EGYTIAN INTERNATIONAL CENTER FOR AGRICULTURE

EICA

WARM WATER FISH PRODUCTION TRAINING COURSE

2012

AQUACULTURE PROJECT

Establishment of a Private Fish Hatchery for Nile tilapia and African catfish in Mparambo, Burundi)

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This project is the outcome of a group efforts to whom credit and technical responsibility go. This project is based on an assignment which was given to course participants and supervised by Dr. Abdel Rahman El Gamal as a part of "Warm Water Fish Production Training Course". This annual course is organized by EICA and JICA. The names, countries and pictures of the team members who developed this project are shown in the subsequent slide

2012

Sponsored by :

Japan International Cooperation Agency

and

The Egyptian Fund for Technical Cooperation with Africa (EFTCA)

Group Picture (UAAP)

Burundi

Cameroon

Malawi

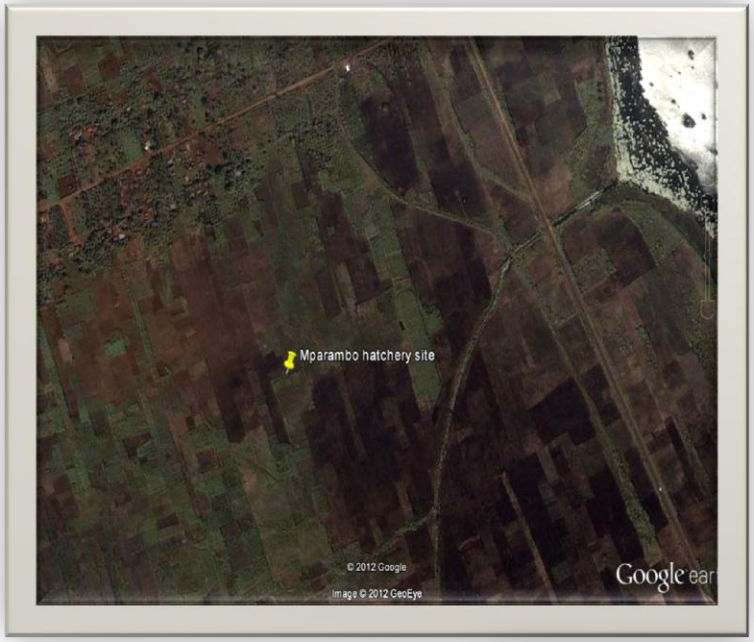
Sudan

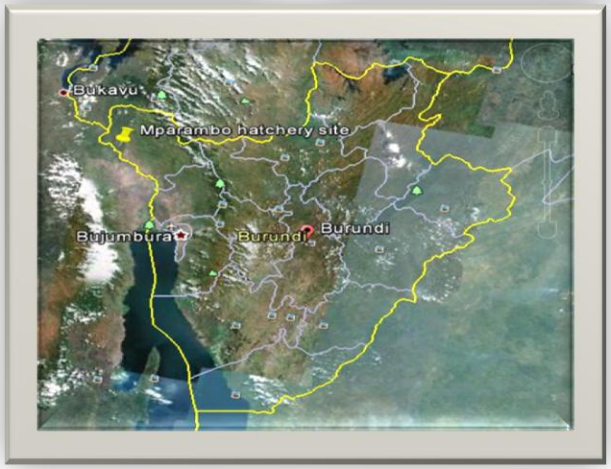
Ghana

Project Profile

- Project name: Establishment of a private fish hatchery
- Location: Mparambo, Cibitoke province, Burundi
- Owners: United Africa Aquaculture Partners (UAAP)
- Source of funding: Equity contributions
- Project cost: 16,099.00 US Dollar
- Total project cost: 16,420.98 USD
- Projected annual production: 280,000 fingerlings from with 196,000 sex reversed all-male tilapia and 84,000 catfish.

