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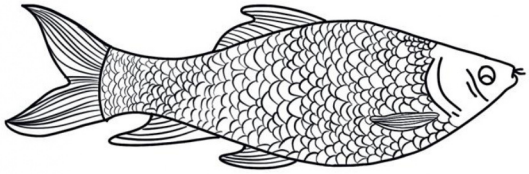
मत्स्यपालन, पशुपालन और डेयरी मंत्रालय
MINISTRY OF FISHERIES, ANIMAL HUSBANDRY AND DAIRYING

GROW MORE FISH — DEPTT. OF FISHERIES ASSAM

Assam State Rural Livelihoods Mission
Towards Livelihood Promotion

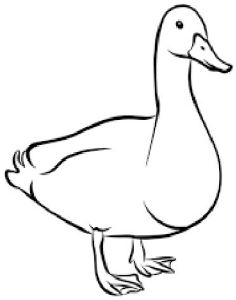
Sustainable Aquaculture for Food and Livelihood
SAFAL



Aquaculture Business School

Training Notebook and Workbook

India



Carp, Rice, Duck

1st Edition

September 2023

Foreword

The Farmer Business School (FBS) approach was developed in 2010 by GIZ/Sustainable Cocoa Business and local partners from Ghana, Nigeria, Côte d'Ivoire, Cameroon and Togo, for cocoa production systems. This and implementation for over 480,000 smallholders was achieved with the support of the Federal Ministry of Economic Cooperation and Development of Germany (BMZ), the World Cocoa Foundation, Bill & Melinda Gates Foundation, NIRSAL from Central Bank of Nigeria and the European Union. Since 2012, other GIZ programmes as well as public and private partners have adapted the FBS, with a total outreach presently exceeding 1.7 million smallholder farmers in more than 30 countries.

In 2022, the Agri-Business Facility for Africa (ABF) in collaboration with the Global Program Sustainable Fishery and Aquaculture has adapted the FBS concept specifically for aquacultural entrepreneurs. Aquaculture Business School (ABS) is building on experiences with FBS taking into consideration specific content elements for aquaculture value chain.

GIZ Sustainable Aquaculture for Food and Livelihood (SAFAL) is implementing the ABS in India, in collaboration with the Ministry of Fisheries, Animal Husbandry and Dairying (MoFAHD), Department of Fisheries (DoF), Government of Assam and the Assam Rural Livelihood Mission (ASRLM). Introducing ABS in India shall contribute to achieve the following specific objectives:

- Professionalizing aquaculture entrepreneurs for stronger business linkages with input suppliers and off-takers
- Productivity and quality increases of aquaculture as a business;
- Improved incomes and living conditions of aquacultural entrepreneurs and their families

The Agribusiness Facility for Africa (ABF) project of GIZ has supported the adaptation of Aquaculture Business School (ABS).

Only ABS-Trainers that underwent a special qualification program including classroom and learning trainings with farmers deliver the training in line with the principles of adult and discovery learning and the quality standards of ABS.

At the end of the training ask for your ABS participation certificate with serial number and signature

Contents

Page

1. Aquaculture Business School: the training

Introduction: What is Aquaculture Business School (ABS) about?

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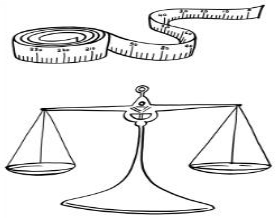
<td> 
M2 Know the units to know your assets</td>
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M3 Manage your farm for enough food and better nutrition</td>
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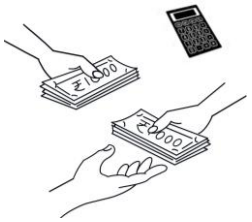
M4 Money-In / Money-Out: Know whether you are doing good business</td>
<td> 
M5 Make decisions for doing good business</td>
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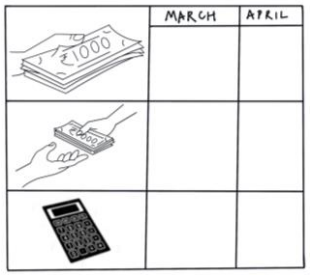
M6 Diversify your farm enterprise for more income and nutrition</td>
<td> 
M7 Manage your money throughout the year</td>
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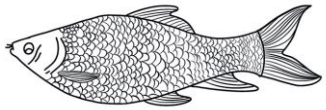
<td> 
M9 Make more money with improved feeding techni-ques and management</td>
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M10 Know the benefits of membership of Farmers' Organisations</td>
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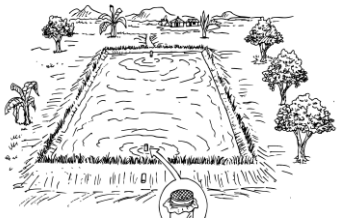
<td> 
M11 Long-term investment in pond-based aquaculture</td>
<td> 
M12 Become an aquacultural entrepreneur</td>
<td colspan="3">What are the advantages?
The skills learned in Aquaculture Business School will allow you to become a better entrepreneur who:
- Takes advantage of improved technologies and market opportunities to increase income
- Plans and adapts his production to assure food security for the family
- Targets decisions and investments in production
- Leads professional negotiations with buyers, input suppliers, credit institutions and land owners.
- Manages financial means and credit.</td>
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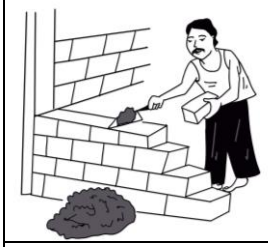
</table>

Module 1 Is fish farming a business?

What examples of businesses do you know?

Examples of businesses	Start and end of activities	Money-Out	Money-In
Construction 	• One can start when one has a contract with a client. • One must respect the conditions of the client. • One construction site follows the next.	For the machines, tools, materials and wages	When the construction is completed
Commerce 	• One can start and stop buying and selling at any time.	To buy stock / merchandise and to pay employees	All year long
Processing of agricultural products Rice bran, processed mustard 	• One can start the processing at any time, if one has the equipment and primary materials/inputs. • One stops the processing when the primary material is no longer available. (Some products are seasonal.)	To buy raw material and equipment, and to hire employees	All year long if you have raw material
Agriculture 	• One needs to start the agricultural work at the beginning of the season • One cannot stop the field work before the harvest (or the use of the seedlings)	For tools, equipment, inputs, services (tractor) and hired labour force	After harvest, when products are ready, at the moment of sales
Aquaculture (pond-based) 	• One can start pond-based aquaculture anytime with seasonal limitations, if one has land for pond construction, feed (natural or artificial), fingerlings and time to manage the pond. • One cannot stop the fish production before harvest	For pond construction, feed, fingerlings, fertilizer, equipment, services (tractor) and hired labour force	After harvest, when products are ready, at the moment of sales

What does the aquacultural entrepreneur need and use to produce products?

Inputs	Tools and equipment	Labour	Money	Land
Water, manure, fertiliser, fingerlings, feed labour, equipment	Pond, net, weighing scale, pipe, pump, hapa, thermometer	Family work force, hired workers	Own money, credit	Own land, leased/ rented land

Main Lessons

Farming and aquaculture are businesses like any other business. They are productive activity aimed at making a profit (getting more out than you put in).

The agricultural entrepreneur needs business management skills to be successful and to understand if he/she is successful.

The agricultural entrepreneur (man or woman) plans and organizes him/herself to have inputs, tools, labour and money necessary for the production ready at the right time.

What does one need to know about the market to do good business?

The market for agricultural produce	The market for inputs and equipment
• The location of the market • Access to the market • Who needs the product and wants to buy it • When the product is needed • The qualities of product that is demanded by the market • The price of the product compared to other markets and how it changes	• The location of suppliers • Who sells the inputs and equipment • The recommended quality of inputs and equipment • The prices for inputs, tools and equipment and their seasonal variations • Year round availability of inputs (especially feed and fingerlings)

How does the price of agriculture products change?

The prices of agriculture products change according to the season of the year • At times of abundance, the prices are lowest. • Prices are highest at times of scarcity for example during the dry season or during closed fishing seasons.	The prices of agricultural products change between years. • The price of a product that is needed by more and more people will rise from one year to the next. • The price of a product that is produced in greater abundance will fall from one year to the next.

Critical aspects of **aquaculture products** influencing **price**:

- Species
- Size
- Freshness (morning vs. evening)
- Processing form (smoked, dried)

Main Lesson

To do successful business, the agricultural entrepreneur (man or woman) informs him/herself on the prices of inputs and products at different markets..

This allows the farmer to plan production, and to make decisions on the purchase of inputs and the sale of produce.

Agricultural calendar to plan your crop production

Work planning for rice.

Mark with an “X” to show the month in which you do the task:

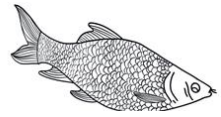
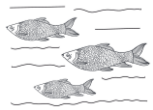
 **The tasks of the entrepreneur**	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
 **Planning and input preparation**												
Record keeping												
 **Land preparation**												
 **Field bank preparation**												
 **Seed soaking/preparation**												
 **Sowing**												
 **Irrigation**												
 **Fertilizing**												
 **Weed (IPM protocol)**												
 **Scouting for pests** **Pesticide application** **Safe use and storage of pesticides**												
 **Disease management (IPM protocol)**												
 **Harvest**												
 **Post-harvest operations – Quality!** **Proper drying, shelling, winnowing, grading, bagging, storage, etc.**												
 **Marketing**												

Main Lesson A good agricultural entrepreneur (man/woman) plans to do the necessary work in the field for a good yield, considering which crop to plant and/or harvest first, and uses inputs efficiently for better profit.

Aquaculture calendar to plan your fish production

Work plan for fish production in pond

Mark with an "X" to show the month in which you do the task:

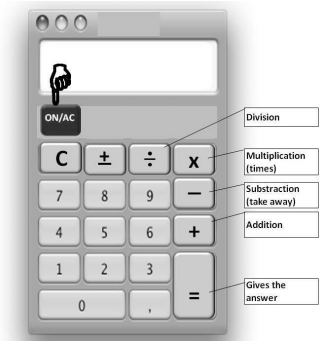
	**The tasks of the entrepreneur**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
	Pond sight selection												
	Pond preparation												
	Purchase of inputs (fish feed)												
	Slushing of dykes												
	Applying organic fertiliser												
	Stocking of fish												
	Feeding												
	Checking, weighing and observing												
	Harvesting												
	Transport												
	Marketing & sales												

Main Lesson: A good aquacultural entrepreneur (man or woman) plans for doing all production work, considering the type of fish species and how to use the inputs efficiently for better profit.

Module 2 Know the units to know your assets

Let's get familiar with the calculator.

How to use a calculator

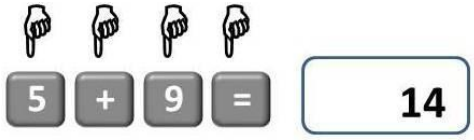
WHAT IS A CALCULATOR? A calculator is a tool that you can use to do addition, subtraction, multiplication and division To switch on the calculator: Press **ON/AC** To clear a wrong number: Press **C** To start a new calculation: Press **ON/AC** to clear	

Addition (Plus)

Example:

5 + 9 = 14

Type



Example:

10 + 20 = 30

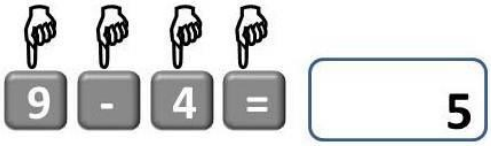
Type

Subtraction (Minus or Take Away)

Example:

9 – 4 = 5

Type



Example:

100 – 20 = 80

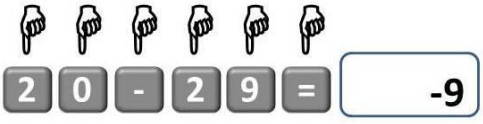
Type

If you subtract a higher number from a lower number, the calculator will give you a minus number as in this example. You will know this by the small dash "-" in front of the answer.

Example:

20 – 29 = -9

Type



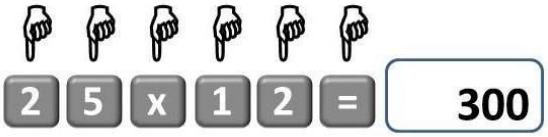
Example:
-20 – 29 = -49

Type

Multiplication (Times)

Example:
25 x 12 = 300

Type



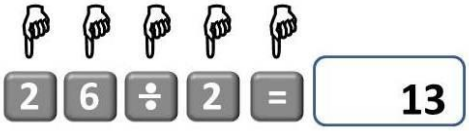
Example:
22 x 27 = 594

Type

Division (Divide)

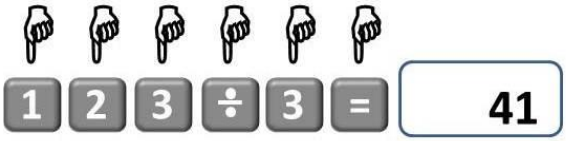
Example:
26 ÷ 2 = 13

Type



Example:
123 ÷ 3 = 41

Type



Here are some more examples. Try to get the same result.

