Small-Scale Aquaculture Program
AwF-Nepal: Phase II

First Year Report
(April 1, 2010 – March 31, 2011)

Prepared by:

Dr Ram C Bhujel
Asian Institute of Technology (AIT), Thailand

Dr Madhav K Shrestha
Institute of Agriculture and Animal Sciences (IAAS), Chitwan, Nepal

March 2011

1. Executive Summary

This report is the summary of activities and outcomes of the AwF-Nepal Project Phase II accomplished during the first year of the project period (April 2010 – March 2011). A total of 49 families were supported by forming three women's groups of 20, 15 and 14 respectively in two districts; namely, Gorkha (Putlikhet) and Lamjung (Chakratirtha and Dhamilikuwa). This phase of the project is expansion of the AwF-Nepal Phase I project which was launched in Rainas Tar, Lamjung. During the first of this phase, 49 ponds have been newly constructed and a total of 1,275 kg fish (valued at about US$3,600) was produced from the total pond area of 2.58 ha). This project shows that small family ponds, of average size of less than 100 m^2 can produce over 40 kg fish (e.g. Gorkha) in a production cycle of about 8 months. Total production from Gorkha was more than double compared to Chakratirtha and more than three folds as compared to Dhamilikuwa. Families have consumed fish quite high proportion of their produce, e.g. in Chakratirtha, it was nearly 90% where as in other locations; consumption was at least 60%. Mean fish consumption per family ranged from 5.6 kg in Dhamilikuwa up to 25.8 kg in Gorkha. It clearly showed that significant increase in production and consumption is possible by launching small-scale aquaculture. Within a year increase in fish consumption around 10 kg per capita after sale (assuming 4 members in the family) whereas national average is less than 2kg (over 500% times). As one of the objectives of the project is to supply animal protein to the family, it shows a good potential to fight against malnutrition. However, it depends on the management. Production can be a small fraction of that level if the ponds are not managed properly. For example, Dhamilikuwa had only 8.2 kg per family.

Another important aspect is income generated from the sales of surplus fish. By selling fish, the families in Gorkha earned in an average of about 2,600 NRs(=US$) /family which more than adequate for their two children to support for their education. In addition to producing animal protein to the family, small-scale aquaculture has a potential to supplement family income. In conclusion, the project has been successful in fulfilling the objectives; therefore it should be expanded to nearby districts and if possible throughout the country as a national campaign.

Table of Contents

1. **Executive Summary** ---------- **2**
2. **Introduction** ---------- **4**
3. **Project Implementation** ---------- **5**
4. **Results / outcomes** ---------- **10**
5. **Conclusion and recommendations** ---------- **14**
6. **Plan for Project Expansion (Year II)** ---------- **15**
7. **Appendices** ---------- **17**

2. Introduction

Current project is the scale-up program of the project extended to two additional villages (Sites 1 and 2) in the same district Lamjung and eastern district i.e. Gorkha as shown in the Fig. 1. All the project locations are in the mid-hills near the Annapurna range. This AwF funded small-scale aquaculture program in mid-hills of Nepal started in Rainas Tar, Lamjung, Nepal in 2008. The project has been implemented by the Institute of Agriculture and Animal Science (IAAS) in cooperation with the Asian Institute of Technology (AIT, Thailand) and local organizations and individuals.

Main objectives of the project are to improve rural food security, supply animal protein and generate supplemental income through small-scale aquaculture by empowering women using the AwF-Nepal project as model for rural communities in Nepal. Specific objectives of the proposed project include:

- to expand small-scale aquaculture to other parts of the district
- to expand small-scale aquaculture to other districts
- to test and further improve the productivity and efficiency of AwF-Nepal model of small-scale aquaculture
  to assist women's fish farming groups to develop as "cooperatives" so that they can carry on their activities and also further expand fish farming by themselves.
- to disseminate the project idea as widely as possible throughout the country

This report covers the activities accomplished and the outcomes achieved during the first year of the AwF-Nepal project (Phase II).

