SMALL SCALE AQUACULTURE IN BUDUDA DISTRICT, UGANDA

This project is the outcome of a group efforts to whom credit and technical responsibility goes. 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 “Fish Culture Development” Training course”. This annual course is organized by the Egyptian International Centre for Agriculture - (EICA). Names of the team members and pictures are shown above and in the following slide

2011


Names of pictures of the project team (from left to right)
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Introduction

- Gap between the supply and demand for fish (Urban and rural areas in Uganda)
- Major and minor lakes have been fished to their maximum
- Population are on the increase
- Per capita fish consumption is on the decline

    14 kg/capita before 1996

    4 - 10 kg/capita after 2007

Aquaculture opportunities

- 18 % of land surface is covered by open water; network of rivers and streams
- Fresh water bodies are suitable for aquaculture
  - temperature is above 25°c all year
  - water is almost free of industrial or municipal pollution
- High price of fish

Objectives of project

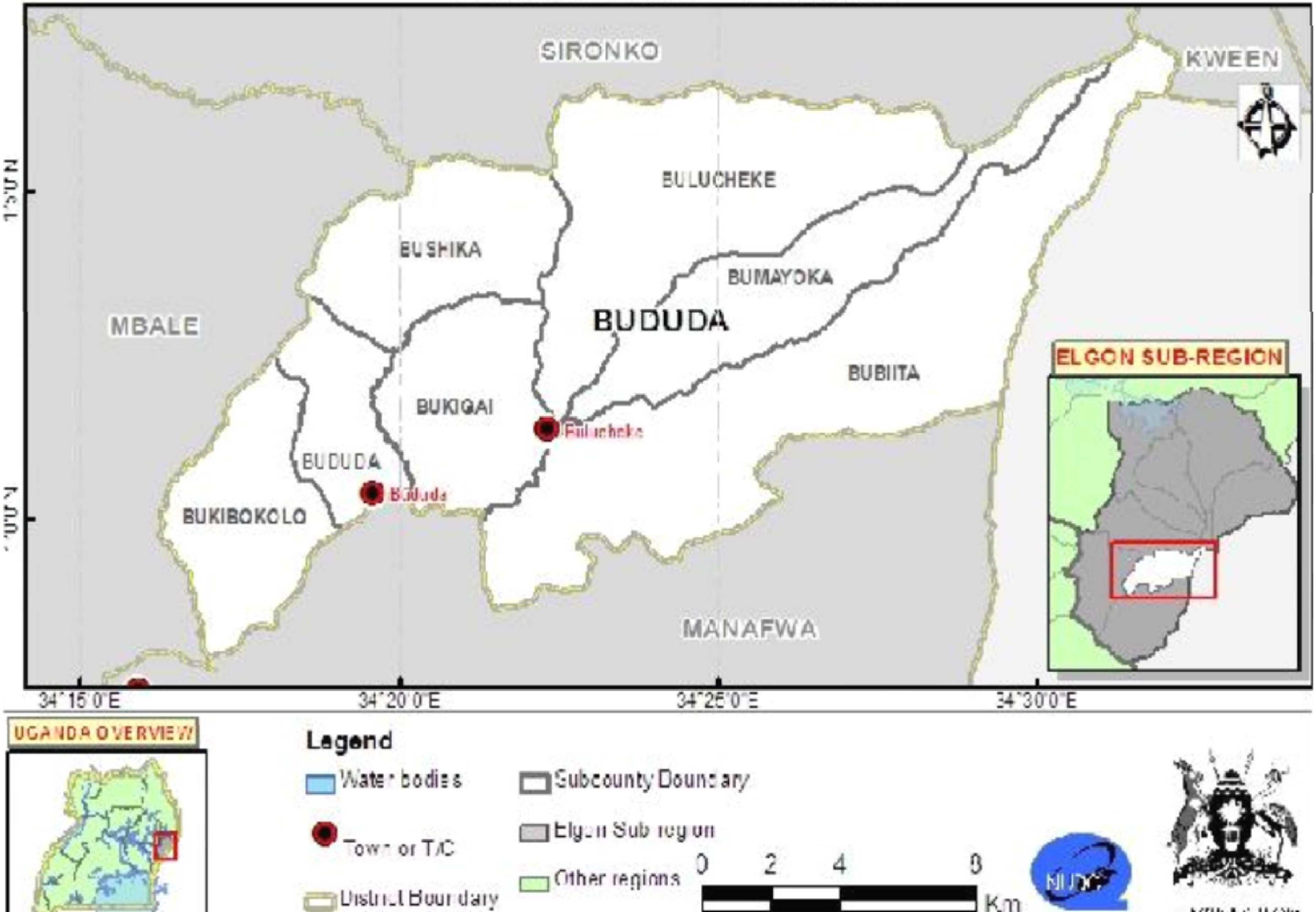
- Production of 500 kg of tilapia/ 500-m^2 pond per crop
- Income generation for people in rural area

