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 “Warm Water Fish Production Training Course”. This annual course is organized by the Egyptian International Centre for Agriculture - Egypt (EICA) and Japan International Cooperation Agency (JICA). The names, countries and pictures of the team members who developed this project are shown in a subsequent slide

2012

# ESTABLISHING A SMALL-SCALE NILE TILAPIA FARM IN NYAGATARE DISTRICT, RWANDA

## NYAGATARE FISH FARMERS’ COOPERATIVE

## 2012

# ESTABLISHING A SMALLSCALE NILE TILAPIA FARM IN NYAGATARE DISTRICT, RWANDA

- Project location
- Brief on fish production in Rwanda
- Project owners
- Project objectives
- Project outputs
- Project layout
- Water quality
- Activity schedule
- Project budget, revenue & economic viability
- Project impacts & mitigation measures
- Conclusion

# PROJECT LOCATION NYAGATARE DISTRICT, RWANDA

- Nyagatare District is located in the Eastern Province of Rwanda, borders Uganda (north), Tanzania (East)
- Total area is 1,743Km$^2$.
- It lies at latitude 1°22’51.6’‘South of the equator and longitude 30° 19’.19’’ East.
- Average altitude 1.400m above sea level

# MAP OF NYAGATARE DISTRICT

# FISH PRODUCTION IN RWANDA

- National fish production is est. 13,000 metric tones per year.
- ✓ Capture fisheries contribute 9,000 and aquaculture 4,000 metric tones per year.
- Per capita fish consumption 1kg ( lowest in East African countries)
- Establishing a fish farm in Nyagatare will boost fish production & improve per capita fish consumption

# NYAGATARE FISH FARM

- Project owners;
  - ✓ Nyagatare Fish Farmers Cooperative (NFFC)
- Location of the project;
  - ✓ Eastern Province/Nyagatare Distrct/Nyagatare Sector/ Nyagatare Cell/ Nyagatare Village.
- Total area of the project; 2.47 Ha
- Total Project Cost = 60,887,168 Frw (1U$= 600 Frw)
- The source of funds; membership contribution

# MAIN OBJECTIVE

- To increase fish production and improve the nutritional status of the people in Rwanda.

# SPECIFIC OBJECTIVES

- To create employment for 9 workers at the farm.
- To produce 48 tons of fish.
- To improve the Income of Nyagatare fish farmers cooperative members.
- To construct 8 fish ponds of 1000 $m^2$ each