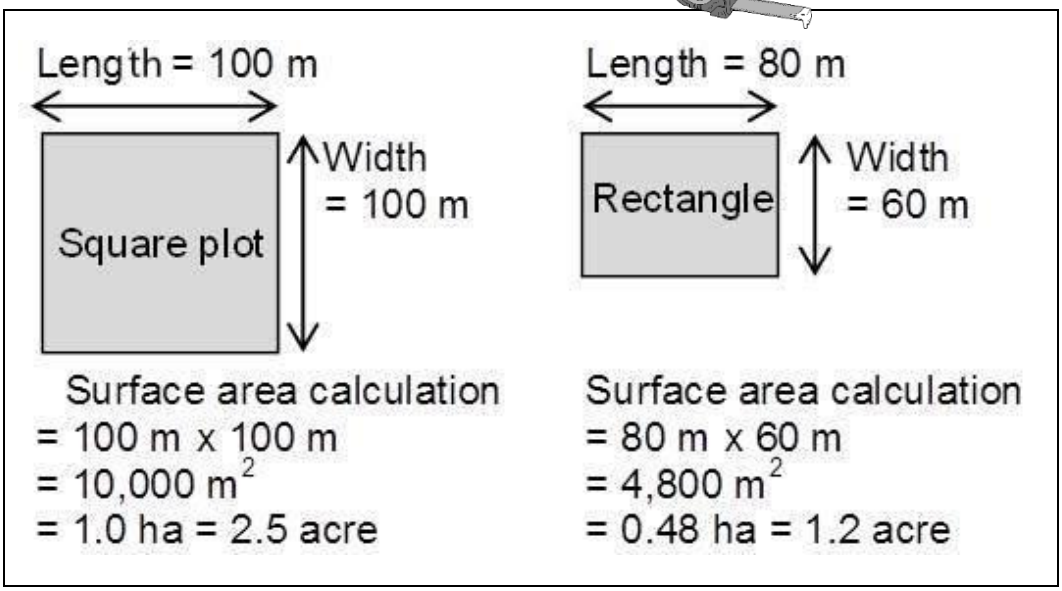
Addition (plus)	Subtraction (minus / take away)
100 + 250 = 350	33 - 13 = 20
124 + 24 + 52 = 200	175 - 35 = 140
1035 + 465 + 120 = 1620	1243 - 12 = 1231
Multiplication (times)	**Division (divide)**
33 x 3 = 99	200 ÷ 4 = 50
75 x 5 = 375	350 ÷ 7 = 50
12 x 12 = 144	1100 ÷ 8 = 137.5

Measure and calculate the surface of a field or pond.

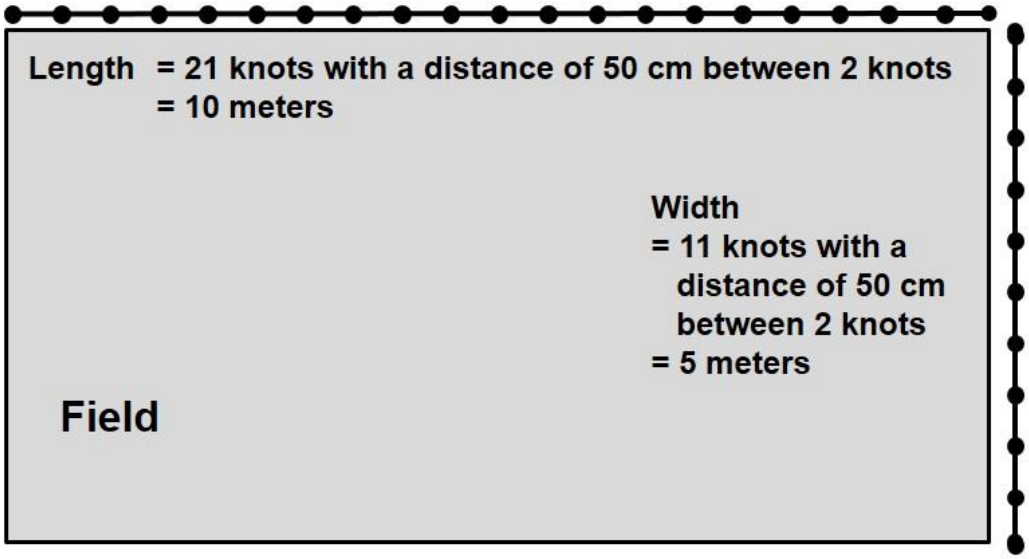
The size or surface area of a field or pond is measured in square metres (m^2) or hectares (ha).

1 hectare (ha) is 10,000 meters squared (m^2). 1 Assamese bigha = 1,338 m^2.

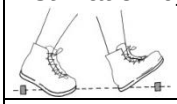
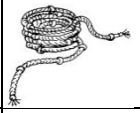
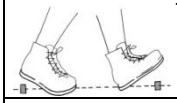
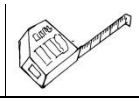
Measuring an area using a measuring tape:



Measuring area using a cord with knots



Exercise

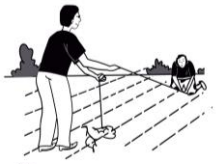
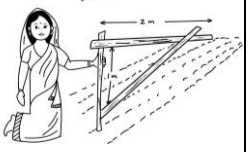
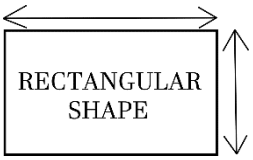
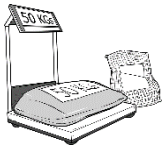
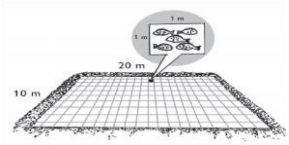
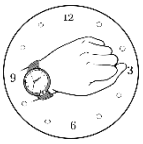
	Method	Length x Width =	Surface size	Difference with measuring tape	Rank
Group 1	Estimation by steps 	x =			
	Cord with knots 	x =			
Group 2	Estimation by steps 	x =			
	Measuring tape in meters 	x =			

The most modern way of measuring the size of a field is by using the GPS (which stands for Global Positioning System). If you don't have your own GPS device or smartphone with a reliable application, you can ask local extension agents to assist you.

Main Lessons

1. Measuring the field size by walking-steps is not always accurate.
2. The aquacultural entrepreneur (man or woman) who
   - underestimates field size, risks using too little fertiliser and too few seeds, which can lead to reduced yields; or
   - overestimates field size, risks using too much fertiliser and planting too close together, which can lead to reduced yields and unnecessary spending.
3. The aquacultural entrepreneur (man or woman) measures his/her fields/ponds with a measuring tape or with a cord with knots.
4. A field in the shape of a rectangle or square is easy to measure. On such a field it is easier to sow or plant in lines, respecting the correct spacing distances.
5. GPS measurement is another (more modern) technique for measuring farm size and fields of irregular shape. Ask your extension agent to assist you.
6. A field in the shape of a rectangle or square is easy to measure. On such a field, it is easier to sow or plant in lines respecting the correct spacing distances

Standard measures and units

Distance	Kilometre (km): 1 km = 1 000 metres (m)
Length width or depth of a field  **Slope of a dike** 	Meter (m): 1 m = 100 centimetres (cm) Increase in hight by 1 m over a distance of 2 meter = 50 % or 27°
Surface area 	Hectares (ha) Square meter (m^2) 1 ha = 10,000 m^2 1 bigha = 1,338 m^2 (e.g. 30 m x 44.6 m or 13.4 m x 100 m) 1 hectare = 7.5 bigha / 1 bigha = 0.13 hectares
Weight 	Gram (g) Kilogram (kg): 1 kg = 1,000 g Ton (T): 1 ton = 1,000 kg
Density 	Stock per square meter – eg. Number of fingerlings in the pond per square meter
Yield per unit area 	Yield per hectare: Yield per acre Example: 2,000 kg rice/ha = 800 kg rice/acre
Volume 	Litre (l) Millilitre (ml) 1 l = 1,000 ml
Temperature 	Celsius degree - e.g. 25°C –ideal temperature for Rohu
Time 	Minutes (min) Hour (h): 1 hour has 60 minutes Day (D): 1 day has 24 hours
Agricultural work 	**Person-days (PD): The work of an adult person in one day.** Example: Work on one hectare requires 10 Person-days. (10 PD / ha). The work can be done by 1 adult person in 10 days or 10 adult persons in 1 day. **It is important to specify the number of hours in a work day.**

Main lessons

Units and measures are important for the agricultural entrepreneur (man or woman).

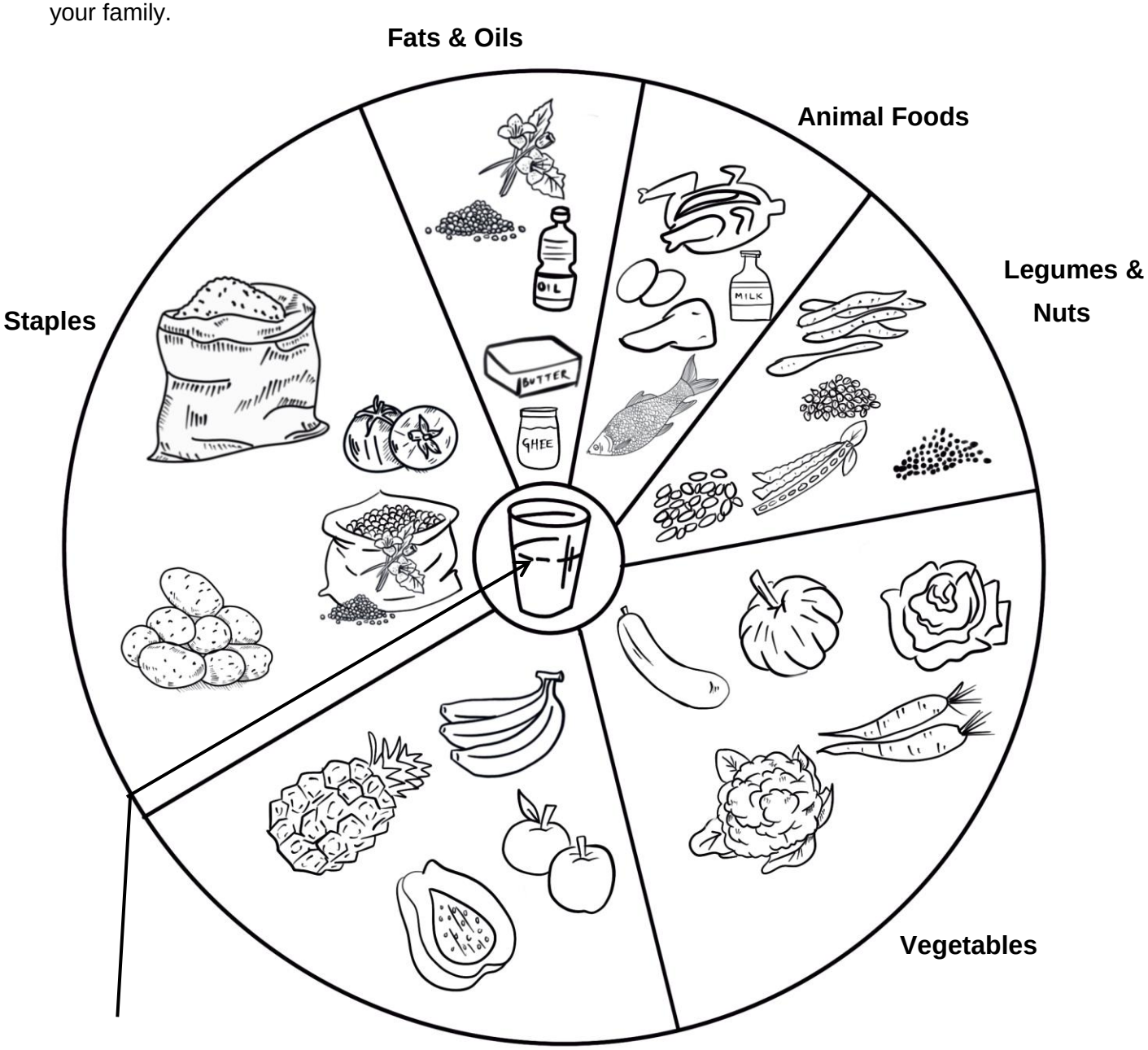
They are necessary:

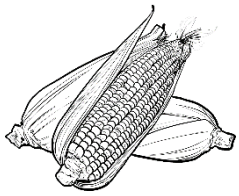
- to know precisely the assets, such as the size of your land and amount of labour needed;
- to correctly plan production and the quantities of inputs that need to be available on time;
- to apply correct amounts of inputs such as seeds, manure and fertiliser;
- to know before harvest if investments will exceed expected income
- to know the quantity harvested (weighing harvest with a calibrated scale);
- to correctly evaluate losses or profits; and
- to better sell the products.

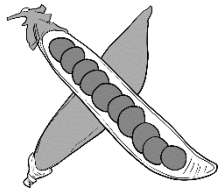
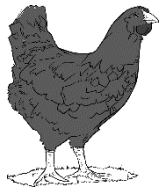
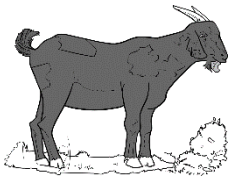
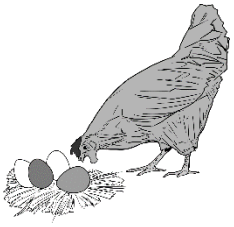
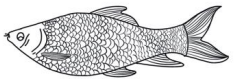
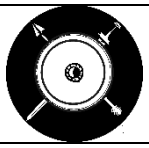
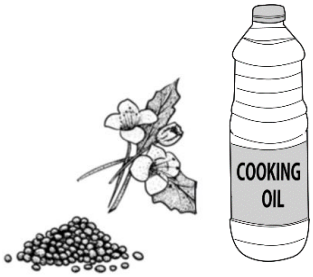
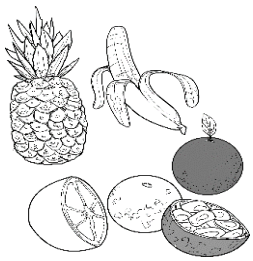
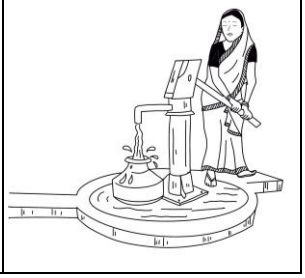
Measures and units are important for the producer to do good business.