Project duration: 10 years

Location in Uganda: Bududa District

- Eastern part of Uganda
- New district that was created in 2006
- Population was estimated about 146,000
- Major language is Lumasaba
- Average altitude of 1,800 m above MSL
- Abundant rainfall (1,500 mm/year)
- Agricultural is the backbone of the economy of the district
- Tsusu and Manafa rivers are the main water source

BUDUDA DISTRICT - OVERVIEW




100 km
Bududa
Bududa
Lat: 0.997 - Long: 34.331 - Alt: 700 km

Species of choice:

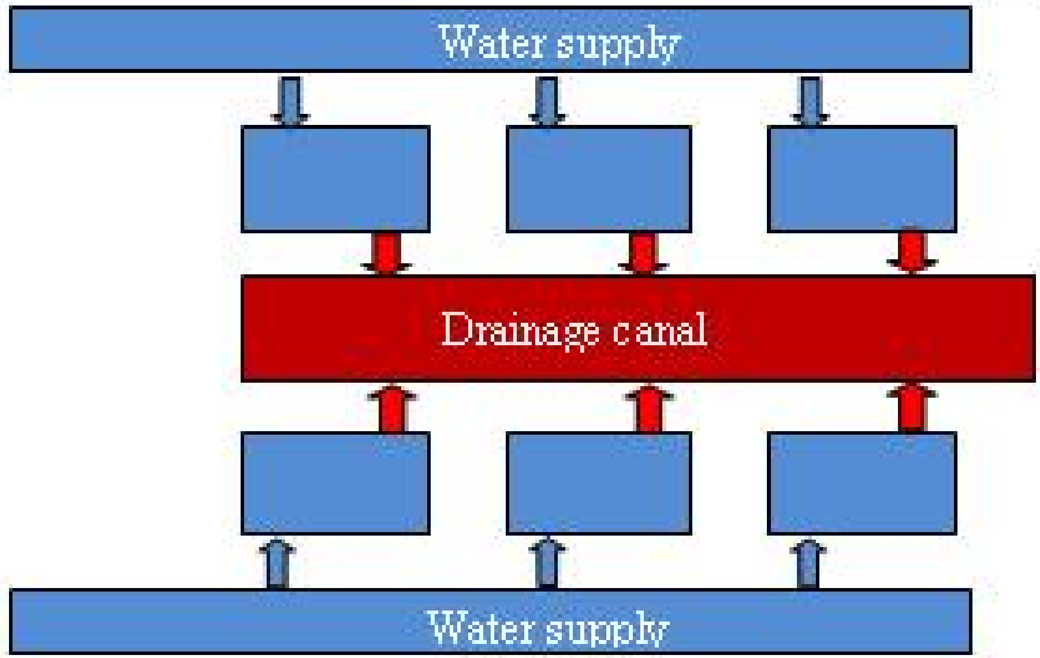
Nile tilapia, *Oreochromis niloticus* (All-male)

- large size and rapid growth
- easy to find fish seed
- high consumer preference
- tolerant to disease and can cope with variety of management systems
- omnivorous (can feed on variety of feed stuff)
- native to Uganda (no environmental threat)

