

**Summary Report of the stocking and restocking of waterbodies
in villages participating in the MRAG Adaptive Learning
project, Savannakhet & Khammouane Provinces.
(July and November 2000)**

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Introduction

This report provides a summary report of the stocking programme undertaken for the MRAG Adaptive Learning project. The programme has been designed to use the stocking of community managed waterbodies in order to gain information about the suitability of alternative species for stocking and potentially their effects on wild fish populations in the waterbodies. The programme had been agreed with participating villages during four workshops held in four districts (see RDC Activities 8557 and 8562-8564). The stocking, and subsequent monitoring of the management and yields, has been carried out in waterbodies under the control of communities. These communities were either already stocking communal waterbodies to produce village income, or had a strong wish to do so. In total, 38 waterbodies in 33 villages have been stocked. This report outlines the following aspects of the stocking programme:

- Description of the experimental stocking programme
- Implementation of the stocking programme
- Subsequent changes to the stocking programme
- evaluation of the programme

The 33 villages came from eight districts in Savannakhet Province (Sonbuli, Champon, Songkhon, Xayaputong, Outhomphone, Atsaphantong, Khantabouli, & Saybouli) and four districts in Khammouane (Thakek, Yomalad, Xe Bahn Fai, & Hinboun). A complete list of the participating villages and their respective waterbodies, including the month in which the villagers wished the waterbody to be stocked is given in Appendix I.

The selection of these villages was based on an exploratory 'survey' carried out by MRAG/RDC staff in September – December 2000 (see RDC Activity 8555) when 39 villages and 61 waterbodies were surveyed. Results of this data collection exercise can be found in the RDC/MRAG District data analysis workshop report, RDC Activity 8552. Villages involved in the stocking programme described here were selected on the basis of the appropriateness of the physical characteristics of their waterbodies (in particular waterbodies larger than 40 Ha were not selected), and their willingness and/or capacity to manage a communally stocked waterbody for community benefit.

Description of the experimental stocking programme

On the basis of the water quality data collected during the exploratory 'survey', waterbodies were divided into those with high levels and those with low levels of total phosphorous. The experimental stocking programme would stock high and low total phosphorous waterbodies with one of three stocking options. The aim of the programme would be to see whether particular species mixes might be more appropriate given the waterbody productivity, based on the total phosphorous level.

It was decided that the species that would be used for stocking would be tilapia (*Oreochromis niloticus*) and the Indian carps rohu (*Labeo rohita*) and mrigal (*Cirrhinus mrigala*). The stocking options would be tilapia only, 50:50 rohu and mrigal and finally equal amounts of tilapia, mrigal and rohu. Each of these options would be stocked at a density of 3500/hectare. Each option was to be stocked in about five waterbodies with high, and five waterbodies with low total phosphorous. Additionally, waterbodies that had previously been stocked with tilapia would not be stocked with the carp only option. Four waterbodies, Nong Miang, Nong Lam Tuay, Nong Hong and Nong Pa Por were stocked but not at the same density as the others. In the case of Nong Hong and Nong Pa Por, the waterbodies were stocked with 2000 fingerlings each as it was felt that stocking might influence the type of management. Nong Miang and Nong Lam Tuay were both larger waterbodies and Nong Miang was stocked at 50% density. Nong Lam Tuay was stocked with 10000

fingerlings. The planned treatments and fingerling numbers can be seen in Appendix II.

Implementation of the stocking programme

The experimental stocking programme was discussed with the villages participating in the project and the villages selected the time at which they would like their waterbody to be stocked. This was to avoid potential problems such as flooding which might occur in some waterbodies. This information was discussed with the district staff and stocking was to proceed in two phases, one in July 2000 and the second in October 2000. For both phases, the fingerlings required were to be produced at the government fish hatchery at Pak Bor, near Savannakhet. Pak Bor were provided with the stocking plans and species requirements so that fingerlings would be available to the project when they were needed for stocking. The fingerlings to be stocked were to be produced at 3-5 centimetres. The fingerlings would be transported in plastic bags using an RDC vehicle and mortalities from transportation recorded on a mortalities form (see Appendix III). The stocking programme was carried out by RDC staff including Khamchan Sidavong, Phansy Homekingkeo, Bounthong Saengvilaikham, Sonesai Kosy and Khamthon Vongphachan assisted by district staff and staff from Pak Bor fish hatchery.