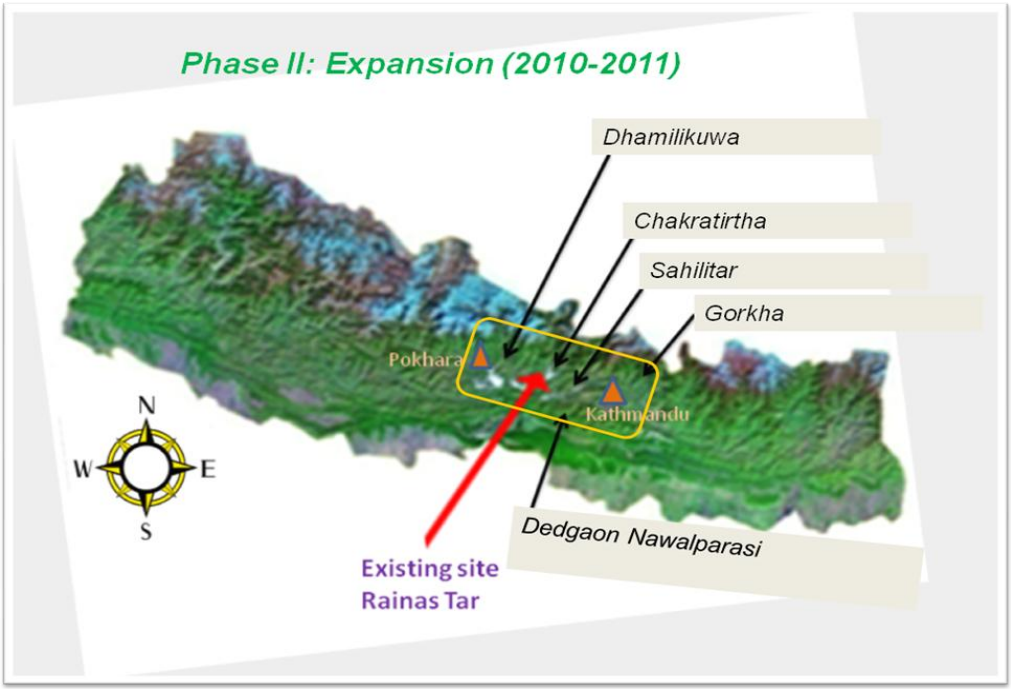

Fig. 1 Expansion of AwF Project in mid-hills of Nepal from its original site of Rainastar

3. Project Implementation

a. Project Initiation

The AwF Nepal, Phase II project was initiated by a paying a visit during April 12-14, 2010 when Dr Ram C. Bhujel was on a mission trip to Nepal for EU Aqua-Internship program. Detailed activities have been given in "Project Initiation Report available at http://www.aquaculturewithoutfrontiers.org/projects/. Basic framework mentioned in the report prepared by Dr Ram C. Bhujel and Dr Madhav Shrestha on 12th April 2010 at IAAS remained the same except some modifications, for examples changes are highlighted:

1. There is no change in the role of Dr Ram C Bhujel who liaises with AwF authorities and writes report.
2. As planned, the project has been hosted by IAAS, Chitwan, Nepal and Dr Madhav Shrestha has served as Technical Advisor / Country Coordinator or PI for the host institution, IAAS.
3. Hare Ram Devkota who served as overall Field Coordinator has now joined Nepal Agriculture Research Council. His responsibility has been given to Mr Khagaraj Nakhola who is the Chair of the Fish Growers Association.
4. The RDC, Mr Babu Ram Chiluwal is responsible for RDC, Rainas Tar/Dhamilikuwa (previous AwF farmers and also one new group); however, because of request from farmers, this area has also been given to Mr Krishna Raj Pandey. He is also responsible for the group in Putlikhet, Gorakha (Site 3) where farmers have got extremely results.
5. Agni Nepal together with Dr Madhav Shrestha and Jiyan Chaudhary is taking responsibility of Dedgaon, Nawal Parasi (Site 5). These sites were left to be initiated in Year II.

The following was the visit schedule for project initiation at the community level:

- Dhamilikuwa was on April 12, 2010 (Ram Bhujel, Hareram, Krishna Pandey and Khagaraj Nakhola)
- Chakaratirtha village on April 13, 2010 (Ram Bhujel, Hareram, Krishna Pandey and Khagaraj Nakhola)
- Gorkha (Putlikhet) on April 13, 2010 (Ram Bhujel, Hare Ram, Krishna Pandey)

b. Women's training

A total of 15 enthusiastic women from Chakratirtha Village were gathered for one-day training in Sharada Lower Secondary School on November 4, 2011. Mr Hare Ram Devkota, Nabin Khanal (MS graduates in Aquaculture of IAAS were the main trainers. Mr Kishor Pant (Chief) and Kul Prasad Adhikary from District Agriculture Development Office were also present. Mr Pant also gave the benefits of working in group and as cooperative. During the training Prof Peter Edwards (AIT, Thailand) was present together with Dr Ram Bhujel. Both of them highlighted the importance of small-scale aquaculture and described the situations in other countries such as Bangladesh, Thailand, Vietnam and other countries encouraging them to move forward in group.