Pond construction

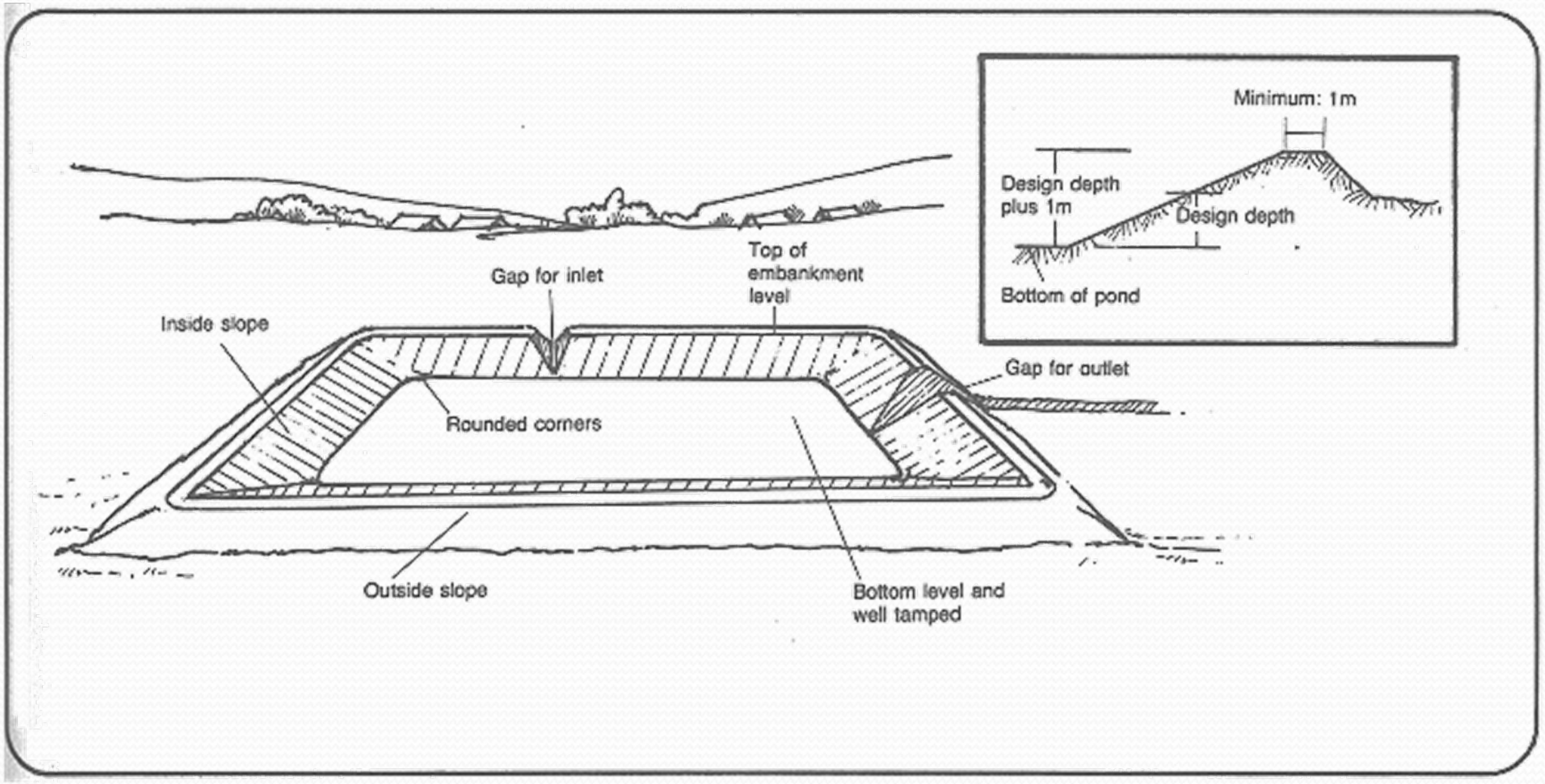
- six ponds are required
- excavated earthen pond 20 x 25 m (area = 500 m^2); dept 1.2 m.
- inlets and outlets use pvc pipe (Φ = 6 inches)
- pond filling and draining is done by gravity flow
- water source: Tsusu or Manafa river

Farm diagram



Land area 0.5 ha.