First stocking phase

Following discussions with the district staff a timetable for the first phase of stocking was agreed and this is shown in Appendix IV. This timetable for stocking was followed and all mortalities resulting from transportation were recorded.

Second stocking phase

For the second phase of the stocking programme the remaining waterbodies were due to be stocked. In addition, a number of waterbodies that had been stocked during the first phase but had subsequently flooded were also to be restocked (see subsequent changes section below). A timetable for stocking and restocking was agreed and this is shown in Appendix V. Again, Pak Bor were to supply fingerlings of 3-5 cm and transportation and mortality to be recorded as in the first phase. Some adjustments in the timetable were required due to the availability of transportation and fingerlings but all waterbodies were stocked within the timetabled period.

Subsequent changes to the stocking programme

During the first phase the only problems that were encountered involved the supply of fingerlings. The fingerlings were less than the desired size of 3-5 cm. In addition, Pak Bor were unable to supply sufficient tilapia fingerlings and the numbers were made up from supplies from independent producers.

Between the end of the first stocking phase and the beginning of the second, a number of the waterbodies that had been stocked in the first phase flooded. A list of these waterbodies is shown below in Table 1. It was decided that the flooded waterbodies should be restocked during the second stocking phase with the same species as previously but at 50% of the original stocking density. It was decided to do this as fish may have been lost during the flooding and villages may have decided not to continue to manage the waterbodies.

Table 1. Villages requiring restocking during the second stocking phase due to flooding.

Village name	District	Waterbody name
Kong Knak	Sonbuli	Khoud Kong Knak
Xieng Hom	Sonbuli	Nong Bua
Xieng Hom	Sonbuli	Khoud Nong Bua
Bung Xe	Saybouli	Bung Pai
Na Khu	Outhomphone	Nong Sim
Keng Lek	Yomalad	Nong Seng
Keng Lek	Yomalad	Huay Feng

During the second stocking phase Pak Bor were unable to provide sufficient fingerlings for the stocking and restocking programme. The majority of the fingerlings needed had to be supplied by local independent producers (tilapia) or from independent producers in Thailand (carp species and tilapia). These fish were supplied to Pak Bor who then counted and packed the fish for transportation. Again, as with the first phase, some of the fingerlings, particularly the tilapia, were less than the desired size. Despite the problems with supply the stocking and restocking were both completed.

In one village, Kang Phosy in Sonbuli district, there was a problem with the waterbody being very dry and the fish were instead stocked in Nong Khe waterbody, a larger waterbody that had not previously been surveyed. This may prove problematic later in the project but the village administration believed that this waterbody would be managed as a community fishery.

Evaluation of the programme

The stocking and restocking programme was successful in stocking all the waterbodies in the study with the required number of fish at the required time, with the exception of Kang Phosy village. While it had not been anticipated that restocking might be required, it proved possible to successfully incorporate this into the second phase. As far as the fingerlings are concerned, overall the mortalities experienced during transportation were low. While ensuring a supply of fingerlings at times proved difficult the fish were obtained in the end, though some of the fingerlings were less than the desired size. Ideally it would have been best for the experiment if all the fish used had been obtained from the same source but, as stated, this did not prove possible.

Conclusions

Overall, the stocking programme has been successfully completed and a number of waterbodies that had flooded since the first stocking phase were successfully restocked. This has meant that it is possible to conduct a replicated experiment to examine the performance of the stocked fish. Communities will now monitor and record catches from the stocked waterbodies that will provide information about the relative performance of the different species combinations (RDC Activity 8560). This information will be used to assess species performance in waterbodies of different productivity levels, based on the total phosphorous level in the waterbody.