Module 3 Manage your farm for enough food and better nutrition

Making money with agriculture is good, but the farm must also provide enough nutritious food for your family.



<table>
<tr><td colspan="2"> 
These products give us energy and physical strength to work and to grow.</td><td colspan="2"> 
These products give us physical strength and mental force.</td></tr>
<tr><td> 
Maize</td><td> 

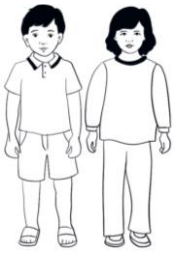
Rice</td><td> 
Beans & Peas</td><td> 
Poultry (chicken)</td></tr>
<tr><td> 
Wheat</td><td> 
Potato</td><td> 
Groundnut</td><td> 
Meat
(goat, cattle etc.)</td></tr>
<tr><td> 
Banana</td><td> 
Sweet potato</td><td> 
Eggs</td><td> 
Fish</td></tr>
<tr><td colspan="4"> 
These products give us protection</td></tr>
<tr><td>Oils give us energy and make the meals tasty.
 
</td><td>Fruits give us energy (sugar) and health.
  </td><td>Vegetables give us health and make the meals tasty.
  </td><td>Clean drinking water keeps us healthy.
  </td></tr>
</table>

Source: Adapted from Food and Agriculture Organisation (FAO), *Family Nutrition Guide*, 2004.

Main lesson:
The agricultural entrepreneur (man or woman) knows that each type of food and clean drinking water are necessary for good and balanced nutrition for his/her family.

How much energy and protein do we need per day?

					
	Pregnant woman	Breastfeeding woman	Children 0 to 6 months	Children 7 to 11 months	Children 1 to 3 years
Energy Kcal per day	**2,690**	**2,860**	**524**	**708**	**1,022**
Protein Grams per day	**47**	**60**	**12**	**14**	**14**
			Breastfeeding	Breastfeeding plus 2 to 3 meals per day	Breastfeeding plus 3 to 4 meals per day

				
	Children 4 to 6 years	Children 7 to 9 years	Girls 10 to 17 years	Boys 10 to 17 years
Energy Kcal per day	**1,350**	**1,700**	**2,330**	**2,830**
Protein Grams per day	**22**	**25**	**43**	**48**

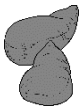
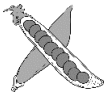
				
	Men 18 to 59 years	Women 18 to 59 years	Men 60 years and more	Women 60 years and more
Energy Kcal per day	**3,100**	**2,410**	**2,500**	**2,140**
Protein Grams per day	**50**	**41**	**50**	**41**

Source: Adapted from Food and Agriculture Organisation (FAO), *Family Nutrition Guide*, 2004.

Main lesson

The agricultural entrepreneur (man or woman) knows that the different types of food need to be combined to ensure a good nutrition of his/her family

Food products and their content in energy, protein and fat

Food	Energy (kcal per kg)	Fat (grams per kg)	Protein (grams per kg)	
Millet 	**3,780**	**43**	**110**	
Rice 	**3,610**	**10**	**65**	
Maize 	**3,530**	**38**	**93**	
Wheat/Wheat Flour 	**2,610**	**20**	**77**	
Potato 	**790**	**1**	**21**	
Sweet Potato 	**1,050**	**17**	**3**	
Groundnut 	**5,670**	**450**	**258**	
Soybeans 	**4,160**	**200**	**365**	
Beans & Peas 	**3,330**	**8**	**226**	
Fish (e.g. Carp) 	**2,790**	**158**	**208**	
Chicken 	**2,230**	**134**	**240**	
Eggs 	**1,580**	**112**	**120**	
Fruits (orange) 	**450**	**2**	**9**	
Vegetables (carrot) 	**305**	**0**	**7**	

Source: Adapted from FAO, *Family Nutrition Guide*, 2004; http://www.nutritiondata.com/facts/fats-and-oils/575/2

Explanation: The kilocalorie (kcal or 1,000 calories) is a measure for the energy of food. The number of kilocalories of 1 kg of a given food shows whether the food is rich or poor in nutrition.

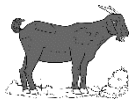
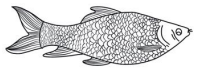
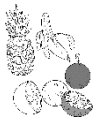
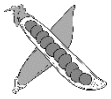
Main lessons

- The agricultural entrepreneur (man or woman) knows that each type of food is necessary for a good and balanced nutrition of his/her family.
- The agricultural entrepreneur (man or woman) knows that the different types of food ensure a healthy nutrition of his/her family.
- The agricultural entrepreneur (man or woman) knows that the members of his family have different needs of food.
- Very good food for pregnant and breastfeeding women ensures good health and growth of new children
- From the 7th month onward children need good quality meals (without spices!) and breast feeding for good health and growth.
- Children of a certain age need almost as much food as adult persons.
- The agricultural entrepreneur (man or woman) knows that the members of his/her family need clean water therefore he/she takes the necessary measures such as Integrated Pest Management including safe use of pesticides and disposal of empty containers to conserve water resources.
- The nutrition level will also depend on the preparation and storage.

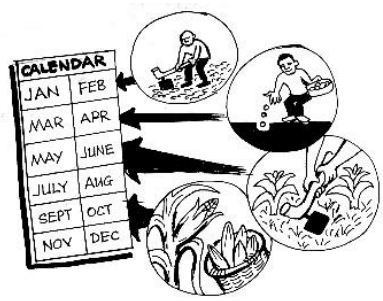
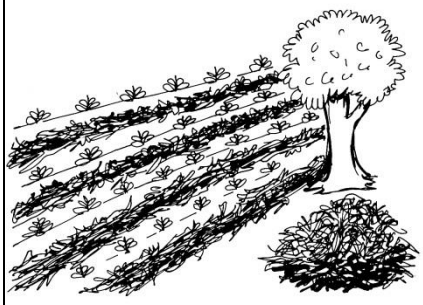
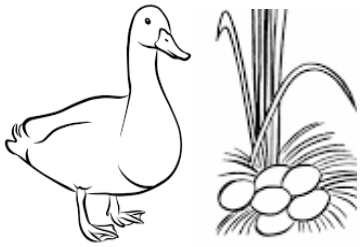
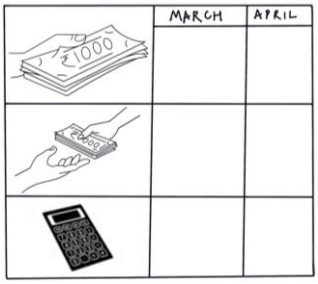
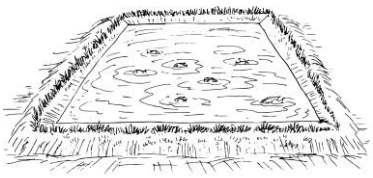
Nutritional calendar: How do you cover the food needs of your family?

- Mark with a square (☐) if the product is sold.
- Mark with a triangle (△) to show the months in which you need to buy the product.
- Mark with a circle (○) if the product is eaten.
- Indicate with a line (–) how long the product is available from own production.
- What are the months of high prices and the months of low prices for a food item?

	Sell ☐	Eat ❍	September	October	November	December	January	February	March	April	May	June	July	August
 **Rice / Rice flour**														
 **Mustard**														
 **Beans**														
 **Potato**														
 **Wheat / Wheat flour**														

	Sell ☐	Eat ❍	September	October	November	December	January	February	March	April	May	June	July	August
 **Chickens (poultry)**														
 **Meat**														
 **Fish**														
 **Fruits**														
 **Vegetables**														
 **Beans & Peas**														
 **Duck**														

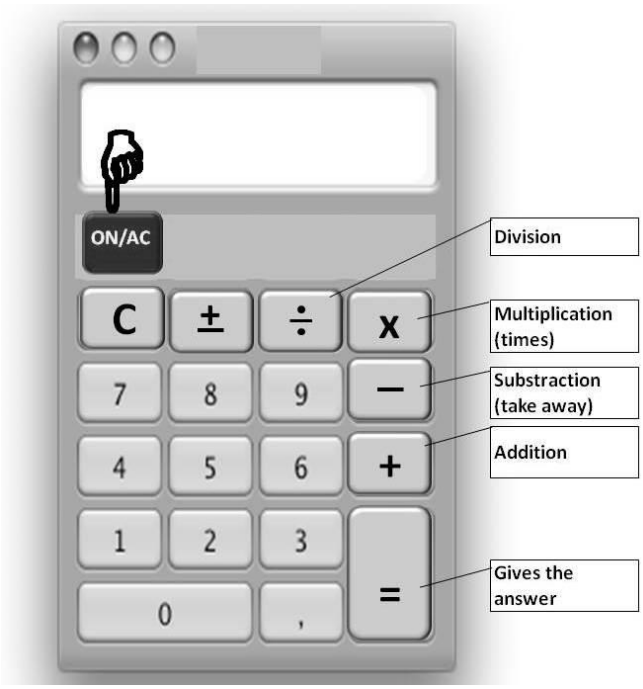
How to have more and better food

Plan the season 	**Use improved varieties for improved yields** 	**Integrated soil fertility management** 
Mulching to conserve soil moisture 	**Diversify cropping** 	**Raising Duck (and Duck eggs)** 
Proper pest and disease management  Scouting, pesticide applications	**Use proper facilities to reduce losses in storage** 	**Improve financial management** 
Establishing well-managed fish ponds 	**Prepare food well** 	**Other possibilities** - Produce early maturing and drought tolerant crops; - Use water harvesting techniques to conserve water and for small-scale irrigation - Establishing backyard gardens - Raising animals (chickens, goats, etc.)

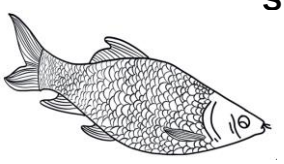
Module 4 Money-In / Money-Out: Know whether you are doing good business

In this module we will learn how to calculate and determine whether our current way of farming is a good or bad way of doing farming business. We will calculate the "money in" and "money out" from different produce.

In this exercise we will use the calculator again

To put on the calculator Press the **ON/AC** To clear a wrong number **Press C – CE** To start a new calculation Press the **ON**/**AC** to clear	

Module 4 – Exercise Sheet 1: Carp (current practices)



Steps:

- Multiply the quantity with the price in each line for inputs/services.
- Add up the money spent (Money-Out) on inputs, services, and labour.
- Multiply the yield by the sales price (Money-In).
- Subtract the total of Money-Out from the Money-In.
- Determine whether you made a profit or a loss.

One 1 bigha pond-stock density 1 fish/sqm, mortality rate 20% 1 cycle per year–expected yield 400 kg	**Unit**	**Quantity**	**Price (INR)**	**Total (INR)**
1. Money-Out – Inputs and Services				
Fingerlings	Each	1,335 x	3.5 =	
Organic fertiliser	Thela of 50 Kg	1 x	350 =	
Quick lime (CaO)	bag of 25 Kg	1 x	375 =	
Calcium Carbonate (CaCO3)	bag of 25 Kg	2 x	694 =	
Dolomite (CaMgCO3)	bag of 25 Kg	0 x	150 =	
Rice Bran	bag of 50 Kg	2 x	650 =	
Oil Cake	bag of 50 Kg	2 x	1,350 =	
Potassium Permanganate	20 g	10 x	45 =	
Net rent for harvesting	INR/day	2 x	500 =	
Water pumping, rent of pump	INR/day	2 x	300 =	
Diesel	INR/L	11 x	90 =	
Zeolite	20 kg bag	0.5 x	1,100 =	
Tetracycline	100 g package	1 x	84 =	
Mineral Mixture	1 kg package	3 x	300 =	
Oxygen supply	500 g Bottle	1 x	1,600 =	
Total Cost of Inputs and Services			**INR**	
2. Money-Out – Labour				
Pond preparation	PD	3 x	375 =	
Fertilising	PD	4 x	375 =	
Stocking of fingerlings	PD	1 x	375 =	
Feeding	PD	20 x	375 =	
Checking&Weighing&Observing	PD	3 x	375 =	
Harvesting	PD	4 x	375 =	
Total Labour Needs (Man-days)	PD	**35**		
3. Total Money-Out			**INR**	
4. Money-In				
Production x Sales price	Kg	400 x	200 =	
5. Profit or Loss? ***(Money in MINUS Money-Out = Gross Margin)***			**INR**	
6. Unit Cost ***(Total Money-Out / Production)***			**INR/Kg**	

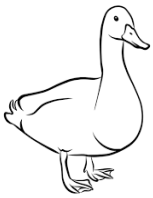
Module 4 – Exercise Sheet 2: Rice (current practices)

Steps:

- Multiply the quantity with the price in each line for inputs/services.
- Add up the money spent (Money-Out) on inputs, services, and labour.
- Multiply the yield by the sales price (Money-In).
- Subtract the total of Money-Out from the Money-In.
- Determine whether you made a profit or a loss.

