic Organisms

37	Ca Ro ta Ca Ro dong		Climbing perch	<i>Anabas testudineus</i>
38	Ca Nheo		catfish	<i>Parasilurus asotus</i>
39	Ca Me Vinh		Silver barb	<i>Barbodes gonionotus</i>
40	Ca Chim trang		Clossoma	
41		Pa Ca		
42		Pa Ba		
Other Aquatic Animals				
1	Ba ba	Pa Pha,	Softshell turtle	<i>Pelodiscus sinensis</i>
2	Rua hop ba vach	Tau	turtle	<i>Cuora trifasciata</i>
3	Tom suoi	Kung (Tom)	Stream prawn	
4	Tom cang	Kung	Pond shrimp (large)	<i>Macrobrachium nipponensis</i>
5	Tom riu Tep	Kung	Pond shrimp (small)	<i>Caridina flavilineata</i>
6	Ech dong	Gope	Frog	<i>Rana rugulosa.</i>
7	Ech nui	Kiet	Small frog	<i>R. microlineata</i>
8	Nhai, Ngoe		Small frog	<i>R. limnocaris</i>
9	Chao chuoc		Small frog	<i>R. guentheri</i>
10	Hen	Hoi Bom	Short shellfish	<i>Corbicula cyreniformus</i>
11	Cua dong	Bu	Paddy crab	<i>Somanniathelphusa sinensis</i>
12	Cua suoi	Bu	Stream crab	
13	Trung truc	Hoi Nam	Long shelfish	
14	Ran nuoc, Ran liu diu	Ngu nam	Water snake	<i>Enhydris plumbea</i>
16	Oc (nhoi)	Hoi	snail	<i>Pila polita</i>
17	Trai song		mussel	<i>Sinanodonta jourdyi</i>
18		Ep e		
19	Au tung chuon chuon		Dragon fly larvae	
20	Ca niang		insect	
21	Bap cay		insect	
22		Mang Da	Giant water beetle	
Aquatic Plants				
1	Rau muong nuoc		Water morning glory	<i>Ipomoea reptans</i>
2	Rau can		celery	<i>Apium graveolens ?</i>
3	Cai soong		Watercress	<i>Nasturtium officinale</i>
4	Rong		(submerged plant?)	
5	Reu		moss	
6	Beo tam		duckweed	
7	Beo hoa dau		azzolla	
8	Rau bo, Co bo	Phac Ben	Aquatic vegetable (clover fern?)	<i>Marsilea quadrifolia</i>
9	Cai ngo		Local mustard	
10	Beo tram		Type of duckweed?	