Satellite location of the project area





Executive Summary

- Burundi is a small country with a population of about 8,691,005 million (2008 census) and a total land area of 27, 834 km^2. Most of the fisheries resources are from the declining stocks from capture fisheries which are currently at 12,069 metric tons (2011)
- The percentage protein intake from fish and fisheries resources is very low with per capita consumption of about 2 kg/year which is far below the recommended 18kg/year. (FAO)

Executive Summary continued

- Studies show that there is high demand for fish but this is being crippled by the unavailability of resources to the consumers. Aquaculture is therefore being recognized as the only reliable means of bridging the gap of declining fisheries resources
- In order to achieve this objective it is hoped that a private hatchery be established to supply quality fingerlings to farmers. It is against this background that the United Africa Aquaculture Partners (UAAP) decided to establish a fish hatchery at Mparambo in Rugombo Commune

Introduction

- The project is to establish a private fish hatchery on 1ha land at Mparambo, Cibitoke Province, in the north west of Burundi
- The site of the project is close to the lake Dogodogo and a stream from the lake will permanently supply water to the hatchery
- At Mparambo temperature ranges between 22-32°C all year long which is suitable for production of tilapia and catfish fingerlings

Objectives

General objective

- To produce good quality and quantity of fingerlings at affordable price to the fish farming communities to bust aquaculture development

Specific objectives

- To produce quality fingerling in abundance
- To supply fish seed to fish farmers at affordable price
- To promote aquaculture development

Project Outcomes

- Fish production increased
- Per capital consumption of fish increased
- Nutritional status of individual household improved
- Food security for sustainable livelihood improved

Justification

- The investment is in response to the lack of good quality and quantity of tilapia and catfish fingerlings with the growing interest of people to farm fish especially in Cibitoke
- The total pond area in Cibitoke and his neighbor provinces Kanyanza, Bubanza and Bujumbura is about 50,000m^2
- Considering that each farmer stocks twice a year (two production cycles) at a stocking rate of 3 fingerlings/m^2 the 300,000 fingerlings will be required every year

Justification continued

- As this hatchery will be the first one in the country, additional demand by farmers out the targeted hatchery area must be considered
- The hatchery location is on a strategic place, close to the source of broodstock and good quality water (Lake Dogodogo), near a national road, at 70 km from the capital city Bujumbura

Species and production technology

- The hatchery will produce Nile tilapia (*Oreochromis niloticus*) and African catfish (*Clarias gariepinus*) fingerlings by natural spawning.

Species and production technology cont'd

- The total planned number of broodstock to be maintained is 108 for Nile tilapia at sex ratio of 1m:2f; and for catfish, 12 At a sex ratio of 1:1
- The total annual production is 280,000 fingerlings: 196,000 Nile tilapia fingerlings and 84,000 *Clarias gariepinus* fingerlings