2 bigha of rice: 750 kg yield	**Unit**	**Quantity**	**Price (INR)**	**Total (INR)**
1. Money-Out – Inputs and Services				
Seeds	kg	5.3 x	35 =	
Chemical fertilizer	treatment	1 x	801 =	
Organic fertilizer, vermicompost	kg	0 x	9 =	
Herbicide, post-emergence	Kg	0.1 x	160 =	
Empty bags	piece	15 x	7 =	
Insecticides	L	0.5 x	350 =	
Irrigation/pumping	Lumpsum	1 x	534 =	
Land preparation	Lumpsum Machinery& PD	1 x	1121.4 =	
Threshing	Lumpsum Machichery &PD	1 x	560.7 =	
Transportation cost	Lumpsum	1 x	133.5 =	
Total Cost of Inputs and Services			**INR**	
2. Money-Out – Labour				
Land preparation (manually)	PD	5 x	375 =	
Transplantation (manually)	PD	3 x	375 =	
Weeding	PD	2 x	375 =	
Application of Pestizdes	PD	1 x	375 =	
Harvesting (manually)	PD	3 x	375 =	
Treshing (manually)	PD	2 x	375 =	
Marketing	PD	1 x	375 =	
Total labour needs (Person-days)	**PD**	**17**	**INR**	
3. Total Money-Out			**INR**	
4. Money-In				
Production paddy x Selling price	kg	750 x	12 =	
Production straw x Selling price	kg	1,068 x	5 =	
Total Money-in			**INR**	
5. Profit or Loss? ***(Money-in MINUS Money-Out = Gross Margin)***			**INR**	
6. Unit Cost ***(Total Money-Out / Production)***			**INR/kg**	

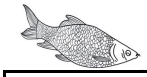
Module 4 – Exercise Sheet 3: Duck



Steps:

- Multiply the quantity with the price in each line for inputs/services.
- Add up the money spent (Money-Out) on inputs, services, and labour.
- Multiply the yield by the sales price (Money-In).
- Subtract the total of Money-Out from the Money-In.
- Determine whether you made a profit or a loss.

32 animals, meat and egg	**Unit**	**Quantity**	**Price (INR)**	**Total (INR)**
1. Money-Out – Inputs and Services				
Ducklings (1-2 days)	by piece	0.0 x	40.0 =	
Ducklings (15 days)	by piece	25.0 x	95.0 =	
Duck Feed (husk/oil cake/rice)	by 1 kg	200.0 x	17.0 =	
Vaccine	per piece	0.3 x	10.0 =	
Total Cost of Inputs and Services			**INR**	
2. Money-Out – Labour				
Construction Duck House good for 4 years	PD	0.5 x	375 =	
feeding and management	PD	10 x	375 =	
Selling of eggs and duck	PD	1 x	375 =	
Total Labour Needs (Person-days)	**PD**	**12**	**INR**	
3. Total Money-Out			**INR**	
4. Money-In				
Production Duck x Selling price	head	32 x	350 =	
Production Egg x Selling price	piece	900 x	10 =	
Total Money-In			**INR**	
5. Profit or Loss? *(Money-In MINUS Money-Out = Gross Margin)*			**INR**	
6. Unit Cost *(Total Money-Out / Production)*			**INR/Kg**	



Module 4 – Solution to Exercise 1: Carp (current practices)

One 1 bigha pond-stock density 1 fish/sqm, mortality rate 20% 1 cycle per year–expected yield 400 kg	Unit	Quantity	Price (INR)	Total (INR)
1. Money-Out – Inputs and Services				
Fingerlings	Each	1,335	3.5	4,673
Organic fertiliser	Thela of 50 Kg	1	350	350
Quick lime (CaO)	bag of 25 Kg	1	375	375
Calcium Carbonate (CaCO3)	bag of 25 Kg	2	694	1,388
Dolomite (CaMgCO3)	bag of 25 Kg	0	150	0
Rice Bran	bag of 50 Kg	2	650	1,300
Oil Cake	bag of 50 Kg	2	1,350	2,700
Potassium Permanganate	20 g	10	45	450
Net rent for harvesting	INR/day	2	500	1,000
Water pumping, rent of pump	INR/day	2	300	600
Diesel	INR/L	11	90	990
Zeolite	20 kg bag	0.5	1,100	550
Tetracycline	100 g package	1	84	84
Mineral Mixture	1 kg package	3	300	900
Oxygen supply	500 g Bottle	1	1,600	1,600
Total Cost of Inputs and Services			**INR**	**16,690**
2. Money-Out – Labour				
Pond preparation	PD	3	375	1,125
Fertilising	PD	4	375	1,500
Stocking of fingerlings	PD	1	375	375
Feeding	PD	20	375	7,500
Checking & Weighing & Observing	PD	3	375	1,125
Harvesting	PD	4	375	1,500
Total Labour Needs (Man-days)	PD	**35**		**13,125**
3. Total Money-Out			**INR**	**30,085**
4. Money-In				
Production x Sales price	Kg	400	200	**80,000**
5. Profit or Loss? *(Money in MINUS Money-Out = Gross Margin)*			**INR**	**17,916**
6. Unit Cost *(Total Money-Out / Production)*			**INR/Kg**	**75.21**

Module 4 – Solution to Exercise 2: Rice (current practices)

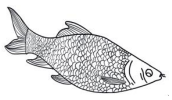
2 bigha of rice: 750 kg yield	Unit	Quantity	Price (INR)	Total (INR)
1. Money-Out – Inputs and Services				
Seeds	kg	5.3	35	186.9
Chemical fertilizer	treatment	1	801	801.0
Organic fertilizer, vermicompost	kg	0	9	0
Herbicide, post-emergence	Kg	0.1	160	16.0
Empty bags	piece	15	7	105.0
Insecticides	L	0.5	350	175.0
Irrigation/pumping	Lumpsum Diesel&rent	1	534	534.0
Land preparation	Lumpsum Machinery& PD	1	1121.4	1121.4
Threshing	Lumpsum Machichery &PD	1	560.7	560.7
Transportation cost	Lumpsum Paddy& straw	1	133.5	133.5
Total Cost of Inputs and Services			**INR**	**3,633.5**
2. Money-Out – Labour				
Land preparation (manually)	PD	5	375	1,875
Transplantation (manually)	PD	3	375	1,125
Weeding	PD	2	375	750
Application of Pestizdes	PD	1	375	375
Harvesting (manually)	PD	3	375	1,125
Treshing (manually)	PD	2	375	750
Marketing	PD	1	375	375
Total labour needs (Person-days)	**PD**	**17**	**INR**	**6,375**
3. Total Money-Out			**INR**	**10,009**
4. Money-In				
Production paddy x Selling price	kg	750	12	**9,000**
Production straw x Selling price	kg	1,068	5	**5,340**
Total Money-in			**INR**	**14,340**
5. Profit or Loss? *(Money-in MINUS Money-Out = Gross Margin)*			**INR**	**4,331**
6. Unit Cost *(Total Money-Out / Production)*			**INR/kg**	**5.50**

Module 4 – Solution to Exercise 3: Duck (current practices)

32 animals, meat and egg	Unit	Quantity	Price (INR)	Total (INR)
1. Money-Out – Inputs and Services				
Ducklings (1-2 days)	by piece	0.0	40.0	0
Ducklings (15 days)	by piece	25.0	95.0	2,375
Duck Feed (husk/oil cake/rice)	by 1 kg	200.0	17.0	3,400
Vaccine	per piece	0.3	10.0	3
Total Cost of Inputs and Services			**INR**	**5,778**
2. Money-Out – Labour				
Construction Duck House good for 4 years	PD	0.5	375	187.5
Feeding and management	PD	10	375	3,750
Selling of eggs and duck	PD	1	375	375
Total Labour Needs (Person-days)	**PD**	**12**	**INR**	**4,312.5**
3. Total Money-Out			**INR**	**10,090.5**
4. Money-In				
Production Duck x Selling price	head	32	350	**11,200**
Production Egg x Selling price	piece	900	10	**9,000**
Total Money-In			**INR**	**20,200**
5. Profit or Loss? *(Money-In MINUS Money-Out = Gross Margin)*			**INR**	**10,110.5**
6. Unit Cost *(Total Money-Out / Production)*			**INR/Kg**	**315.31**

Comparing Result

Please compare and tell what is good and what bad business is and indicate reasons.

Product		 Carp	 Rice	 Duck
Land/pond size	sqm or ha	**1 bigha**	**1 bigha**	**32**
Production	kg	400	**750**	32
Price	INR/kg	200	12	350
1. Money-Out	INR/ha			
2. Money-In	INR/ha			
3. Profit or Loss?	INR/ha			
Ranking (based on Profit/Loss)		☺	😐	☺

NOTE: The pond size is 1 bigha and has given a profit of INR 17,960. Assuming that this pond was at 1 hectare land then the profit could INR 134,202.

Main Lessons

1. The agricultural entrepreneur (man or woman) knows if he/she is doing successful business with an agricultural product by knowing his/her Money-In and Money-Out.
2. He/she tracks the inputs and labour used in a field or for the pond and calculates the Money-In and Money-Out.
3. From the Money-In the agricultural entrepreneur subtracts the Money-Out. The result tells him/her if he/she made a profit or loss.
4. The agricultural entrepreneur makes a **profit** if the Money-In is greater than the Money-Out. In that case he/she is doing **good business**.
5. The agricultural entrepreneur (man or woman) makes a **loss** if the Money-Out is greater than the Money-In. In that case he/she is doing **bad business**.
6. You recognise a **loss** by the minus sign (-) in front of the number.
7. The good agricultural entrepreneur will abandon this enterprise or use a better technique to make a profit.
8. To make sure that he/she will make a profit, the agricultural entrepreneur calculates Money-In and Money-Out **before production**.

Module 5 Decisions for doing good business – Exercise Carp

One 1 bigha pond -stock density 0.8 fish/sqm, mortality rate 8% intermittent harvest – expected yield 520 kg	Unit	Carp Current (1 bigha)			Carp Improved (1 bigha)		
		Quantity	Price (INR)	Total (INR)	Quantity	Price (INR)	Total (INR)
1. Money-Out – Inputs and Services							
Fingerlings	Each	1,335	3.5	4,673	1,068	3.5	
Organic fertiliser	Thela of 50 Kg	1	350	350	2	350	
Quick lime (CaO)	bag of 25 Kg	1	375	375	1	375	
Calcium Carbonate (CaCO3)	bag of 25 Kg	2	694	1,388	3	694	
Rice Bran	bag of 50 Kg	2	650	1,300	8	650	
Oil Cake	bag of 50 Kg	2	1,350	2,700	8	1,350	
Potassium Permanganate	20 g	10	45	450	10	45	
Net rent for harvesting	INR/day	2	500	1,000	2	500	
Water pumping, rent of pump	INR/day	2	300	600	2	300	
Diesel	INR/L	11	90	990	11	90	
Zeolite	20kg bag	0.5	1,100	550	0.5	1,100	
Tetracycline	100 g package	1	84	84	0	84	
Mineral Mixture	1 kg package	3	300	900	1	300	
Oxygen supply	500 g Bottle	1	1,600	1,600	0	1,600	
Total Cost of Inputs and Services			**INR**	**37,650**		**INR**	
2. Money-Out – Labour							
Pond preparation	PD	3	375	1,125	3	375	
Fertilising	PD	4	375	1,500	6	375	
Stocking of fingerlings	PD	1	375	375	1	375	
Feeding	PD	20	375	7,500	25	375	
Checking & Weighing & Observing	PD	3	375	1,125	3	375	
Harvesting	PD	4	375	1,500	4	375	
Total Labour Needs	PD	**35**		**13,125**	**42**		
3. Total Money-Out			**INR**	**50,775**			
4. Money-In							
Production	Kg	400	200	**80,000**	520	230	
5. Profit or Loss? ***(Money in MINUS Money-Out = Gross Margin)***			**INR**	**29,225**			
6. Unit Cost ***(Total Money-Out / Production)***			**INR/kg**	**126.93**		**INR/kg**	

Exercise Rice

Rice improved: Improved variety, two seasons per year.	Unit	Rice Current (1 ha)			Rice Improved (1 ha)		
		Quantity	Price (INR)	Total (INR)	Quantity	Price (INR)	Total (INR)
1. Money out – Inputs &Services							
Seeds 	kg	5.3 x	35 =	186.9	4.2 x	35 =	
Chemical fertilizer 	Treatm.	1 x	801 =	801.0	0 x	801 =	
Organic fertilizer, vermicompost 	kg	0 x	9 =	0	320.4 x	9 =	
Herbicide, post-emergence 	Kg	0.1 x	160 =	16.0	0 x	160 =	
Empty bags 	piece	15 x	7 =	105.0	29 x	7 =	
Insecticides 	L	0.5 x	350 =	175.0	0.54 x	500 =	
Irrigation/pumping 	Lumpsum	1 x	534 =	534.0	1 x	1,068 =	
Land preparation 	Lumpsum	1 x	1,121.4 =	1121.4	1 x	2,242.8 =	
Threshing 	Lumpsum	1 x	560.7 =	560.7	1 x	1,121.4 =	
Transportation cost 	Lumpsum	1 x	133.5 =	133.5	1 x	267 =	
Cost of Inputs and Services			**INR**	**3,633.5**		**INR**	
2. Money Out – Labour							
Land preparation (manually) 	PD	5 x	375 =	1,875	10 x	375 =	
Nursery management	PD	0 x	375 =	0	6 x	375 =	
Transplantation (manually) 	PD	3 x	375 =	1,125	6 x	375 =	
Weeding 	PD	2 x	375 =	750	10 x	375 =	
Application of Pestizdes 	PD	1 x	375 =	375	2 x	375 =	
Harvesting (manually) 	PD	3 x	375 =	1,125	6 x	375 =	
Treshing (manually)	PD	2 x	375 =	750	4 x	375 =	
Marketing	PD	1 x	375 =	375	4 x	375 =	
Total Labour Needs	**PD**	**17**	**INR**	**6,375**	**48**	**INR**	
3. Total Money Out			**INR**	**10,009**		**INR**	
4. Money in							
Production paddy	kg	750 x	12 =	**9,000**	3600 x	12 =	
Production straw	kg	1068 x	5 =	**5,340**	1,602 x	5 =	
Total Money-in	kg			**14,340**			
5. Profit or Loss? *Money in MINUS Money Out*			**INR**	**4,331**		**INR**	
6. Unit Cost *(Total Money Out/Production)*			**INR/kg**	**5.5**		**INR/kg**	

Exercise Duck

40 animals in improved production meat and egg.