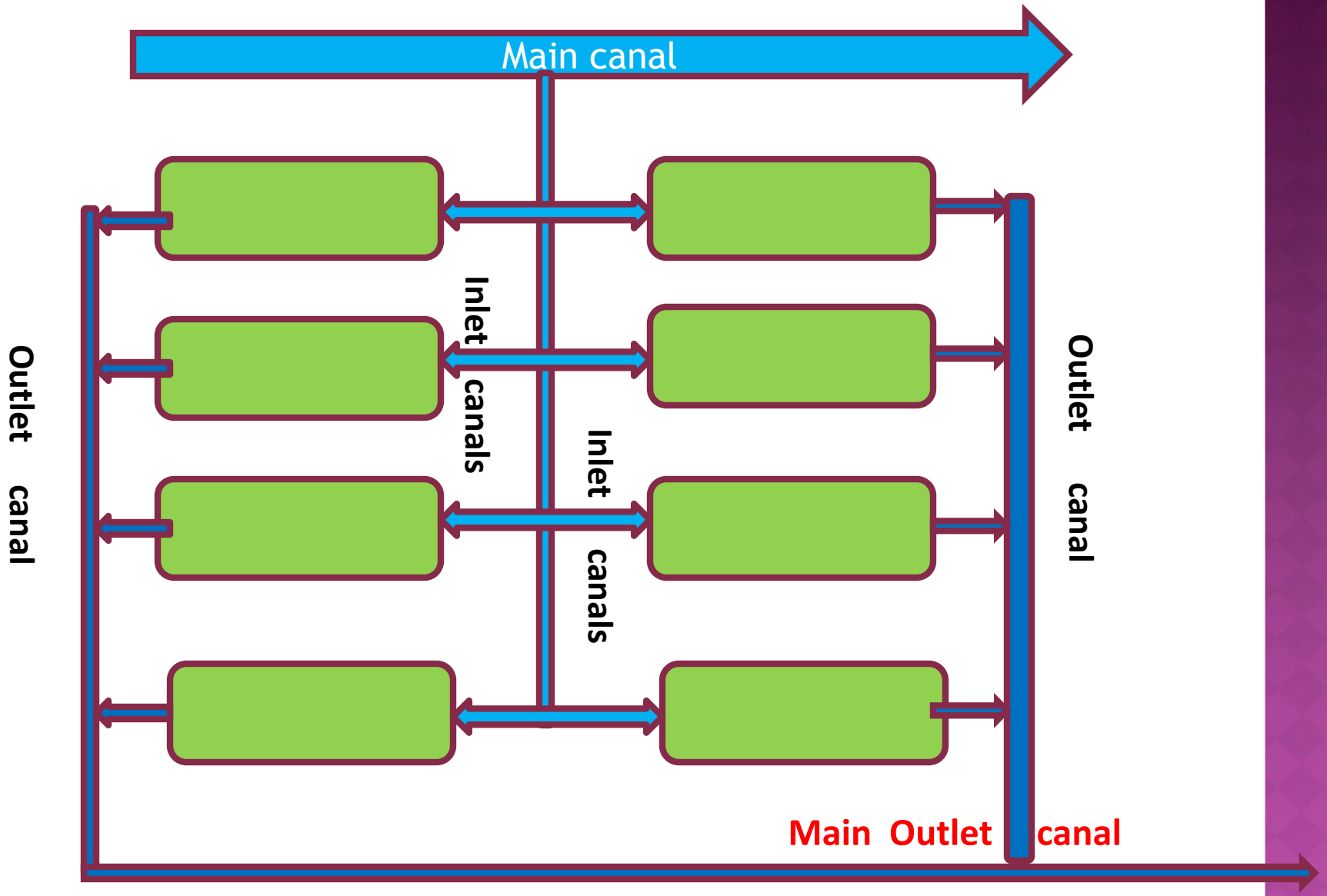
# PROJECT OUTPUT

- 1 office & store constructed
- 48 tons of fish be harvested
- Fish stocking densities; 6 fish/$m^2$
- 8 fish ponds established with a total surface area/ pond 1000 $m^2$
- 9 personnel employed by the project
- ✓ 1 manager, 2 Technicians, 2 Security guards & 4 casual labourers

# POND LAYOUT

- Total area of the ponds = 109m x 92m = 10,028$m^2$
- Distance between ponds 3m,
- Total distance between ponds 5m (middle)
- Pond dimension; 50m x 20m
- Supply Canal width 1 m
- Distance between supply canal & ponds 2m

# NYAGATARE FISH PONDS LAYOUT



FEEDING IN NYAGATARE FISH FARM

PROTEIN CONTENT OF THE FEED IS 27%

ALL-MALE NILE TILAPIA

# WATER QUALITY: PARAMETERS TO BE MONITORED

- Water source as represented in River Muvumba will be source of water (pond filling is done by gravity)
- Key parameters to be monitored;
  - ✓ Dissolved oxygen
  - ✓ Temperature
  - ✓ pH
  - ✓ Total ammonia
  - ✓ Turbidity
- Water quality testing kits will be procured

# TABLE 1: ACTIVITY SCHEDULE FOR NYAGATARE FISH FARM

| ACTIVITY | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land purchase | × | | | | | | | | | | | |
| Fencing | × | | | | | | | | | | | |
| Site clearing | × | | | | | | | | | | | |
| Construction of office, store & house | | x | x | x | x | x | x | | | | | |
| Pond construction | | × | × | | | | | | | | | |
| Pond filling & fertilization | | | × | × | | | | | | | | |
| Purchase fingerlings (10 g) & feeds | | | | × | | | | | | | | |
| Feeding | | | | × | × | × | × | × | × | | | |
| Monitoring water quality parameters | | | × | × | × | × | × | × | × | | | |
| Fish sampling | | | | | × | × | × | × | × | × | | |
| Harvesting/ marketing the fish | | | | | | | | | | × | x | |
| Disinfect & Restock the ponds | | | | | | | | | | | × | × |

# TABLE 2: PROJECT CAPITAL COST

| SN | ITEM DESCRIPTION | UNIT | QUANTITY | COST (Frw) | TOTAL COST [Frw] |
|---|---|---|---|---|---|
| 01 | Purchase land | Hectare | 2.47 | 3,036,437 | 7,500,000 |
| O2 | Fence off the area using chain link | Hectare | 2.47 | 1,457,490 | 3,600,000 |
| 03 | Construction of ponds | No. of ponds | 8 ponds @1,000 $m^2$ | 2500 | 12,000,000 |
| 04 | Construction of office and store | 4x7m | 2 | 4,500,000 | 9,000,000 |
| 05 | Construction of supply and drainages canals | Use contractor | 1 | 3,000,000 | 3,000,000 |
| **06** | **Total** | | | | **35,100,000** |

# TABLE 3: PROJECT RECURRENT COST

| SN | ITEM DESCRIPTION | UNIT | QUANTITY | COST (Frw) | TOTAL COST [FRW] |
|---|---|---|---|---|---|
| 01 | Procurement of 10 g mono sex O. niloticus all male fingerlings | no. | 8 ponds x 1,000 x 6 fish/m (48,000 fish) | 24 | 1,152,000 x 2 seasons<br>2,304,000 |
| 02 | Procurement of feeds 27% protein | kg | 39,168 Kg per year | 501 | 19,632,168 |
| 03 | Payment of utility bills (electricity, telephone etc) | monthly | 12 | 5,000 | 60,000 |
| 04 | Payment of salary for manager | monthly | 12 | 40,000 | 480,000 |
| O5 | Salary for 2 technicians | monthly | 24 | 20,000 | 480,000 |
| 06 | Salary for 2 security guards | monthly | 24 | 10,000 | 240,000 |
| 07 | Remuneration for 4 casual labourers | man-days | 48 man days x 4 workers | 3,000 x 48 x 4 | 576,000 |
| **08** | **Total** | | | | **23,763,168** |