Similar training was also conducted to the women of Gorkha at Khoplang village in Gorkha on November 3, 2011. Twenty women received training. Resource persons were same as in Chakratirtha, Lamjung. Training manuals were supplied to the participants on both sites during the training.

Fig 2. Training of women: Prof Peter Edwards (fourth from the left) at the back row, next to him is Kishor Pant (the Chief District Agriculture Office) and Dr Ram Bhujel far right.

Fig 3. Kids in the Library Room using the books and materials provided by the project.

c. Visit of Peter Edwards

Ram organized a trip to visit AwF project site taking an opportunity of having EU project at IAAS. Prof Peter Edwards also joined the trip, who was also requested to visit AwF project site and prepare one-page report. The visit was organized on November 4, 2010. On the same day, 15 women's group was having training. As seen in the Fig 2 at the back, he gave a brief speech (translated by Ram) to the trainee women. The training was organized at a Primary School which received some supports from the project. The School Headmaster (Mr Mohan Shrestha) and other teachers showed the books and other teaching materials for science and other subjects which have been stored in a room in a newly built Library building. The Library Building was built by the 'Room-to-Read (www.roomtoread.org)' an international NGO. Kids (Fig 3) and the staff seem to be happy with the support. Afterwards, Peter visited the old farmers of first phase of the AwF project site of Rainas Tar. He visited about 10 family ponds.

d. Involvement of District Agriculture Development Office (DADO), Lamjung

Ram together with Local Coordinators visited the District Agriculture Development Office (DADO), Lamjung on April 14, 2010 to discuss about the possible collaborations. The Chief of the DADO, Mr Kishore Pant (Chief) and Kul Prashad Adhikari (Subject Matter Specialist) provided the brief overview of the agriculture situation in the district and also highlighted the need of commercialization of agriculture. It was mentioned that the purpose of visit was to discuss about the possibility of scaling-up of the aquaculture program in the whole district. More importantly, DADO as a government authority, was asked to get involved more and also be ready to take a responsibility of continuing the program after the AwF project beyond the project period. According to Mr Pant Fish farming has been one of the interests of the office because of AwF program and his staff are assessing the possible areas. The chief also mentioned he has a policy and plan of agriculture commercialization under which 5-6 fish AwF farmers to make a move towards commercialization so that others will also follow the same. Hopefully, production can be increased. Similarly, it was also mentioned that hatchery establishment for on-site seed production and also transport of fry from government stations for the farmers in groups can be supported/facilitated. Mr Pant and his colleague were present during the training when Peter visited the site. It indicates there are continuous supports from the DADO to the AwF project and its farmers. Hopefully, the farmers would not be left out after AwF project ceases its supports leaving to other districts.

A 2-day workshop was organized at District Agriculture Development Office, Besisahar, Lamjung on February 9-10, 2011 with an objective to discuss on the possibilities, opportunities and constraints of fish farming in hills and lower mountainous areas of Lamjung district. Dr Madhav Shrestha from IAAS presented a working paper. Workshop was attended by 42 participants. Participants were farmers interested for fish farming, representatives from NGOs based in Lamjung, District

Agriculture Development officials and the Chief of the Lamjung Campus, a satellite college of IAAS, Rampur. The workshop was organized by District Fish Farmer's Association (DFFA) of Lamjung and sponsored jointly by District Agriculture Development Office (DADO) of the same district and Institute of Agriculture and Animal Science, Rampur Chitwan. The workshop came out with the district fish farming program planning for the coming year. DFFA Lamjung has planned to publish a Calendar for Nepali Year 2068 with information on fish farming for publicity purpose.

e. Visit to Chakratirtha VDC, Lamjung

Ram visited the village on 5th November 2010 including that of Mr Laxmi Bhatta who is facilitating the project activities including forming the women's group, training them and others. Most of the ponds visited had very green water. One of the farmers had water leakage problem because of presence of gravel at the bottom of pond. Similarly, Mr Bhatta and his relatives showed problems of snake, and swimming water bug which attacks fish.

f. Meeting with Rainas Tar Development Committee (RDC) Officials

After completion of the meeting in Chakratirtha VDC, the Project Team (4 persons) observed more than 20 fish ponds constructed under the AwF-Nepal Phase I. Families were met and discussed about their experience of farming fish. Almost all of them expressed that they are benefitting from fish farming and there was indications that they will continue in long term basis, as most of the ponds are next to their houses (Fig. 4) which can be taken care of easily. For example, some farmers are already moving towards commercially integrated farming. Several farmers which we visited have bigger ponds than average and some farmers have small ponds with pig sheds. One of the remarkable progresses was seen common carp farming in paddy filed.