Pond Design

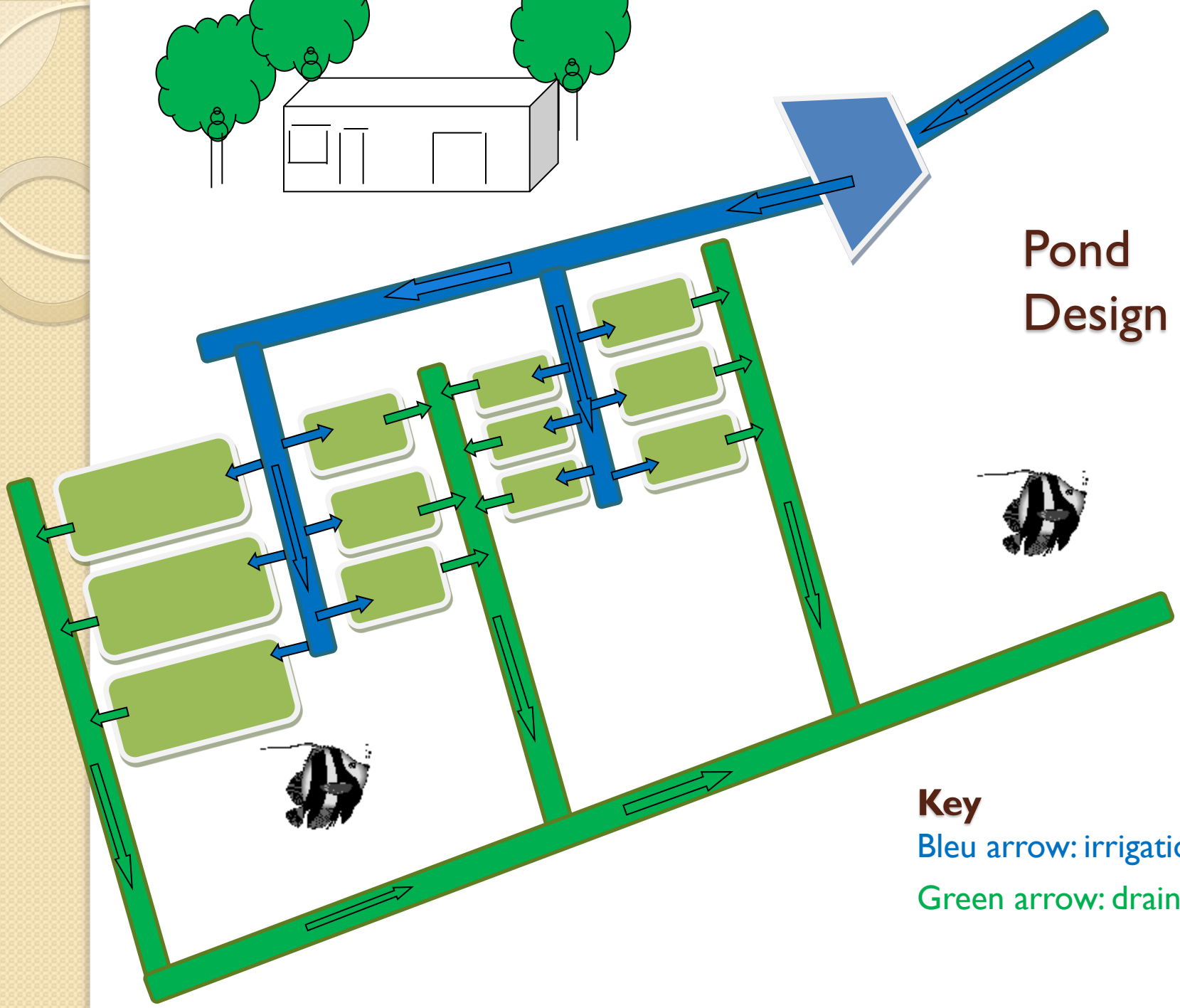
For *Oreochromis niloticus* production

- 3 Holding ponds of 10x5m^2 of a total area 50X3 =150 m^2
- 1 Breeding pond of 20 x 10 m^2= 200 m^2
- 1 Nursing concrete pond of 8 x 5 m^2= 40 m^2
- 1 Rearing pond of 20 x 10 m^2= 200 m^2
-

For *Clarias gariepinus* production

- 2 holding ponds of 5 x 3 m^2 = 15 m^2
- 1 breeding pond 5 x 3 m^2 = 15 m^2
- 2 nursing concrete ponds of 8 x 5 m^2 = (40 m^2)x2
- 1 rearing pond of 10 x 20 m^2= 200 m^2