	Unit	Duck Current (32)			Duck Improved (40)		
		Quantity	Price (INR)	Total (INR)	Quantity	Price (INR)	Total (INR)
1. Money out – Inputs &Services							
Ducklings (1-2 days)	by piece	0	40	0	0	95	
Ducklings (15 days)	by piece	25	95	2,375	216	17	
Duck Feed (husk/oil cake/rice)	by 1 kg	200	17	3,400	25	10	
Vaccine	per piece	0.3	10	3	100	12	
Feed for ducklings	kg	0	25	0	6	25	
Cost of Inputs and Services			**INR**	**5,778**		**INR**	
2. Money Out - Labour							
Construction Duck House good for 4 years	PD	0.5	375	187.5	0.5	375	
Management for Mother ducks	PD	0	375	0	2	375	
Management for ducklings	PD	0	375	0	1	375	
feeding and management	PD	10	375	3,750	10	375	
Selling of eggs and duck	PD	1	375	375	2	375	
Total Labour Needs	**PD**	**11.5**	**INR**	**4,312.5**	**15.5**	**INR**	
3. Total Money Out			**INR**	**10,090.5**		**INR**	
4. Money in							
Production duck Sales price	head	32	350	**11,200**	40	350	
Production eggs	piece	900	10	**9,000**	900	10	
Duckling	piece	0	95	**0**	50	95	
Total Money-In				**20,200**			
5. Profit or Loss? *Money in MINUS Money Out*			**INR**	**10,109.5**		**INR**	
6. Unit Cost *(Total Money Out/Production)*			**INR/kg**	**315.3**		**INR/kg**	

Explanation of fixed costs

Some costs are called fixed costs. Fixed costs are costs for equipment and tools that the producer owns and uses on various crops for several years – e.g. irrigation pumps, tractors and sprayer.

Main Lessons

1. The Difference between Money-In and Money-Out indicates whether we are making a loss or profit from the use of the land.
2. The Unit Cost of a crop indicates if it can compete on the international market with the same crop produced elsewhere. In the case of food crops, the Unit Cost indicates if it is better to buy the crop on the market.
3. The good agricultural entrepreneur (man or woman) calculates well ahead of the season to decide what he/she will produce and which techniques to use.
4. During the production season the good agricultural entrepreneur (man or women) registers money spent for farm operations and inputs.
5. After the harvest, the good agricultural entrepreneur (man or woman) evaluates his/her profit and identifies what changes are needed to improve the planning and profit for the next production season.

Module 5 – Solution to Exercise Carp

One 1 bigha pond -stock density 0.8 fish/sqm, mortality rate 8% intermittent harvest – expected yield 520 kg	Unit	Carp Current (1 bigha)			Carp Improved (1 bigha)		
		Quantity	Price (INR)	Total (INR)	Quantity	Price (INR)	Total (INR)
1. Money-Out – Inputs and Services							
Fingerlings	Each	1,335	3.5	4,673	1,068	3.5	3,738
Organic fertiliser	Thela of 50 Kg	1	350	350	2	350	700
Quick lime (CaO)	bag of 25 Kg	1	375	375	1	375	375
Calcium Carbonate (CaCO3)	bag of 25 Kg	2 2	694 694	1,388	3	694	2082
Rice Bran	bag of 50 Kg	2	650	1,300	8	650	5,200
Oil Cake	bag of 50 Kg	2	1,350	2,700	8	1,350	10,800
Potassium Permanganate	20 g	10	45	450	10	45	450
Net rent for harvesting	INR/day	2	500	1,000	2	500	1,000
Water pumping, rent of pump	INR/day	2	300	600	2	300	600
Diesel	INR/L	11	90	990	11	90	990
Zeolite	20kg bag	0.5	1,100	550	0.5	1,100	550
Tetracycline	100 g package	1	84	84	0	84	0
Mineral Mixture	1 kg package	3	300	900	1	300	300
Oxygen supply	500 g Bottle	1	1,600	1,600	0	1,600	0
Total Cost of Inputs and Services			**INR**	**37,650**		**INR**	**26,785**
2. Money-Out – Labour							
Pond preparation	PD	3	375	1,125	3	375	1,125
Fertilising	PD	4	375	1,500	6	375	2,250
Stocking of fingerlings	PD	1	375	375	1	375	375
Feeding	PD	20	375	7,500	25	375	9,375
Checking & Weighing & Observing	PD	3	375	1,125	3	375	1,125
Harvesting	PD	4	375	1,500	4	375	1,500
Total Labour Needs	PD	**35**		**13,125**	**42**		**15,570**
3. Total Money-Out			**INR**	**50,775**		**INR**	**42,355**
4. Money-In							
Production	Kg	400	200	**80,000**	520	230	**119,600**
5. Profit or Loss? ***(Money in MINUS Money-Out = Gross Margin)***			**INR**	29,225		**INR**	77,265
6. Unit Cost ***(Total Money-Out / Production)***			**INR/kg**	126.93		**INR/kg**	81.45

Module 5 – Solution to Exercise Rice

	Unit	Rice Current (1 ha)			Rice Improved (1 ha)		
		Quantity	Price (INR)	Total (INR)	Quantity	Price (INR)	Total (INR)
1. Money out – Inputs &Services							
Seeds	kg	5.3 x	35 =	186.9	4.2 x	35 =	189
Chemical fertilizer	Treatm.	1 x	801 =	801.0	0 x	801 =	0
Organic fertilizer, vermicompost	kg	0 x	9 =	0	320.4 x	9 =	2,883.6
Herbicide, post-emergence	Kg	0.1 x	160 =	16.0	0 x	160 =	0
Empty bags	piece	15 x	7 =	105.0	29 x	7 =	203
Insecticides	L	0.5 x	350 =	175.0	0.54 x	500 =	270
Irrigation/pumping	Lumpsum	1 x	534 =	534.0	1 x	1,068 =	1,068
Land preparation	Lumpsum	1 x	1121.4 =	1,121.4	1 x	2,242.8 =	2,242.8
Threshing	Lumpsum	1 x	560.7 =	560.7	1 x	1,121.4 =	1,121.4
Transportation cost	Lumpsum	1 x	133.5 =	133.5	1 x	267 =	267
Cost of Inputs and Services			**INR**	**3,633.5**		**INR**	**8,244.8**
2. Money Out - Labour							
Land preparation (manually)	PD	5 x	375 =	1,875	10 x	375 =	3,750
Nursery management	PD	0 x	375 =	0	6 x	375 =	2,250
Transplantation (manually)	PD	3 x	375 =	1,125	6 x	375 =	2,250
Weeding	PD	2 x	375 =	750	10 x	375 =	3,750
Application of Pestizdes	PD	1 x	375 =	375	2 x	375 =	750
Harvesting (manually)	PD	3 x	375 =	1,125	6 x	375 =	2,250
Treshing (manually)	PD	2 x	375 =	750	4 x	375 =	1,500
Marketing	PD	1 x	375 =	375	4 x	375 =	1,500
Total Labour Needs	**PD**	**17**	**INR**	**6,375**	**48**	**INR**	**18,000**
3. Total Money Out			**INR**	**10,009**		**INR**	**26,245**
4. Money in							
Production paddy	kg	750 x	12 =	**9,000**	3600 x	12 =	**43,200**
Production straw	kg	1068 x	5 =	**5,340**	1,602 x	5 =	**8,010**
Total Money-in				**14,340**			**51,210**
5. Profit or Loss? *Money in MINUS Money Out*			**INR**	4,331		**INR**	24,965
6. Unit Cost *(Total Money Out/Production)*			**INR/kg**	5.5		**INR/kg**	5.04

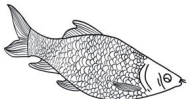
Module 5 – Solution to Exercise Duck

	Unit	Duck Current (32)			Duck Improved (40)		
		Quantity	Price (INR)	Total (INR)	Quantity	Price (INR)	Total (INR)
1. Money out – Inputs &Services							
Ducklings (1-2 days)	by piece	0	40	0	0	95	0
Ducklings (15 days)	by piece	25	95	2,375	216	17	3,672
Duck Feed (husk/oil cake/rice)	by 1 kg	200	17	3,400	25	10	250
Vaccine	per piece	0.3	10	3	100	12	1,200
Feed for ducklings	kg	0	25	0	6	25	150
Cost of Inputs and Services			**INR**	**5,778**		**INR**	**5,272**
2. Money Out - Labour							
Construction Duck House good for 4 years	PD	0.5	375	187.5	0.5	375	187.5
Management for Mother ducks	PD	0	375	0	2	375	750
Management for ducklings	PD	0	375	0	1	375	375
Feeding and management	PD	10	375	3,750	10	375	3,750
Selling of eggs and duck	PD	1	375	375	2	375	750
Total Labour Needs	**PD**	**11.5**	**INR**	**4,312.5**	**15.5**	**INR**	**5,812.5**
3. Total Money Out			**INR**	**10,090.5**		**INR**	**11,084.5**
4. Money in							
Production duck Sales price	head	32	350	**11,200**	40	350	**14,000**
Production eggs	piece	900	10	**9,000**	900	10	**9,000**
Duckling	piece	0	95	**0**	50	95	**4,750**
Total Money-In				**20,200**			**27,750**
5. Profit or Loss? *Money in MINUS Money Out*			**INR**	**10,110**		**INR**	**16,665.5**
6. Unit Cost *(Total Money Out/Production)*			**INR/kg**	**315.3**		**INR/kg**	**277.11**

Module 6 Diversifying your farm enterprise for more income

After all the calculations, we will determine the opportunities to increase revenues. By looking at the numbers on this page we will learn how to make investment decisions. We will determine the best opportunities as follows:

- Rank enterprise based on Profit or Loss
- What enterprise and techniques will you choose?
- Make a choice based on this ranking
- Calculate the risk in the table below
- Transfer the new profit and loss in the table and redo the ranking
- What do you observe?

	Unit	 Carp		 Rice		 Duck	
		Current	**Improved**	**Current**	**Improved**	**Current**	**Improved**
		1 pond	1 pond				
Surface Area	sqm or ha	1 bigha	1 bigha	1 ha	1 ha	1 ha	1 ha
Mortality	%	20 %	8 %				
Production	Kg/head	400	520	750	3600	32	40
Price	INR	200	230	12	12	350	350
1. Money-In	INR/ha	80,000	119,600	14,340	51,210	20,220	27,750
2. Money-Out	INR/ha	50,775	42,535	10,009	26,245	10,090	11,084
3. Profit or Loss?	INR/ha	29,225	77,265	4,331	24,965	10,110	16,665
Rank (based on profit/loss)							
4. Profit or Loss with risk?							
Rank (based on profit/loss with risk)							

What is a risk in aquaculture and in agriculture?

Risk is defined as any factor that may cause losses to the farm business.

The agricultural entrepreneur **(man or woman)** does not like risks because they are difficult to predict. However, one can determine during the planning what the impact of risks could be on revenues.

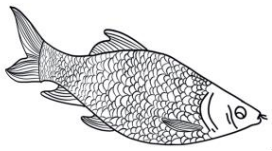
We use an example below to learn this.

Production Risks	**Market Risks**
Due to a lack of rains the yield of rice falls to ▪ 675 kg / ha (current technique) ▪ 1,287 kg/ha (improved technique)	Imports which are not fairly regulated flood the market. ○ e.g. rice prices and prices of other products drops ○ Carp price drops from 120 INR to 110 INR and from 140 INR to 130 INR

Let us have a look at what the implications are on revenues in the case of the above production and marketing risks.

- Calculate the changes to Money-In and resulting Profit. Money-Out remains unchanged as the money is already spent.
- Rank crops once more based on Profit or Loss using the tables below
- Register the results in the preceding table to compare the results with the situation without risk

Production Risk
The yield for rice current and improved are reduced due to lack of rains
Marketing Risk
Sales price for Carp is lower than expected (current and improved)



		Rice		Carp	
	Unit	**Current**	**Improved**	**Current**	**Improved**
Production size		1 ha	1 ha	1 bigha	1 bigha
Production	kg	**675**	**1,287**	400	520
Price	INR	12	12	110	130
1. Money-In	INR				
2. Money-Out	INR	10,009	26,245	30,085	42,535
3. Profit or Loss?	INR				

Risk-Management Strategies

Some risks can be managed. Examples of risks and risk-reducing strategies are:

Table presents risks in fish farming in Indiai among small-scale fish farmers. [1]

Risk	Frequency of Occurrence	% Fish Loss	Comments
Poor management	Depending on managment	up to 50% (depending on stocking density)	To attain reasonable growth, fish require feed, be it natural feed by fertilization of the pond, supplementary feeding of agri-by-products or formulted feed. This can be best managed, if fish growth is regular monitored by sampling & weighing.
Mortalities at Stocking	1 x/year	up to 10%	If fingerlings are very small, rough handling and stress increase mortality. Careful handling and stocking of larger fingerlings reduces this risk to a minimum.
Predation	monthly	3%	Predation from birds and snakes cause injuries and losses. Often weak fish are lost. Use of scarecrows, reflective aluminum stips flapping in the breeze can reduce bird predation. A large mesh net placed across middle inside water of a pond can be effective.
Theft	1 time / 100 ponds	Up to 100 %	As fish grow poaching fish by thieves increases using a line and hook or a net. Farmers need to be observant of conditions around their ponds as thieves usually leave a trace. Poachers usually steal fish at night. Guards are needed at high producing farms.
Flooding	every 3-5 years	Up to 100 %	Risk of flooding risk depends on the area. Flood prone areas tend to be floodded often and you may calculate with a flooding every 3 years with a total loss of fish.
Draught	1x / year	2%	Ponds built in the water table or low lying areas are difficult to manage and not recommended. The most successful aquacultural entrepreneurs have ponds fed by streams; such ponds can be filled or drained anytime.