Fig. 4 Ponds are built close to house so that they can through left over kitchen food, direct urine from animal shed, grow vegetables on the dike or nearby and use water to irrigate, and safeguard their ponds even during night.

g. Fund Raising

Sales of the T-shirts (Fig. 5) donated by Ram and his wife, Sukanya has raised about US$960 so far which will be continued. Ram sold about half of the T-shirts during the World Aquaculture conference September 13-15, 2010 in Phuket, Thailand organized by FAO/NACA. Some of the members of the Board of Directors helped by purchasing 10 each.

All the funds generated from the sales of the T-shirts with AwF logo will be spent for the expansion of the project activities in nearby districts which will be decided later.

The information about the T-shirt, booking and on-line payment can be found at the link below: http://www.see-thailand.com/whcove.html

Fig. 5 AwF-T shirts for fund raising (Price US$30

4. Results / outcomes

Table 1 and Figure 6&7 show the outcomes of the AwF project during the first year (Phase II). A total of 49 families were supported during the first year by forming three women's groups (Appendices 1-3) of 20, 15 and 14 respectively in Putlikhet of Gorkha and Chakratirtha and Dhamilikuwa of Lamjung districts. Total fish production (first crop of about 8 months' period) from the three villages was about 1,275 kg (valued at about US$3,600) produced from the pond area of 2.58 ha (Table 1). Size of ponds varied from 12 m^2 up to 225 m^2.

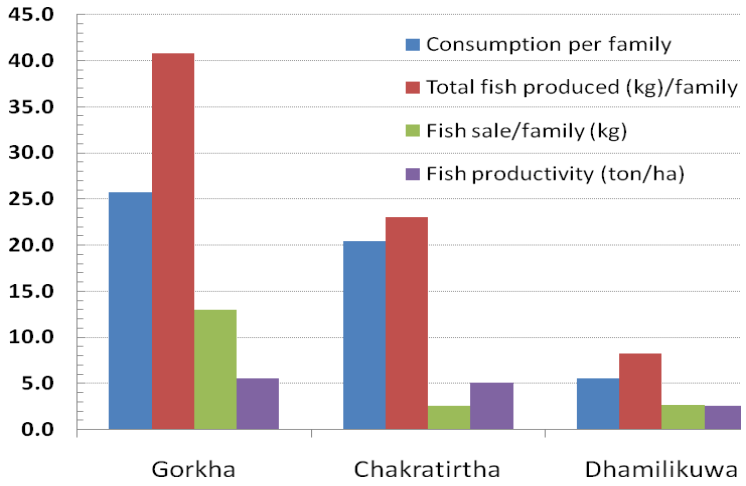

Fig 6 Fish production, consumption and sales in three project sites

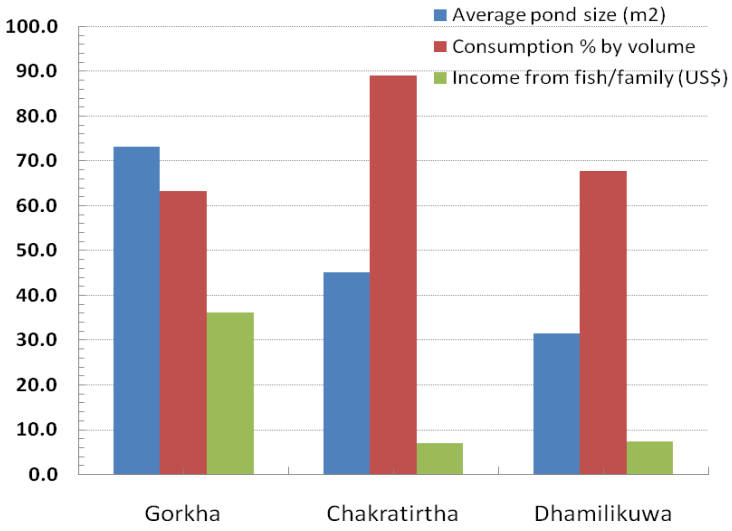

Fig 7 Fish production, consumption and sales in three project sites

This shows that small ponds can produce up over 40 kg fish (e.g. Gorkha) in a production cycle of about 8 months. Pond size varied with the location. Farmers of Gorkha (73 m^2) had more than double than that of from Dhamilikuwa (32 m^2), whereas pond size of Chakratirtha (45m^2) was not significantly different either of the above. Based on the size of ponds, number of fish stocked and the harvest weight varied accordingly. Farmers in Gorkha stocked more fish than in Chakratirtha and Dhamilikuwa probably because of shortage of finglerlings in the latter two locations. Total production of fish per family in Gorkha (40.8kg) was almost double as compared to Chakratirtha (23 kg) and about five times of Dhamilikuwa (8.2kg). Extrapolated pond productivity (ton/ha) was almost double in Gorkha (6.4 ton/ha) and Chakratirtha (5.5) villages compared to Dhamilikuwa.