Pond Design



Key

Bleu arrow: irrigation

Green arrow: drainage

Investment Costs

No	Item/ description	Unit	quantity	Unit price/USD	Total price, USD
1	Purchase of land	Ha	1	3,580	3,580
2	Water & soil analysis	constancy		145	145
3	Site clearing	Man / days	10 men / 1day	3	30
4	Slashers	Pieces	5	3	15
5	Hoes	Pieces	3	4	12
6	Rake	Pieces	3	4	12
7	PVC pipe (6m)	Pieces	23	15	345
8	PVC elbow joints	Pieces	15	2	30
9	Cement	Pieces	45	17	765
10	Bricks	100 Pieces	30,000	3	900
11	Sand	Trip	5	57	285
12	Stones	Trip	2	57	114
13	Pond & canal construction	Man/day	15 / 20	3	900
14	Oxygen cylinder	piece	1	300	300
15	Furniture	set	1	400	400
16	Wooden rack	piece	10	3	30
17	Torch light	piece	4	4	16
16	Construction of a farm house	Man / day	1 / 7 2/7	6 3	42 42
	total				**7,963**

Investment Costs cont'd

No	Item/ description	Unit	quatity	Unit cost (USD)	Total cost (USD)
16	Broodstock hapas	pice	7 (tilapia), 1 (catfish)	2	16
18	Seine net	piece	1	145.50	145.50
23	Assorted sieves		5	2	10
24	Scoop nets		3	3	9
25	Basins		4	1	4
26	Buckets		3	1	3
27	Weighing scale		2	20	40
28	Water quality kites		1	600	600
	total				**827.50**

Operation Costs for the first year

	Item/description	Unit	Cost/unit, USD	quantity	Total cost ,USD
	Farm manager's salary		100	1x 9months	900
	Salary -labors		45	2x 9months	810
	Casual labors wages		30	2x 9months	540
	Fish feeds- broodstock	1 KG	2	68,625kg x 9 months	1647
	Fry feeds& fingerlings feed 40% protein	1 KG	2.5	74,67 kg x 8 months	2240
	fertilizer	1 kg	0.6	180 kg yearly	108
	Oxygen refilling	$6m^3$	35	4	140
	Packing materials	1 roll / bundle	20	2	40
	lime	25 KG	5	2	10
	hormone	10 gramme	20	100	200
	Ethanol 90%	litter	2	3	6
	Isopropyl Concentrated	litter	5	1.5	7.5
	Broodstock purchase		108 (tilapia), 12 (catfish)	3	360
	Transport costs				300
	total				**7,308.50**

Investment Budget Summary

	Category	Amount , USD	Depreciation
	Fixed costs:		
	Land cost	**3,580.00**	
	Constructions(ponds, house,…)	**3,223.00**	**20 years**
	Long span equipment	**1,860.50**	**5 years**
	Short span equipment	**127.00**	**2 years**
	Variable costs first year	**7,308.50**	
	Total cost	**16,099.00**	
	Contingency on total cost (2%)	**321.98**	
	TOTAL PROJECT COST	**16,420.98**	

PROJECT IMPLEMENTATION PLAN FOR MPARAMBO TILAPIA AND CAT FISH HATCHERY.

ID NO	Specific Objective/ Activity	Monitoring Indicator	Planned Targets	Time Frame in Months													Respons Officer	Amount in US Dollar
				1	2	3	4	5	6	7	8	9	10	11	12	13		
1	Procurement of land		1 Ha														PMC	3,580.0
2	Procurement of equipment	Report															PMC	1987.5
3	Clearing of land		1 Ha														PMC	30.0
	Soil analysis	One month															consultant	145.0
4	Construction works	No.of ponds & house	13 1														PMC	3,048
5	Recruitment of staff	Report	5														PMC	000.0
6	Pond treatment	Water quality	9														PMC	118.0
7	Fixing of hapas in ponds	No. of hapas	8														PMC	0.00
8	Purchase o f broodstock and pond stocking	No. of broodstock	120														PMC	360.0
9	Collection of tilapia fry & feeding with hormone	No. of survived fry															PMC	0.00
10	Collection of cat fish fry & grading		280,000														PMC	0.00
11	Feeding and pond management	Amount of feed & pond outlook	1719.5 Kg														PMC	4,100.5
12	Monitoring and record keeping	No. of supervision visits	48 day														PMC	0.00
13	Payment of personnel	Monthly payment records	9														PMC	2,250
14	Marketing/ advertising of fish products	No. of adverts	12 months														PMC	0,000.0
15	Selling of fish products	Amount of fry sold	07 months														PMC	450
16	Evaluation of project	report	01														Consultant	0.00
	TOTALS																	16,099.00