Appendix I: Participating villages, waterbodies and proposed stocking date.

Village name	Waterbody	District	To be stocked
Keng lek	Nong song	Yomalad	June
Nong ping	Nong deng	Yomalad	June
Nong ping	Huay ki mou	Yomalad	June
Keng lek	Huay feng	Yomalad	June
Don Mak Ba	Huay kam boun	Xe Bahn Fai	June
Phon thad	Nong Kop	Xayaputong	June
Phon than	Nong hong hian tung	Xayaputong	June
Nong miang	Nong miang ngai	Thakek	October
Sing ta	Nong lam tuay	Songkhon	November
Ban kong kaen	Nong itu	Songkhon	June
Lo ha ko	Nong luum	Songkhon	June
Kong knak	Khoud kong knak	Sombuli	June
Dong boun	Nong kak het	Sombuli	October
Nha holuang	Nong tam nung	Sombuli	October
Xieng hong	Nong bua	Sombuli	June
Nong khu	Nong sim nua	Sombuli	June
Bung xiang	Nong bung xiang	Sombuli	June
Xieng hong	Khoud nong bua	Sombuli	June
Nong saphang	Nong sa ngai	Saybouli	June
Bung xe	Bung pai	Saybouli	June
Nong sa	Nong sa	Saybouli	June
Sanamxai	Nong pang	Outhomphone	June
Kang phosy	Nong kam yard	Outhomphone	June
Na khu	Nong sim	Outhomphone	June
Na khu	Nong hin	Outhomphone	June
Dong noi	Bung ngam	Outhomphone	June
Samphatvillai	Nong luum nung	Outhomphone	June
Nong deun	Nong bua	Khantabouli	June
Nong chang	Nong chang	Hinboun	October
Nong chang	Nong dom	Hinboun	October
Huay sai	Nong haeng	Champhon	July
Dong deng	Nong leung	Champhon	June
Pang haeng	Nong kam panay	Champhon	June
Buk tong	Nong Ybou	Champhon	June
Dong mi	Bung pi kang	Champhon	June
Nong hong	Nong hong	Champhon	June
Liamxai	Nong noi	Atsapanthong	June
Ho meung	Nong pa por	Atsapanthong	June

Appendix II: Design of the experimental stocking programme

Phosphate level	Village	Waterbody	District	stocking option	Number of fingerlings
high	Kong knak	Khoud kong knak	Sombuli	tilapia	15750
high	Sanamxai	Nong pang	Outhomphone	tilapia	2380
high	Huay sai	Nong haeng	Champhon	tilapia	6405
high	Dong deng	Nong leung	Champhon	tilapia	11900
high	Sing ta	Nong lam tuay	Songkhon	tilapia	10000
high	Nong chang	Nong chang	Hinboun	tilapia	14000
low	Pang haeng	Nong kam panay	Champhon	tilapia	1120
low	Nong miang	Nong miang ngai	Thakek	tilapia	26250
low	Buk tong	Nong Ybou	Champhon	tilapia	13475
low	Nong saphang	Nong sa ngai	Saybouli	tilapia	11340
low	Kang phosy	Nong kam yard	Outhomphone	tilapia	19180
low	Nong deun	Nong bua	Khantabouli	tilapia	21000
low	Keng lek	Nong song	Yomalad	tilapia	1750
high	Na khu	Nong sim	Outhomphone	carp	7945
high	Phon than	Nong hong hian tung	Xayaputong	carp	385
high	Nong ping	Nong deng	Yomalad	carp	2485
high	Dong boun	Nong kak het	Sombuli	carp	21000
high	Bung xe	Bung pai	Saybouli	carp	14000
high	Ban kong kaen	Nong itu	Songkhon	carp	5250
low	Liamxai	Nong noi	Atsapanthong	carp	4445
low	Nha holuang	Nong tam nung	Sombuli	carp	7000
low	Nong chang	Nong dom	Hinboun	carp	8750
low	Nong ping	Huay ki mou	Yomalad	carp	8750
low	Keng lek	Huay feng	Yomalad	carp	11200
low	Nong sa	Nong sa	Saybouli	carp	11830
high	Phon thad	Nong Kop	Xayaputong	both	1960
high	Xieng hong	Nong bua	Sombuli	both	6440
high	Nong khu	Nong sim nua	Sombuli	both	14000
high	Bung xiang	Nong bung xiang	Sombuli	both	24500
high	Xieng hong	Khoud nong bua	Sombuli	both	19180
high	Na khu	Nong hin	Outhomphone	both	7945
high	Don Mak Ba	Huay kam boun	Xe Bahn Fai	both	1225
low	Dong noi	Bung ngam	Outhomphone	both	16555
low	Samphatvillai	Nong luum nung	Outhomphone	both	3045
low	Ho meung	Nong pa por	Atsapanthong	both	2000
low	Lo ha ko	Nong luum	Songkhon	both	6370
low	Dong mi	Bung pi kang	Champhon	both	7000
low	Nong hong	Nong hong	Champhon	both	2000