Mean fish consumption per family was only 5.6 kg in Dhamilikuwa whereas it was 20.5 kg in Chakratirtha village which was still significantly lower than that of Gorkha (25.8 kg). Sales of fish per family were significantly higher in Gorkha (13 kg) as compared to other two villages where sales were only 3 kg each. This shows Chakratirtha village consumed larger portion of its production (89%) compared to the other locations. It is obvious because most families residing there are ethnic fishermen' families. The percentage of consumption in those two locations; Gorkha and Dhamilikuwa are still quite high 63% and 68% respectively. The figures clearly emphasize the importance of small-aquaculture in supplying animal protein to the family. Although, the level of income generation was nominal, by selling fish, the families in Gorkha earned about 2,600 NRs (=US$36) per family which is more than 5 times higher as compared to the incomes generated in other two villages (NRs500 =US$7 per family).

Table 1 Summary of results: AwF Project Phase II - Year I (April 2010 – March 2011)

	Villages / clusters			**Total**
	Gorkha	Chakratirtha	Dhamilikuwa	
No. of farmers	20	15	14	49
Total pond area (m^2)	1,462	677	441	2,580
Average pond size (m^2)	**73^{a}**	**45^{ab}**	**29.2^{b}**	**52**
Fish production (by volume)				-
Family consumption (kg)	515^{a}	307^{b}	78^{c}	900
Consumption % by volume	63%	89%	68%	
Consumption per family	25.8^{a}	20.5^{b}	5.6^{c}	
Total fish sale/family (kg)	13^{a}	2.5^{b}	2.6^{b}	
Average production (kg)/family	40.8^{a}	23.0^{b}	8.2^{c}	
Total fish produced (kg)	**815^{a}**	**345^{b}**	**115^{c}**	**1,275**
Fish productivity (ton/ha)	**6.4**	**5.5**	**3.2**	
Value of fish				
Value of fish consumed (NRs)	103,000	61,400	15,600	180,000
Value of fish sold (NRs)	52,000	7,600	7,400	67,000
Income (NRs)/family	2,600^{a}	507^{b}	529^{b}	
Income from fish/family (US$)	36^{a}	7^{b}	7^{b}	
Total (US$)	2,296	972	324	**3,592**

In general, correlation analysis (Fig 8) showed that amount of fish harvest is linearly increased with the increase in pond size. Similarly, income from fish sale increased exponentially (Fig. 9) with the increase in pond size. However, productivity was did not show any association with the pond size. At the same time, fish consumption is not relation with the size of ponds.