[1] COFAD 2021

Main Lesson

1. Comparing profits of different crops and production techniques helps the agricultural entrepreneur to make decisions about using the land, labour and capital to maximise revenue. This comparison is important for all agricultural entrepreneurs (men or women).
2. Production decisions are based on these comparisons.
3. The good agricultural entrepreneur (man or woman) knows that a fluctuation in prices constitutes a risk on revenue. Risks are a concern for traditional as well as improved techniques, be it crop or animal production.
4. To evaluate the impacts of market risk, the producer calculates the Money-In with a much lower price ("pessimistic") than the current price (or last season's price). If the "pessimistic" profit can still satisfy the revenue objectives, then the risk is acceptable.
5. The good agricultural entrepreneur (man or woman) seeks actively for information in prices and markets
6. Production risks can be reduced using risk-management strategies and following recommendations for pond establishment and protection methods.

Module 7 Manage your money throughout the year

Management of money

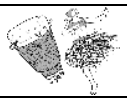
- How does one know if the money is managed badly?
- What are the causes?
- How to manage money well during the year?

One must plan!
The person, who fails to plan, plans to fail!

First step: Foresee household expenditure

We have looked at « Money In » and « Money Out » for different crops on the farm.

Now we will have a look at the expenditures of a household of 4-5 persons (1 of the children not yet in school, 2 children in primary school). How much money is needed for the household in one year? Can we foresee these expenditures? When is the money needed?

Money needs of the household	Can be foreseen?	Period/Month	Money-Out	
			INR per period/month	INR per year
Matches 	yes	Each month	5	60
Salt 	yes	Each month	30	360
Soap 	yes	Each month	40	480
Electricity	yes	Each month	330	3,960
Purchase food 	yes	Each month	4,130	49,560
Mobile phone recharge	yes	Each month	200	2,400
Subtotal each month / per year INR				
School uniforms for 2 children 	yes	Dec/Jan		1,500
Clothing at end of the year and in June 	yes	Apr, Oct, Nov, Dec		10,000
Happy events 	yes	April & Jan & Dec		10,000
Unexpected events	yes	unexpected		10,000
Annual money needs for household INR				

In this exercise we will now consider a household managing 1 bigha pond area, 1 ha of field for rice and 30 ducks. We are looking at how expenditures and income are spread over the year for both current and improved production techniques as in Module 6, and then look if the money needed for the household is really available.

Module 7 Exercise: Financial Calendar for a farm using current practices (INR) – 1 ha field and 1 bigha pond for carp

Money-Out		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Carp	**1 bigha**													
	Inputs and Services													
	Labor Costs													
Rice	**1ha**													
	Inputs and Services													
	Labor Costs													
Duck	**30**													
	Inputs and Services													
	Labor Costs													
1. Total expenditure for production per month														
Household monthly														
School fees and material														
Happy Events														
Unexpected Events														
Clothing														
2. Household expenditure per month/year														
3. Total expenditure per month/year (1+2)														
Money-In		**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Total**
Carp														
Rice														
Duck														
4. Total money income production per month														
Profit or loss		**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Total**
Monthly balance (Money in- Money out (4.-3.)														
Cumulative balance (Money in- Money out														

Module 7 Exercise: Financial Calendar for a farm using <u>improved</u> practices (INR) – 1 ha field and 1 bigha pond for carp

Money-Out		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Carp	**1 bigha**													
	Inputs and Services													
	Labor Costs													
Rice	**1ha**													
	Inputs and Services													
	Labor Costs													
Duck	**30**													
	Inputs and Services													
	Labor Costs													
1. Total expenditure for production per month														
Household monthly														
School fees and material														
Happy Events														
Unexpected Events														
Clothing														
2. Household expenditure per month/year														
3. Total expenditure per month/year (1+2)														
Money-In		**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Total**
Carp														
Rice														
Duck														
4. Total money income production per month														
Profit or loss														
Monthly balance (Money in- Money out (4.-3.)														
Cumulative balance (Money in- Money out														

Let's discuss the results using this overview

			With **current** production techniques	With **improved** production techniques
	Can be foreseen?	**Period-month**	**Per year (INR)**	**Per year (INR)**
Money-Out for household	Yes	Each month		
Money-Out for inputs, services and labour	Yes	Different months		
Total Money-Out for household and production	Yes	Different months		
Money-In from production	Yes, but can change	Different months		
Money-In from other sources	Yes, but can change	Different months		
Total Money-In from production and other sources	Yes, but can change	Different months		
Money available for next season, other expenditure including labour, and savings (INR) Total Money-In from production and other sources minus Total Money-Out for household and production				

Difference between the two situations	**INR**	

Main Lessons

1. In the agricultural enterprise, expenditures (Money-Out) for the farm and the household are made each month, but the revenue (Money-In) comes only during the months of harvest or sale of produce. Therefore there are months of the year where the expenditures are greater than the revenues. These months are called "**deficit months**."

2. For this reason, the good agricultural entrepreneur (man or woman) makes a financial calendar. He or she plans with the spouse(s) the expenditures for production and household needs.

3. To cover the expenditures in deficit months, the good agricultural entrepreneur saves money from the sales of produce ("surplus months").

4. Improved techniques can improve the revenues of the agricultural entrepreneur.

5. The needs for Inputs can be identified with calculations of Gross Margin and the Financial Calendar. This information can be used to make savings in a targeted way or to solicit credit for production.

Module 8 How to get good financial services

Objectives:

- Learn about financial services and become an informed financial decision-maker
- Learn about basic skills related to earning, spending, saving and borrowing
- Strengthen and sustain financially-responsible behaviours that will lead to increased savings, prudent spending, and borrowing for productive purposes
- Understand what you need to keep in mind when getting financial services

Savings

Saving is when money is put aside by an individual or household in the present for use in the future. Saving can also be done in the form of investments, animals or land, which can be sold when cash is needed and is a way of building assets.

Why is it important to create savings?

- With savings you can invest in your enterprise and thereby make greater revenue. For example, by buying fertilizer or improved seeds.
- If you save on a bank account, your money is safe.
- Savings on an account are often necessary to obtain a loan.

How can you create savings? What are the advantages and disadvantages?

	Hide money at home	Bring money to a bank
Advantage	1. The money is immediately available	1. The money is safe at the bank 2. Having savings at the bank facilitates a loan from the bank 3. Saving at the bank reduces the risk of spending money impulsively because it is not immediately available
Disadvantage	1. Money is not safe and can be stolen 2. Money can be destroyed (by a fire, for example). 3. There is increased risk of making impulsive expenditures	1. The money is not immediately available

Paying money into your bank account	Removing money from your bank account
• Go to the bank or village financial institution	• Think why you need money, and how much • Go to the bank or the village financial institution
• Fill out the deposit form	• Fill out the money withdrawal form
• Your deposit is registered in your savings booklet	• Your withdrawal amount is registered in your savings booklet

Bank Deposits

Collection of money from the people

Commercial Banks, Savings and Credit Cooperatives (SACCO's) and some Microfinance Institutions (MFI's) collect money from people who have it to spare or who are saving it from their income. They keep the money safe on your account.

Your money can be put into **current**, **savings** and **fixed accounts**.

A **Current Account** allows the agricultural entrepreneur (man or women) to always access money. Money put in this account can be taken out any time. You use a cheque to take out money or to pay a bill. The bank charges a fee for the services it has given to you for this account.

What saving products are being offered by financial service providers?

A **Savings Account** helps you to save money and keep it safe or with the objective to get a loan. You can take money only when you are present at the bank. The bank pays additional money on the money in this account every three months, every six months or every year. As owner of a savings account you receive a passbook from the bank into which money put in and money taken out is recorded.

A **Fixed Deposit Account** helps you to keep money safe and to earn more money. You can only take out your money after a certain time, that you have agreed with the bank, let us say six months. The money that is paid on top of the amount in this account depends on how long the money will be in this account. If for any reason, you want to take out the money before the time you have agreed with the bank, the bank charges you a fee. This type of account could be used by a farmer business person planning to put in more money into for example quality seed or fertilizer. For long-term fixed deposits can help you to build up more money and also interest over time, and thus can be used for investments, such as pond establishment

There are many advantages of depositing money. However, there are things that the agricultural entrepreneur (man/woman) should look into when opening a bank account, such as the direct costs that are associated with the account. Direct costs might be:

- Monthly account holding fees
- Withdrawal fees
- Costs for an ATM card
- Account opening fees

When visiting a financial institution, the agricultural entrepreneur makes sure to ask the officer for information on all of these and other costs.

There are also indirect costs that may be associated with a bank account and have to be taken into consideration, e.g. travel time and cost to reach the nearest bank branch, agent, or ATM.

Loans

What is Credit (Lending / Loan)?

It is money you borrow from a person or a bank promising to pay back this money. This is a service you get and you pay a fee for this service, which is called interest.

- A loan is money you borrow (credit) from a person or a bank.
- Money can be borrowed for a very short time (1 month to 12 months).
- Money can be borrowed for a short time (1 to 2 years)
- Money can also be borrowed for a long time (3 years onwards).
- Service fee (interest) can be charged every week or every two weeks, every month or every year on the money you borrowed.

Reasons people borrow:

- To invest
- To respond to an unexpected emergency
- To consume – to purchase an item for which they do not have enough money

Discussions

What are the responsibilities when borrowing?

- How did you feel when you lent something – anything – to someone that was not returned to you? What did you do?
- How did you feel when you failed to return something that you borrowed? What happened?
- When someone borrows something, what are their responsibilities as the borrower?
- What can happen if the borrower fails to meet their responsibilities as a borrower?

What is the difference between using your own money and using borrowed money?

- A loan costs money.
- A loan comes with obligations for the borrower, including repayment with interest and, in some cases, group membership.
- You have fewer obligations and responsibilities when you use your own money.
- By borrowing, you gain access to more financial capital

The most common sources of loans are summarized below.

Microfinance Institution	**Informal Lender (Baniya)**	**Village Savings and Loans Association (VSLA)**
		
Bank	**Loans from Friends and Family**	
		

What to know before borrowing:

- The use of the loan money you are intended to get
- The sources of income and/or savings you have to make those payments
- When you will actually get the loan
- The amount of your loan payment, including principal, interest and fees
    - Usually, interest is charged monthly as a percentage on the loan amount. Make sure that you really understand what the interest rate is, not only in a percentage but also in monetary terms
    - Loan processing fees as a percentage of the loan
    - Mandatory credit life insurance
- That the price you can charge for your goods financed with loan money is high enough to both repay the loan, interest and still make sufficient profit
- Understand the grace period before the first repayment is due

When you apply for a loan, the bank or MFI will demand a number of things from you before they consider giving you a loan. Some requirements could be:

- A valid ID card
- Proof of residence (e.g. utility bill or letter from the chief)
- Some form of collateral or compulsory savings

Depending from whom you borrow, the service fee (interest) you will have to pay will vary.

Let us have a closer look at how a bank provides a loan. After applying for the loan a bank will give you a letter telling you it has agreed to give you the money you have asked for. The bank also shows when you have to pay back the total amount of money.

You, the borrower and the bank know what will be the payments of the loan and service fee is being paid, and when is it to be paid. This makes planning very simple for all.

Example

Jeherul is a farmer from India. He needs INR 166,000 to buy fertilizer for his rice crop (1 ha). He decides to go to the bank to borrow this money.

The bank agrees to give Jeherul the money but told him, he has to pay back INR 196,800 in 6 months

The INR 166,000 Jeherul borrowed is the credit. Jeherul will have to pay INR 30,800 as fee for the money he borrowed.

The 6 months is how long it will take until Jeherul has to pay back the money.

There are two common types of loans

- Business loans
- Personal loans

Business Loan

This loan is given to business men and women like farmers to make their business (farming) better or to increase the size of their business (farm increasing from 2.5 acres to 5 acres). They are given to the groups or to individuals. Examples of business loans are:

Agricultural Loan:	This is a short time loan that can be used to buy planting material, seeds, fertilizer, insecticides, and herbicides.
Expansion Loan:	This loan helps farmers to increase their farming business by increasing the cropping area.
Other investment loans:	For other non-agriculture related businesses (expanding existing businesses e.g. groceries shops).

Personal Loan

This type of loan is not for business. It is rather used to buy things that are needed for the home like a solar system or to pay school fees.

Ways by which money can be borrowed

- You can borrow money as a single person (individual loan). In this case, the bank always asks for things like a building, a car or land to be put down before giving out the money. If you pay the loan back and the service fee in time, the bank will be happy to serve you in the future.
- You can borrow money as a member of a group (group solidarity loan). The group can be a VSLA or a registered Farmers' Association. If you pay the loan back and the service fee in time, the other group members will be happy to keep you in the group.