Appendix III: Stocking mortalities recording form.

Stocking form

Village name	
District	
Waterbody name	
Date	
Monitoring period	
Enumerator	

1. Stocking

What time did stocking happen?

Species	no of fish	number dead
TOTAL		

Enumerator signature

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Provincial staff signature

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Appendix IV: Agreed timetable for the first phase of stocking, July 2000.

Day:	Monday	Tuesday	Wednesday	Thursday	Friday
Date:	3	4	5	6	7
Village:	Bung xiang	Bung xiang	Xieng hom	Xieng hom	Ban kong kaen
Waterbody:	Nong bung xiang	Nong bung xiang Kong knak Khoud kong knak	Khoud nong bua	Nong bua Nong khu Nong sim nua	Nong itu Lo ha ko Nong luum Pohn thad Nong kop Pohn than Nong hong hian tung

Day:	Monday	Tuesday	Wednesday	Thursday	Friday
Date:	10	11	12	13	14
Village:	Dong deng	Buk tong	Nong deun	Kang phosy	Na khu
Waterbody:	Nong leung Huay sai Nong haeng Nong hong Nong hong	Nong ybou Dong mi Bung pi kang	Nong bua	Nong kam yard	Nong hin Na khu Nong sim Samphatvillai Nong luum nung

Day:	Monday	Tuesday	Wednesday	Thursday	Friday
Date:	17	18	19	20	21
Village:	Sanamxai	Liamxai	Nong sa	Nong sa	
Waterbody:	Nong pang Dong noi Bung ngam	Nong noi Ho meung Nong pa por Pang haeng Nong kam panay	Nong sa Bung xe bung pai	Nong sa Nong saphang Nong sa ngai	

Appendix V: Agreed timetable for the second phase of stocking, November 2000

Shaded sections indicate waterbodies being restocked.

Day:	Monday	Tuesday	Wednesday	Thursday	Friday
Date:	6	7	8	9	10
Village:				Keng Lek	Nong Chang
Waterbody:				Huay Feng	Nong Chang
				Keng Lek	Nong Chang
				Nong seng	Nong Dom

Day:	Monday	Tuesday	Wednesday	Thursday	Friday
Date:	13	14	15	16	17
Village:	Bung Xe	Dong Boun	Kong Knak	Nha Khu	
Waterbody:	Bung Pai	Nong Kak Het	Khoud Knak	Kong Nong Sim	
	Nong Miang	Nha Holuang	Xieng Hom		
	Nong Miang Ngai	Nong Tam Nung	Nong Bua		
			Xieng Hom		
			Khoud Nong Bua		