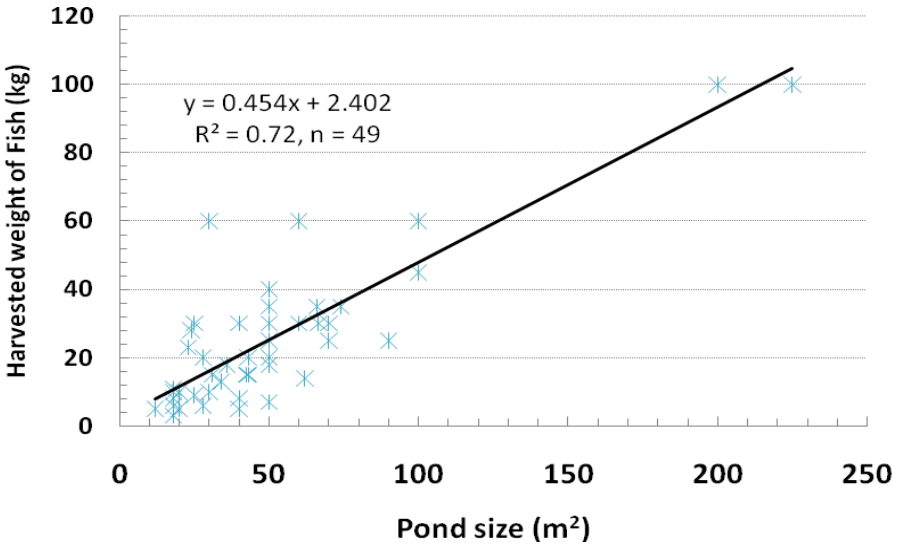

Fig 8 Relationship between the total fish production with pond size

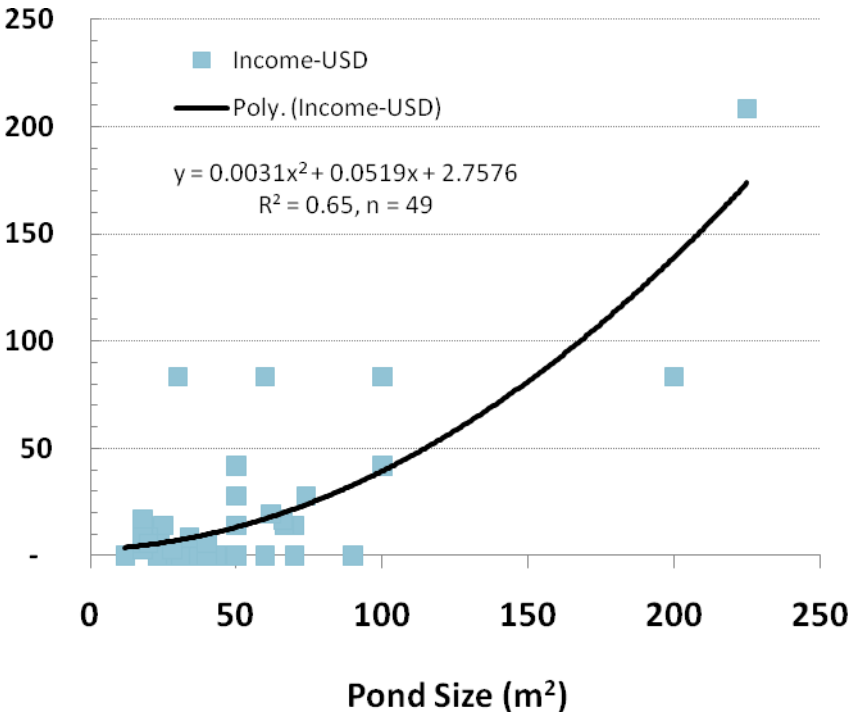

Fig. 9 Relationship between the income and pond size

Fig 10 Pond under construction (in Rainas Tar, Lamjung) belongs to an entrepreneur (Mr Madhav Parajuli). Taking loan from a bank he plans to integrate fish farming with his brick kiln and restaurant as his family occupation.

5. Conclusion and recommendations

Results of this project clearly showed that significant increase in consumption to around 10 kg per capita (assuming 4 members in the family) where national average is less than 2kg (over 500% times) is possible by launching small-scale aquaculture in within a year. Fish can play a significant role in meeting the needs of animal protein as evident by the consumption of over 60% of their produce, and in a village it was nearly 90%. As one of the objectives of the project is to supply animal protein to the family, it shows a good potential to fight against malnutrition. However, it depends on the management. Production can be very poor if the ponds are not managed properly. For example, Dhamilikuwa had only 8.2 kg per family which was almost one-fifth of Gorkha. As Gorkha is new location and farmers are with full of energy whereas farmers in Dhamilikuwa under this project phase seem to be less enthusiastic as enthusiastic farmers were already in the first phase who achieved the similar level of production as in Gorkha. Better production has been achieved form the ponds which are close to animal shed from where animal urine is drained to pond have extremely good productions and farmers are very happy and planning to add more ponds.

There are some signs of adoption by other people in the project site as a result of awareness about the fish farming. Some farmers have integrated fish pond with pigs, vegetables and other animals. A typical example of integration of fish farming with restaurant and brick kiln has been found. Pits made from digging for mud to make bricks can be added advantage as these could serve as fish ponds. More reports are still to gather, at least an entrepreneur in Rainas Tar has already started restaurant-brick kiln-fish integrated project (Fig. 10).

However, the project has encountered some problems. Amongst them the shortage of fingerlings is critical. Farmers are using mix-sex tilapia as a solution as tilapia breeds itself in the ponds they stock. Attempts have been made to establish a hatchery in the region. If the shortage of fingerlings continues it may lead to abandonment of the ponds they have constructed over the last few years. Possibly, training to 2-3 farmers in hatchery operation would be very helpful as hatchery(ies) could play a significant role for the expansion of aquaculture in terms of area coverage as well as enhancement in the productivity in the district as well as in the surrounding areas. Another challenge is how these farmers can be moved towards more commercial farming. Although the government i.e. District Agriculture Development Office is supportive on this aspect, they do not have expertise, nor they have adequate financial resources to directly support few pilot farmers. One of the ways might be approaching some local banks for the provision of micro-finance and requesting them to hire an enterprise development technical officer. Farmers are still facing some minor problems such as snake and water bug as in the past project period.