	**It is important that you pay back your loan plus the interest after the agreed time.** **This way you can build a good relationship with the lender and make sure that next time you will get another loan at the same or maybe even better conditions!**

Main Lessons:

1. The good agricultural entrepreneur (man or woman) plans his/her expenditures and money entries throughout the year to avoid shortages of money and unforeseen loans that are expensive.
2. To meet the needs of Money-In in deficit months, the good agricultural entrepreneur makes savings with the surplus money from product sales. It takes discipline to do so.
3. Saving money with a bank or a micro-finance institution which is close by has the advantage that money is safe. Another advantage is that one is obliged to plan for expenses before withdrawing money.
4. To know which bank account to open and use, the agricultural entrepreneur enquires about the conditions and associated cost.
5. There are different types of savings that offer various benefits. Banks and micro-finance institutions provide information and advice to assist their customers.
6. There are different types of loans. The good agricultural entrepreneur looks at the options and chooses the type of loan with convenient service fees and conditions for reimbursement
7. The good agricultural entrepreneur takes a loan only when he/she is sure to be able to repay on time. For this reason, he/she plans the investments and expenditures required. The Gross Margin and the Financial Calendar are the appropriate tools for this planning.
8. Once a loan is received, the good agricultural entrepreneur sticks to the objective of the investment. Otherwise, he/she is likely to have repayment problems.
9. The good agricultural entrepreneur pays back his/her loan plus the interest in the agreed time. This way he/she can build a good relationship with the financial institution and make sure that next time he/she will get another loan with the same or maybe even better conditions.

Module 9 Make more money with better feeding and management

Performance overview

IMC growth parameters 1 bigha pond		Unit	Current practice	Improved practice
1.	Number of fingerlings at stocking	Animals	1300	1068
2.	Live weight of fingerlings at stocking	grams per fingerling	5-10	7-8
3.	Days of culture (DOC)	Days	270	270
4.	Live weight at point of harvest	kg	400	520
5.	Mortality	% (stocking to harvest)	20%	8 %
6.	Average live weight when sold	grams per animal	500	1200
7.	Average daily weight gain	gram per day	0,9	1,1
8.	Feed conversion rate	gram feed per g live weight gained	0,5	1.5
9.	Feed cost per kg fish produced [INR/kg fish]	INR/kg fish produced	10	31
10.	**Money-out**	INR/cycle	**38,751**	**42,535**
11.	**Unit costs**	INR/kg live weight	**75,21**	**81,80**
12.	**Selling price**	INR/kg live weight	**200**	**230**
13.	**Money-in**	INR/cycle		
14.	**Profit**	INR/cycle		
15.	**Profit per Unit**	INR/kg live weight		

Why these differences?	Who can change this?
The farmer does or does not apply good feeding and pond management techniques	**The farmer!** **Regular fertilization, feeding and monitoring of the fish (weight, mortality, feed) and water quality is key to do better business!**

To do good business and make more income, the entrepreneur (man or woman) follows the advice given and applies all steps of Good Aquacultural Practices (GAP) to get the most benefit out of inputs and work.

Every step is important.

Every mistake makes you lose money and work.

Site selection

Proper site selection is recognized as the first step guaranteeing the eventual success of any aquaculture activity and therefore forms the basis for proper design, layout, construction and management of an aquaculture enterprise. In fish farming, profitability depends primarily on the selection of a suitable site and therefore site selection is critical and should be given utmost attention. If site selection is not properly done, it may be expensive to operate a fish farming business. The following are the guidelines for the selection of a suitable site for fish ponds although may vary from one site to site:

- Soil suitability
- Topography of the land
- Proximity or accessibility
- Flooding incidence
- Climate
- Land and Water Rights
- Availability of fingerlings production objectives, environment and socio-economic factors
- Markets

Pond construction

Before starting fish farming operations, farmers spend a good percentage of their fish farming expenses in construction of fishponds. They have to critically decide how many and what type of ponds they have to dig before making their first fish harvest. Before the construction works start, think of the design of the pond, the layout according to the land size, topography and source of water. Type of soils can also guide on how to design, layout and construct the ponds. Before constructing ponds, a farmer needs to check the type of soil, and whether the soil can hold water. Clay soil can hold water for a long time whereas land with sandy soil may not retain water for very long. Clay soils and similar types such as sandy clay and sandy loam soils are found in most areas, but most of the land available for aquaculture is unused or unfertile soils. It is likely that soil will not completely hold water and so a quick investigation is necessary. After considering the soil type, it is very important to fully understand the design and functions of facilities for running this particular pond farming system. Fish farmers are encouraged to construct and use of deeper ponds in colder areas and where water is a challenge as shallow ponds do give a number of challenges when it comes to profitable production**.**

Pond liming

After construction, draining, drying and de-silting the pond, before ponds are stocked with fish, they have to be limed. Liming will help improve pond soil quality, provides CO_2 for photosynthetic organisms and will help combat parasites within the pond. If ponds cannot

be dried out completely, they should still be treated to eliminate any predatory fish or other pests. One common practice is to use agricultural lime which is relatively cheaper and abundant. The lime should be applied evenly across the whole bottom. This can be done by manual broadcasting. It is not necessary to dig the lime into the soil; however this will improve its effectiveness. The liming process will remove the majority of unwanted organisms from the pond and improve the effectiveness of fertilization. After the lime has been applied, you can fill your pond to approximately half to two thirds. Thereafter, fertilization can begin.

Pond fertilization

Fertilization is another step in preparing your pond. It provides nutrients to the water, which stimulate the growth of algae and other organisms, such as insects that provide a nutrient source for your fish. The purpose of fertilization in open pond aquaculture is to provide exogenous elementary nutrients (carbon, nitrogen and phosphorus) to enhance natural food in the water. More natural food means faster fish growth, and less supplementary feed will be added. Natural food includes tiny plants called phytoplankton, which are nearly buoyant in the water column, giving the water a greenish color. Algae can be consumed directly by fish or be food for zooplankton (tiny animals and water insects), which the fish can also eat. When fertilizing your pond, you can use either inorganic or organic fertilizers.

Pond stocking

Stocking fish seed (fingerlings) after pond preparation. The carrying capacity of the pond and level of management determines the stocking rates. The stocking rate will also vary according to the common fish culture practices in the surrounding area and the financial capability of farmers. For example, if the farm is using formulated feeds and has a stable supply of water, stocking rates can be increased. Stocking rates vary depending on the quality and availability of water, soil and capital as well as the desired marketing size of the fish.

Feeding

Fish feeding is considered one of the most basic factors in increasing fish production in farms. And if the stocking density is to grow, balanced/formulated feeds have to be used. Good nutrition in fish production systems is essential to economically produce a healthy, high quality product. As formulated fish feeds with good nutrition are very costly, the development of inexpensive, balanced diet formulations is of great importance. This will support aquaculture to satisfy the increasing demand for affordable, safe, and high-quality fish products. As fish meal is often used as a source of animal protein in fish diets though it is costly, the use of alternative feed ingredients, suitable to replace fish meal in artificial diets, like soybean, are becoming more and more popular for fish feed formulations**.**

Harvesting

Aquaculture can be defined as a sustainable practice of fish harvesting that strives to keep aquatic biodiversity and ecosystems intact. And fish harvesting is one of the important pond corrective measures or practices in aquaculture. Fish must be harvested after a production cycle and farmers must adhere to a production cycle. If fish is not harvested the farmer will not get any benefits in return as feed and other resources will just be wasted. The duration of the cultivation is varied upon the agro-ecological zone, intensity of the farming, purpose of production, preferred market size for fish, seasons and by opportunities to achieve good volume of sales and market prices. Some fish harvests are influenced by for example, fortnight pay days and markets, paydays, festive times. For IMC, harvests can be done starting from about 3 – 6 months from the date fingerlings have been stocked.

Pond maintainance

If your pond is producing less than it should provide, one of the common causes can be insufficient nutrients to support fish growth, especially in semi-intensive and extensive pond systems. Pond preparation is a key element in any pond production system. Pond preparation involves liming and fertilization to provide an ideal environment for IMCs to grow. Some of the steps you need to follow include: Draining, drying the pond, de-silting, weed removal, maintaining inlets and outlets, and maintaining dyke shapes.

Record keeping

Analysis of any aquaculture enterprise (financial or biological), requires sound and up to date information (records). In aquaculture, farm records are the most reliable form of information one can use. Poor record keeping is probably one of the major reasons entrepreneurs fail. Investors who operate without records are likely to make wrong decisions due to lack of information of what is happening in their farms. Fish farmers and hatchery operators are therefore required to keep accurate records for all of their farm operations for their own safety and benefit.

Module 10 Benefits from membership of Farmers' Organisations

Questions for discussion in this module

- How a Farmer Organisation can support you in your business development
- How a Farmer Organisation can support you with access to inputs and markets
- What the economic benefits are of belonging to a Farmer Organisation
- How one can know if a Farmer Organization works well

How can one know if a Farmers' Organisation works well?

Existence of the group:

- Members pay membership fees and annual contributions without pressure.
- Members understand cost deductions on groups sales and accept them without complaining.

Operation of the group:

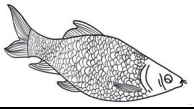
- Existence of rules
- Existence of rules on the control of accounts
- Regular production and presentation of reports
- The evolution of group activities (tonnage production, sales volumes of expenditure, group purchasing of inputs) is positive.

Exercise 1: Group purchase of inputs

Group purchase of inputs can help to negotiate lower prices as larger quantities are bought. **As an example, we assume that inputs can be purchased at a 10% discount through purchases as a group.**

Let us see how much the benefit is for one group member if all required inputs (seed, herbicide, fertiliser, pesticides, bags, etc.) are purchased as a group at a lower price. Services such as land preparation, transport from field to house and to market is <u>not</u> to be included.

Calculation of benefit from group purchase of inputs – <u>improved</u> production techniques

		Carp improved		**Rice improved**		**Duck improved**	
							
	Unit	Individual input purchase 	Group input purchase (less 10%) 	Individual input purchase 	Group input purchase (less 10%) 	Individual input purchase 	Group input purchase (less 10%) 
Surface Area		1 bigha	1 bigha	1 ha	1 ha	40	40
Cost of Inputs (i.e. without services)	INR	26,785	- **24,106.5**	8,244.8	- **7,420.3**	5,272	- **4,744.8**
Benefit Group Purchase	INR	=		=		=	

Total Benefit from the Group Purchases	**INR**	

Exercise 2: Group sale of products

Selling products as a group can also be called **collective marketing**.

Let us calculate the economic benefit obtained through group sales with better prices – in the case of <u>improved</u> farm production, looking at duck, rice and carp.

		Carp Improved 		**Rice improved** 		**Duck improved** 	
	Unit	Individual Sale 	Group Sale 	Individual Sale 	Group Sale 	Individual Sale 	Group Sale 
Surface Area		1 bigha	1 bigha	1 ha	1 ha	40	40
1. Money-Out (Inputs & Services, Labour)	INR						
Production	Kg	520	520	3600	3600	40	40
Price	INR/kg	230	**244**	12	**13.2**	350	**385**
2. Money-In Production	INR						
3. Benefit from Group Sales	INR						

Total Benefit from the Group Sale	**INR**	

Agricultural entrepreneurs can also benefit through group transport after harvest aggregation.

What is a good Farmer Organization?

- How can you know if your farmer organisation works well?
- What are characteristics of a successful farmer organization?
- How can you contribute to the success of your farmer organization?

Main Lessons

1. Agricultural entrepreneurs form groups or associations to do things they are not able to do alone. Farmer organisations can thereby help agricultural entrepreneurs to address challenges, overcome risks and seize business opportunities.
2. Groups or associations of agricultural entrepreneurs have a common business objective. To achieve their common objective, the members plan together, learn from each other and support each other. Group activities such as group sales of products need to be carefully planned and well managed.
3. Larger business partners that sometimes offer interesting opportunities often prefer to work with groups or associations to avoid risk and save on cost.
4. Good Farmer Organisations offer relevant and good services to members. Economic benefits of belonging to a Farmer Organisations can include:
    a. better exchange between farmers to learn from each other
    b. better access to information about markets and prices,
    c. better access to good inputs such as seed,
    d. reduced costs of buying inputs
    e. better access to knowledge about production,
    f. access to equipment and machines such as scales or milling machines
    g. better access to good or new markets,
    h. more negotiating power with sellers of inputs and buyers of commodity
    i. reduced costs of marketing
5. Group activities need to be very well planned and organized in order for members to benefit. Moreover, the leaders have to carefully calculate if there is a tangible profit for members from the specific group activity and service. When leaders have done their job properly they can convince members with good and correct arguments.
6. In a good farmer organisation:
    a. Members are agricultural entrepreneurs
    b. Leaders and members share a joint vision and clear business objectives
    c. Farmer Organizations offer relevant and good services to members
    d. There are clear rules about important aspects of the organisation (e.g. through By-Laws). The rules are applied. If rules are not adhered to there are clearly defined and applied sanctions (e.g. payment of fees)
    e. Records are kept in a professional way. This is important to assess performance of the Farmer Organization and increases transparency and member trust. Accounts are controlled and leadership produces reports regularly.
    f. Members, who want their Farmer Organization to be strong pay their financial contributions, participate actively in meetings, participate in group economic activities and ask leaders to be accountable. Resources are necessary for the farmer organization to function properly.
    g. Members select leaders for their capacity and commitment to lead the Farmer Organization to success. Leaders are strategic, competent, transparent and accountable. Competent women and youth have the same chances to become leaders as competent men.
    h. Group business activities increase over time. A successful organisation starts small and develops further over time.
7. Agricultural entrepreneurs that are members of well-functioning associations or groups do better business.

Module 11 Earning more money: Investing in fish

We have seen that you can make money with fish through good planning and market knowledge, good aquaculture techniques, data and calculations that help you to make good decisions.

For pond-based aquaculture, investment in the pond and equipment is needed.

Let’s see what the investment is about.

The investment calendar on the following two pages shows us the Money-Out and Money-In each year and whether the investment is good business.