Production and Marketing

- Fingerling output projected at 280,000 high quality fingerlings in which 196,000 all male *Oreochromis niloticus* (Nile tilapia) fingerlings and 84,000 *Clarias gariepinus* (African catfish) fingerlings.
- Fingerlings will be sold for both species at 3,6 USD/100 fingerlings
- Projected annual income generated from fingerlings sale is 10,080.00 USD

Project Economic Evaluation

- Return above the variable cost:

  GR-(TVC-S) = 10,080.00- 5,598.50 = 4,481.50 USD

- Net return: gross return – total costs

  GR-TVC= 10,080.00- 7, 308.50= 2,771.50 USD

- Break-even price above (TVC-S) :

(TVC-S)/total production = (5,598.50/280,000)100 = 2.0 USD

- Break-even price above TVC :

TVC /total production= (7,308.50/280,000)100 = 2.6 USD

Project Economic Evaluation cont'd

- Break-even yield above (TVC-S)=5,598.5/3.6= 1,555.14 kg
- Break-even yield above TVC = 7,308.50/ 3.6= 2,030.14 kg
- Payback period = Total investment costs / Net return

16,420.98/ 2,771.50 = 6 years

Where GR= Gross return, (TVC-S) = Total Variable Cost minus salaries,

TVC= Total Variable Cost.

Note: unit price for 100 fingerlings

Discounted Cash Flow Statement

Cash flow ('000)	Period in year									
	1	2	3	4	5	6	7	8	9	10
Cash in flow	10.0800	10.0800	10.0800	10.0800	10.0800	10.0800	10.0800	10.0800	10.0800	10.0800
Cash out flow	7.3085	7.3085	7.4355	7.3085	7.3085	9.2960	7.3085	7.3085	7.4355	7.3085
Net return	2.7715	2.7715	2.6445	2.7715	2.7715	0.7840	2.7715	2.7715	2.6445	2.7715
Discount factor	0.9524	0.9070	0.8638	0.8227	0.7835	0.7462	0.7107	0.6768	0.6446	0.6139
Discounted present value	2.6396	2.5137	2.2843	2.2801	2.1714	0.5850	1.9697	1.8757	1.7046	1.7014

Present value (using 8%) = 17,734.6584
Present value – total investment cost= 17,734.6584-16,420.9800=1,313.6784
The discount factor is based on interest rate of 5% per year.

Marketing & Promotion

- To make the project known, community sensitization will be done through:
  - Stakeholders meetings.
  - Advertisements through posters, brochures and local radio stations will also be done and sales of the product will be done direct on the farm.
  - Packaging of the product will be done in oxygenated polythene bags before transportation to various destinations.

Project Sustainability

- Involvement of the community right from the onset of the project (construction work)
- Employment of casual and permanent labor from the surrounding community
- Availability of water for agriculture purposes to the surrounding community
- Inexistence of a hatchery in the area in particular and even in the entire country in general
- High demand for fish seeds
- Development of a viable constitution and code of conduct for the project
- Development of an effective monitoring tool the project

Environmental Impact Assessment

- Alteration of biodiversity by the use of sex reverse hormone
- Increase of mosquitoes in the area which may lead to malaria cases
- Eutrophication of water downstream due to high nutrient content of the affluent from the hatchery

Mitigation Measures

- Use of affluent from hatchery first for agriculture purpose
- Introduction of fish (tilapia, catfish, carp) in canals and sedimentation pond to control mosquito and algae
- Provision of mosquito nets to the nearby households

Conclusion

- In 6 years the project will have recuperated all investment costs and sustain it self.
- The discounted net present value of the project is positive at the prevailing commercial interest rates thus the project is economically viable.

THANK YOU!

MERCI!

SHUKRAN!