6. Plan for Project Expansion (Year II)

a. Expansion in Lamjung

Farmers of the further north from one of the project locations of Lamjung district i.e. Chakratirtha Village showed keen interest in being the part of the project. The AwF Team has decided to work with PASS-Nepal (People's Awareness and Social Service Center), a local NGO which is headed by retired Head Master of the Secondary school of the area Mr. Prem Prasad Pokhrel as Coordinator. This NGO is working in 24 Village Development Committees (VDCs) of Lamjung district. They have assisted the community with dairy and building public toilets, and want to include small-scale aquaculture as one of their discipline. Upper part of Chakratirtha village will be covered and then expanding further north to Borang Khola which lie along the upstream of the Chepe River. This will provide an opportunity of testing aquaculture in further higher elevations. After launching project in this area a large part of the Lamjung district will have project impacts, especially south-east part of the district which was affected by political conflicts in the past. Nearly 100 people have died during the conflicts from this part of the district. For the second year, total number of farmers expected to be included for project support is 31; 20 in Borang Khola Village (as new group) and 11 in upper Chakratirtha (the remaining number from lower Chakratirtha (5) and Dhamilikuwa (6) to make up 20 per group.

b. Expansion in Dedgaon, Nawalparasi

A site in Nawalparasi district has been selected and prepared. A list of 16 farmers (Table 2) has already been collected who will culture fish by forming a group. These farmers are ready to dig ponds. The site was visited by Dr Madhav Shsrestha, Mr Jiyan Chaudhary (Community Leader of the Kathar Village) and Mr Agni Nepal (Aquaculturist, Nepal Agriculture Research Council) who will be supervising this site. Sixteen 50 m^2 ponds are under construction with the hope that they will be supported by the second year of the AwF project. Training with fish fry stocking of common carp and Nile tilapia will be done from mid of April.

Table 2 List of farmers in Dedgaon, NawalParasi

SN	**Farmers**	SN	**Farmers**
1	Rameshswor Bohora	9	Ganga Ram Rana Magar
2	Hum Bahadur Thada	10	Dhani Ram Rana magar
3	Maniram Rana Magar	11	Arjun Bohara
4	Bhanu Maya BK	12	Mahendra Bohara
5	Man Bahadur Nepali	13	Jyoti Bohara
6	Rup Bahadur BK	14	Tirtha Kumari Bohara
7	Lal Bahadur Nepali	15	Khadga Bahadur Saru
8	Lopisara BK	16	Tirtha Kumari Rana Magar

c. Other activities

Attempts will be made to publicize the project activities through publication of project reports and mass media such as FM radio, TV programs and so on.

Attempts will also be made in bidding proposals from larger donors with the aim of expansion of the project throughout the country.

7. Appendices

Appendix 1. List of farmers in Gorkha District

							Production		Consumption		Sale		
SN	**Farmer**	**Pond Area**	**Aid**	**Farmers contribute**	**Support (NRs.)**	**Stocked (no.)**	**No.**	**wt (kg)**	**No.**	**wt (kg)**	**No.**	**wt (kg)**	**Remarks**
1	Kalpana Khanal	225	175	50	2,240	600	400	100	100	25	300	75	
2	Sabina Luitel	30		30	1,344	400	200	60	100	30	100	30	Rice fish
3	Mina Bk	70	20	50	2,240	200	90	25	70	20	20	5	
4	Ruk Kumari Luitel	100		50	2,240	400	250	45	90	30	60	15	Remaining 50 fish
5	Mina Maya Luitel	50	0	50	2,240	200	100	35	100	35			
6	Nimala Bhujel	50	0	50	2,240	200	150	40	100	25	50	15	
7	Mina Devi Luitel	70	20	50	2,240	200	100	30	100	30			
8	Kalpana Devkota	40		40	1,792	160	100	30	100	30			
9	Indira Neupane	25		25	1,120	100	80	30	80	30			
10	Shusila Dhakal	12		12	538	200	20	5	20	5			Rice fish
11	Parbati Shreatha	30		50	2,240	120	40	10	40	10			
12	Basanti Neupane	100	50	50	2,240	300	200	60	100	30	100	30	
13	Juna Devi Khatri	50	0	50	2,240	200	90	25	90	25			
14	Uma Devi Shah	60	10	50	2,240	200	100	30	100	30			
15	Rabina Neupane	90	40	50	2,240	300	100	25	100	25			
16	Nar Maya Lama	200	150	50	2,240	600	400	100	100	30	100	30	Remaining 200 fish
17	Tika D. Shreatha	50	0	50	2,240	100	60	20	60	20			
18	Bimala Acharya	50	0	50	2,240	200	80	25	80	25			
19	Dhan K Bhattarai	60	10	50	2,240	250	200	60	100	30	100	30	
20	Sun Maya Thapa	100	50	50	2,240	300	200	60	100	30	100	30	
	T0tal	1462				5230	2960	815	1730	515	930	260	
	Average	73				262	148	41	87	26	103	29	
	Min	12				100	20	5	20	5	20	5	
	Max	225				600	400	100	100	35	300	75	