# TABLE 4: FARM IMPLEMENTS

| S/NO | Item Description | Quantity | Unit cost | Total Cost (Frw) |
|---|---|---|---|---|
| 01 | Water pump (15 HP) | 01 | 500000 | 500,000 |
| 02 | Water quality kit | 01 | 800000 | 800,000 |
| 03 | Wheel barrows | 05 | 45000 | 225,000 |
| 04 | Weighing scale | 02 | 45000 | 90,000 |
| 05 | Spades | 05 | 3000 | 15,000 |
| 06 | Harvesting baskets | 10 | 6000 | 60,000 |
| 07 | Harvesting net (22 m length) | 01 | 150,000 | 150,000 |
| 08 | Sampling net/ scoop nets | 02 | 75,000 | 150,000 |
| 09 | 5 Hoes/ 5 forked hoes | 10 | 3000 | 30,000 |
| 10 | 4 Slashes/ 4 pangas/ 2 Knives | 8<br>2 | 2000<br>1000 | 18,000 |
| 11 | Torch | 02 | 3000 | 6,000 |
| | **Total cost** | | | **2,024,000** |

# TABLE 5: INVESTMENT BUDGET SUMMARY

| S/N | Expenditure category | Amount | Replacement period |
|---|---|---|---|
| 01 | Project capital costs | 35,100,000 | 10 years |
| 02 | Annual recurrent costs | 23,763,168 | Annually |
| 03 | Project tools & Equipments | 2,024,000 | 3 years |
| **04** | **Total project cost** | **60,887,168** | |

# PROJECT REVENUE

- A total of 48 metric tones of Tilapia will be produced per annum
- Each Kilogram of fish will be sold at 1200 Rwanda Franks
- The estimated income from Tilapia sales at the end of the year will be 48 tones x 1000 kg x 1200 = 57,600,000 Frw
- 99% of the harvested fish will be sold

# PROJECT ECONOMIC VALUATION

- Returns above variable cost = (Revenue- Total variable costs (57,600,000 – 23,763,168) = 33,836,832 Frw
- Pay back period (total investment cost/annual net returns) 60,887,168/33,836,832 = 1.8 or approx. 2 years
- Break -even price above variable costs =Total variable cost/Total quantity produced =23,763,168/48,000 = 495 Frw.
- This indicates that the tilapia production will be profitable as long as the price is above Frw 495/ Kg.

# PROJECT ECONOMIC VALUATION CT'D

- As long as production per year is above 48,000 kg/p.a, then it is profitable to produce tilapia fish in the short run.
- Break even price above total cost = Total cost/total quantity = 60,887,168/ 48,000 = 1268 Frw/Kg
- As long as the price of tilapia is above Frw 1268/Kg, this project will be profitable in the long term and all annual variable and fixed costs will be covered at this price

# PROJECT ECONOMIC VALUATION CT'D

- Break even yield above total cost (TC/unit price) = 60,887,168/1200 = 50,740 Kg
- If production levels are above 50,740 Kg/pa, this operation will be profitable, even in the long run.
- At this level of production, there is enough production to cover both all variable and all fixed costs.

# PROJECT LIKELY IMPACTS

- Soil erosion downstream. Ponds will be supplied with a channel from the main river (width; 1 m)
- Mosquito breeding in the pond (conducive environment)
- Eutrophication downstream as result of fertile water from the ponds (feeds & weekly pond fertilization)

# MITIGATION MEASURES

- **Soil erosion** – plant puspurum on pond banks, dykes and along the supply canals to hold soil firmly.
- **Mosquito breeding-** stock the pond with Gambusia spp, to control mosquitoes.
- **Downstream Eutrophication -** plan to direct water to the farm garden to irrigate food crop for the farm workers

# CONCLUSION

- The payback period of the project is approximately 2 years. At this level of production of 48 tones, the project will all costs in 2 years.
- If production is increased to 50.7 tones (yield above total cost), the project will cover all costs in a year.
- The return to the capital investment over the life of the investment are positive.
- Therefore this project is profitable and worth the capital on investment.

# MEMBERS OF NYAGATARE FISH FARMERS' COOPERATIVE

FROM LEFT TO RIGHT; MR. JUMA FREZER –SOUTH SUDAN, MR. MUSSA KAYANDA – TANZANIA, MS. AMAL IBRAHIM – SUDAN, MR. YIGA CHARLES – UGANDA, MR. KANIMBA AUGUSTIN – RWANDA & MR. JAMES IRUNGU NDUTHU- KENYA

# ANY QUESTIONS?

# WE Thank you very much for your attention! Welcome to Nyagatare fish farmers' cooperative.' (BFFC)