Pond construction




Water inlet
PVC

Rearing & management practices

- semi-intensive and monoculture
- Nile Tilapia male all-sex
- stocking rate 3 pcs/m^2
- stocking rate 1,500 pcs/pond
- initial weight of fingerling 3.0 g/pc

Rearing & management techniques

- feed with homemade pelleted feed of 30% protein content
- feeding rate starts with 6% and ends by 1% of fish body weight
- feeding frequency: once/day (about 11.00 AM)
- fertilization: with cow dung (25 kg/month/pond)
- sampling: once/month for adjusting feeding rates
- water transparency (turbidity): daily check using Secchi disc (target reading is:15-25 cm)

Feeding Table:

day	Average weight (g)	Feeding rate (%)	Survival rate (%)	Number of fish	Fish biomass (kg)	Feed/day (kg)	Amount Feed (kg/month)
1	3.00	6.00	100	1,500	4.50	0.27	-
30	16.42	3.00	100	1,500	24.63	0.74	8
60	42.41	2.50	90	1,350	57.26	1.43	22
90	82.18	1.80	85	1,275	104.78	1.89	43
120	136.61	1.80	80	1,200	163.93	2.95	57
150	206.43	1.60	75	1,125	232.23	3.72	89
180	292.25	1.30	72	1,080	315.63	4.10	111
210	394.60	1.00	70	1,050	414.32	4.14	123
240	500.00	1.00	70	1,050	525.00	-	124

Rearing & management techniques (Feed formulation)

Item	Composition (%)
Corn	15
Rice bran	27
Soybean meal	58

Feed preparing

Assumptions

Item	Unit	Amount/ value
Stocking rate	fingerlings/m^2	3
Stocking number	fingerlings/pond	1,500
Initial weight of a fingerling	g	3.0
Final survival rate	%	70
Average harvest body weight	g	500
Feed Conversion Ratio (FCR)	-	1.1
Culture period	month	8
Number of harvested fish	pieces/pond	1,050
Weight of harvested fish	kg/pond	525
Feed amount during the whole period	kg	577
Fish price	$/kg.	1.33

Annual Activity Chart

Activities	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Pond preparation	x	x										
Filling water			x									
Initial fertilizing			x									
Stocking				x								
Rearing practices				x	x	x	x	x	x	x	x	
Fertilizing					x	x	x	x	x	x		
Sampling (monthly)				x	x	x	x	x	x	x	x	
Harvesting												x

Investment Costs ($) – for the 6 ponds				
Item	**Unit**	**Quantity**	**Unit Cost**	**Total cost**
Land	ha	0.5	4,000	2,000
Site preparing	sum	1	200	200
Pond construction	pond	6	250	1,500
Water system	sum	1	500	500
Water pump	unit	1	1,000	1,000
Miscellaneous	sum	1	200	200
Total				5,400

Annual depreciation = $ 360

Source: project document (text)

Working Capital (for the 6 ponds)				
Item	Unit	Quantity	Unit cost	total cost
Input materials				
Fry	Per crop	9,000	0.0175	157.50
Feed	Kg	3,465	0.48	1,663.20
Fuel	Liter	144	1.00	144.00
Input services				
Labor	Per crop	1	800	800.00
Maintenance	8 month	1	160	160.00
Total				2,924.70

Total costs (investment & operation):
5,400 + 2,927.70 = 8,388.70 $

Project revenue & Financial analysis

Project revenue/crop	Financial analysis
Fish production of 6 ponds = 3,150 kg	Net income = 915.3 $/crop
	IRR = 28.23 %
Sale price = 1.33 $/kg of fish	Production cost = 1.04 $/kg
Total revenue = 4,200 $/crop	Payback period: 6 years

Financial analysis is based on detailed information in the text document

Conclusion

- This project can generate income for fish farmers in the form of:
  - Wage 800 $/crop
  - Profit after 6 years 915.30 $/crop
- Fish production of about 525 kg/pond/crop
- Provide a good source of animal protein for people in rural area at affordable price
- Easier marketing in rural community as well as save most of transportation cost if transported to distant fish market