Appendix 2. List of farmers in Chakratirtha, Lamjung District

							Production		Consumption		Sale		
SN	Farmer	Pond Area	Subsides Area	Farmer' contribution	Support (NRs)	No.	No.	wt (kg)	No.	wt (kg)	No.	wt (kg)	Remarks
21	Usha Bhatta	66.5	16	50	2,240	150	80	30	68	25	12	5	20 tilapia +130 common
22	Narayani Bhatta	42.5		43	1,926	120	65	15	65	15			20 tilapia +100 common
23	Bishnu M Shrestha	74	24	24	1,075	170	110	35	80	25	30	10	20+150
24	Dhan Maya Kumal	50	0	50	2,240	150	100	18	100	18			50+100
25	Indra Kala Kumal	28		28	1,254	80	50	20	50	20			20+60
26	Pakuli Kumal	36		36	1,613	90	60	18	60	18			20+70
27	Mithimaya Kumal	50	0	50	2,240	120	70	25	50	20	20	5	20+100
28	Uttam Kumari Kumal	43		43	1,926	110	40	15	40	15			20+90
29	Sharada Khanal	66	16	50	2,240	150	90	35	70	29	20	6	20+130
30	Chija Pariyar	31		31	1,389	110	60	15	60	15			20+90
31	Ganga Kumal	43		43	1,926	110	70	20	70	20			20+90
32	Tan Maya Kumal	50	0	50	2,240	120	55	18	55	18			20+100
33	Prasamsha Kadariya	50	0	50	2,240	150	100	30	70	20	30	10	50+100
34	Inira Bakhrel	24				110	70	28	4	26	6	2	50+60
35	Saraswoti Devkota	23				110	50	23	50	23			20+90
	T0tal	677	56	548	24,549	1850	1070	345	892	307	118	38	
	Average	45	8	42	1,888	123	71	23	59	20	20	6	
	Min	23	0	24	1,075	80	40	15	4	15	6	2	
	Max	74	24	50	2,240	170	110	35	100	29	30	10	

Appendix 3. List of farmers in Dhamilikuwa, Lamjung District.

						Production		Consumption		Sale	
SN	**Farmer**	**Pond Area**	**Support**	**No.**	**No.**	**wt (kg)**	**No.**	**wt (kg)**	**No.**	**wt (kg)**	**Remarks**
36	Januka Bistha	18	810	44	25	6	15	4	10	2	4 tilapia + 40 common
37	Sabitri Bistha	18	810	44	25	10	10	4	15	6	4+40
38	Hira Pandey	25	1,125	44	25	9	11	4	14	5	4+40
39	Bhaktta Kumari Pandey	34	1,530	130	27	13	21	10	6	3	10+120
40	Laxmi Devi Chiluwal	40	1,800	34	20	5	20	5			4+30
41	Ishowori Thapa	40	1,800	56	23	8	19	6	4	2	6+50
42	Bhagirathi Devkota	50	2,250	54	30	7	30	7			4+50
43	Bimala Bk	18	810	44	11	3	7	2	4	1	4+40
44	Ishowori Chiluwal	20	900	76	30	10	20	7	10	3	6+70
45	Hasta B. Tamang	18	810	55	25	8	18	6	7	2	5+50
46	Bhagawati Chiluwal	28	1,260	55	19	6	16	5	3	1	5+50
47	Pramila Nakhola	62	2,790	67	28	14	15	7	13	7	7+60
48	Purnimaya BK	18	810	44	29	11	19	8	10	3	4+40
49	Sri Kumari Tamang	20	900	44	14	5	8	3	6	2	
50	Sita Pandey	32	1,440								
	Total	441	19,845	791	331	115	229	78	102	37	
	Average	29	1,323	57	24	8	16	6	9	3	
	Max	62	2,790	130	30	14	30	10	15	7	
	Min	18	810	34	11	3	7	2	3	1	