Investment calendar for improved pond-based fish production (Year 1- Year 15)

1. Money-Out																		
Inputs and services	**Unit**	**Quantity**	**Unit price**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**	**Year 11**	**Year 12**	**Year 13**	**Year 14**	**Year 15**
Fingerlings incl. transport	by piece	1,068	4	3,738	3,738	3,738	3,738	3,738	3,738	3,738	3,738	3,738	3,738	3,738	3,738	3,738	3,738	3,738
Organic Fertiliser	Thela of 50 Kg	2	350	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700
Quick lime (CaO)	bag of 25 Kg	1	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
Calcium Carbonate (Ca CO3)	bag of 25 Kg	3	694	2,082	2,082	2,082	2,082	2,082	2,082	2,082	2,082	2,082	2,082	2,082	2,082	2,082	2,082	2,082
Rice Bran	bag of 50 Kg	8	650	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200
Oil Cake	bag of 50 Kg	8	1350	10,800	10,800	10,800	10,800	10,800	10,800	10,800	10,800	10,800	10,800	10,800	10,800	10,800	10,800	10,800
Potassium Permanganate	20 g	10	45	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450
Net rent for harvesting	IR/day	2	500	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Water pumping, rent of pump	IR/day	2	300	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600
Diesel	IR/L	11	90	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990
Zeolite	20 kg bag	1	1100	550	550	550	550	550	550	550	550	550	550	550	550	550	550	550
Tetracycline	100 g package	0	84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mineral Mixture	1 kg package	1	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Oxigen supply	500 g Bottle	0	1600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal Inputs and Services	INR			***26,785***	***26,785***	***26,785***	***26,785***	***26,785***	***26,785***	***26,785***	***26,785***	***26,785***	***26,785***	***26,785***	***26,785***	***26,785***	***26,785***	***26,785***
Labour	**Unit**	**Quantity**	**Unit price**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**	**Year 11**	**Year 12**	**Year 13**	**Year 14**	**Year 15**
Pond preparation	MD	3	375	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125
Fertilising	MD	6	375	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250
stocking of fingerlings	MD	1	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
Feeding	MD	25	375	9,375	9,375	9,375	9,375	9,375	9,375	9,375	9,375	9,375	9,375	9,375	9,375	9,375	9,375	9,375
Checking & Weighing & Observ	MD	3	375	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125
Harvesting	MD	4	375	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
Subtotal labour	INR			***15,750***	***15,750***	***15,750***	***15,750***	***15,750***	***15,750***	***15,750***	***15,750***	***15,750***	***15,750***	***15,750***	***15,750***	***15,750***	***15,750***	***15,750***
Investments	**Unit**	**Quantity**	**Unit price**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**	**Year 11**	**Year 12**	**Year 13**	**Year 14**	**Year 15**
Pond construction (15 years depreciation)	**lumpsum**	1	130,000	130,000														
Subtotal Equipment	***INR***			***130,000***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***
Total Outflows	INR			**172,535**	**42,535**	**42,535**	**42,535**	**42,535**	**42,535**	**42,535**	**42,535**	**42,535**	**42,535**	**42,535**	**42,535**	**42,535**	**42,535**	**42,535**
2. Money-In																		
Products	**Unit**	**Quantity**	**Unit price**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**	**Year 11**	**Year 12**	**Year 13**	**Year 14**	**Year 15**
Fish	kg live weight	520	140	72,800	72,800	72,800	72,800	72,800	72,800	72,800	72,800	72,800	72,800	72,800	72,800	72,800	72,800	72,800
Total inflows in	INR			**72,800**	**72,800**	**72,800**	**72,800**	**72,800**	**72,800**	**72,800**	**72,800**	**72,800**	**72,800**	**72,800**	**72,800**	**72,800**	**72,800**	**72,800**
3. Profit or Loss																		
Annual Cash flow balance	INR			**-99,735**	**30,265**	**30,265**	**30,265**	**30,265**	**30,265**	**30,265**	**30,265**	**30,265**	**30,265**	**30,265**	**30,265**	**30,265**	**30,265**	**30,265**
Cumulative Balance	INR			**-99,735**	**-69,470**	**-39,205**	**-8,940**	**21,325**	**51,590**	**81,855**	**112,120**	**142,385**	**172,650**	**202,915**	**233,180**	**263,445**	**293,710**	**323,975**

Net Present Value (NPV) @ 10%	**INR**	**112,016**	**15 Years**
Internal rate of return		**30%**	**15 Years**

Main lessons

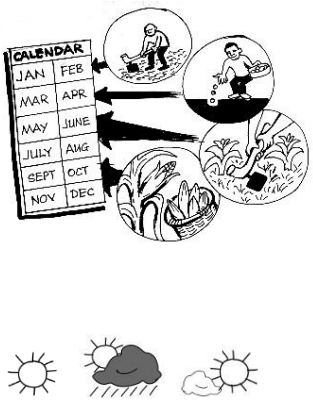
1. Investing in fish production are investments for a long period. The good agricultural entrepreneur (man or woman) searches and follows technical and financial recommendations to plan and to succeed this investment.
2. The investment calendar for fish production shows the Money-Out and the Money-In for 15 years.
3. The Total Money out in year 1 show the capital (savings and / or loans) needed to start the investment.
4. The annual cash flow balance shows for each year whether there is a surplus (Money-In bigger than Money-Out) or a deficit (Money-In smaller than Money-Out).
5. The cumulative balance (bottom line) of the investment calendar shows at what year the agricultural entrepreneur has recovered the money invested at the beginning by money from sales. The good agricultural entrepreneur (man or woman) recognizes this by the figures of the bottom line that have no longer a small dash "-" in front.
6. The investment calendar is useful to prepare the financing of investments by savings or partially by credit.
7. If the agricultural entrepreneur (man or woman) takes a loan, he/she takes into account the interest to be paid. Loan officers will help him /her to complete the calculations and to make the decisions.

Module 12 Becoming an aquacultural entrepreneur

The templates has been presented to you in this session.

- What have you learnt?
- What will you change?
- What do you need to succeed and do good business?

What I like to improve or start to do



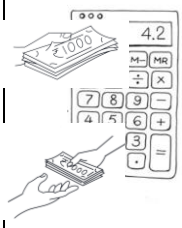
Planning (using the agricultural calendar)

Using good quality seed

Using good quality inputs and applying these on time

Keeping records of all activities (labour, inputs and services) using the ABS workbook

Producing and delivering good quality mustard, potato (clean, dry...)



Calculating the profit (gross margin)

Opening a bank savings account

Establishing an interest group / producer organisation

Others (specify)

Ask for your ABS participation certificate with serial number and signature of your trainer

Use the templates in Part 2 of this workbook to do the following:

- ☞ **Plan production**
- ☞ **Record Money-Out and Money-In**
- ☞ **Calculate whether you made a profit or a loss**
- ☞ **Plan expenditure and income from sales**
- ☞ **Control the reimbursement of loans**

2. Templates for application

Plan and evaluate production **Tasks of the entrepreneur**		**September**	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**
	Pond site selection												
	Pond preparation												
	Purchase of inputs (Fish feed)												
	Slushing of dykes												
	Applying organic fertiliser												
	Stocking of fish												
	Feeding												
	Checking, weighing and observing												
	Harvesting												
	Transport												
	Marketing & sales												

Evaluation production of fish _____

Profit or Loss – Fish **Pond size :** _____ **Pond location:** _____	Unit	**Expected before production**			**Evaluation after sales**		
		Quantity	Price (INR)	Total (INR)	Quantity	Price (INR)	Total (INR)
1. Money-Out							
Inputs							
Total cost of Inputs							
Labour – Man-days (PD)							
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
Total Labour needs and costs	**PD**						
Total Money-Out Costs of Inputs + Cost of Labour			**INR**				
2. Money-In Production X Sales Price			**INR**				
3. Profit or Loss? Money-In MINUS Money-Out			**INR**				
4. Unit Cost (INR/kg) Money-Out / Production			**INR/kg**				

Tracking Money-Out for Fish – Pond XYZ

Date	Reason	Amount Money-Out
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
Total		**INR**

Tracking Money-In for Fish – Pond XYZ

Date	Reason	Amount Money-In
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
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		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
Total		INR

PLOT 1

Cropping Calendar for Plot 1

Size of Plot (field)	Main Crop	Variety
	Associated mixed crop 1	Associated mixed crop 2

Work Planned	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec

Profit or Loss – Plot 1

Plot area : _____	Unit	**Expected before production** Quantity	Price (INR)	Total (INR)	**Evaluation after harvest** Quantity	Price (INR)	Total (INR)
1. Money-Out							
Inputs							
Total cost of Inputs							
Labour – Man-days (PD)							
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
Total Labour needs and costs	**PD**						
Total Money-Out Costs of Inputs + Cost of Labour			**INR**				
2. Money-In Production X Sales Price			**INR**				
3. Profit or Loss? Money-In MINUS Money-Out			**INR**				
4. Unit Cost (INR/kg) Money-Out / Production			**INR/kg**				

Tracking Money-Out for Plot 1

Date	Reason	Amount Money-Out
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
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		INR
		INR
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		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
Total		INR

Tracking Money-In for Plot 1

Date	Reason	Amount Money-In
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
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		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
Total		INR

PLOT 2

Cropping Calendar for Plot 2

Size of Plot (field)	Main Crop	Variety
	Associated mixed crop 1	Associated mixed crop 2

Work Planned	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec

Profit or Loss – Plot 2

Plot area : _____	Unit	**Expected before production** Quantity	Price (INR)	Total (INR)	**Evaluation after harvest** Quantity	Price (INR)	Total (INR)
1. Money-Out							
Inputs							
Total cost of Inputs							
Labour – Man-days (PD)							
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
Total Labour needs and costs	**PD**						
Total Money-Out Costs of Inputs + Cost of Labour			**INR**				
2. Money-In Production X Sales Price			**INR**				
3. Profit or Loss? Money-In MINUS Money-Out			**INR**				
4. Unit Cost (INR/kg) Money-Out / Production			**INR/kg**				

Tracking Money-Out for Plot 2

Date	Reason	Amount Money-Out
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
Total		**INR**

Tracking Money-In for Plot 2

Date	Reason	Amount Money-In
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
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		INR
		INR
		INR
		INR
		INR
		INR
		INR
Total		INR

PLOT 3

Cropping Calendar for Plot 3

Size of Plot (field)	Main Crop	Variety
	Associated mixed crop 1	Associated mixed crop 2

Work Planned	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec

Profit or Loss – Plot 3

Plot area : _____	Unit	**Expected before production** Quantity	Price (INR)	Total (INR)	**Evaluation after harvest** Quantity	Price (INR)	Total (INR)
1. Money-Out							
Inputs							
Total cost of Inputs							
Labour – Man-days (WD)							
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
	PD						
Total Labour needs and costs	**PD**						
Total Money-Out Costs of Inputs + Cost of Labour			**INR**				
2. Money-In Production X Sales Price			**INR**				
3. Profit or Loss? Money-In MINUS Money-Out			**INR**				
4. Unit Cost (INR/kg) Money-Out / Production			**INR/kg**				

Tracking Money-Out for Plot 3

Date	Reason	Amount Money-Out
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
Total		**INR**

Tracking Money-In for Plot 3

Date	Reason	Amount Money-In
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
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		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
		INR
Total		INR

Evaluate the production year

Fish	Pond number	Fish species - Main	Number of animals	Money-Out (INR)	Quantity produced (kg)	Unit	Sales Price per Unit (INR)	Money-In (INR)	Profit or Loss ☺ or ☹
	1	**Rohu**							
	2								
	3								
	4								
	5								

Plots	Plot Number	Main Product	Area	Money-Out (INR)	Quantity produced (kg)	Unit	Sales Price per Unit (INR)	Money-In (INR)	Profit or Loss ☺ or ☹
	1								
	2								
	3								
		Total							

	Fish Pond 1	Fish Pond 2	Plot 1	Plot 2	Plot 3
Am I satisfied with the results of the year?					
What is the most important change to make for the next year?					
What is the purpose of this change?					
How will I make this change? How much will it cost?					
How much money can I raise?					
Do I need credit?					

Manage money throughout the year

Planning of household expenditure

Financial Needs	Expenditures (INR)	When
Matches		Monthly
Salt		Monthly
Soap		Monthly
Petrol		Monthly
Food		Monthly
Water		Monthly
Mobile phone		Monthly
Sub-total		Monthly
School fees		Twice per year
Clothing		Twice per year
Financial Needs	**Expenditures (INR)**	**When**
Happy Events		As and when
Reserves for unforeseen expenditures		Monthly

My Financial Calendar for Planning

Money-Out

Product		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Inputs												
	Labour												
	Inputs												
	Labour												
	Inputs												
	Labour												
	Inputs												
	Labour												
	Inputs												
	Labour												
	Inputs												
	Labour												
Equipment and tools													
Household													
School fees													
Happy events													
Clothing													
Total Money-Out per month													

My Financial Calendar for Planning

Money-In

Product	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Other revenues												
Total Money-In per month												
Monthly balance Money-In minus Money-Out												
Cumulative Balance												

Manage loan and reimbursement

Purpose of loan		
Interest rate		
Date of loan		
Final reimbursement date		
Amount received	INR	
Amount to reimburse	INR	
Date	**Amount reimbursed**	**Remaining reimbursement**
	INR	INR
	INR	INR
	INR	INR
	INR	INR
	INR	INR
	INR	INR
	INR	INR
	INR	INR
	INR	INR
	INR	INR
	INR	INR
	INR	INR
	INR	INR

The Partners

The Ministry of Fisheries, Animal Husbandry and Dairying (MoFAHD) is a ministry of the Government of India for the matters related to fisheries, animal husbandry and dairying. It plays a pivotal role in formulating policies and implementing programs to promote sustainable practices, enhance animal welfare, and boost agricultural productivity in these sectors. MoFAHD is also the national lead for the the Indo-German technical cooperation project 'Sustainable Aquaculture for Food and Livelihood (SAFAL)' of German Development Co-operation (GIZ) funded by by the German Federal Ministry for Economic Cooperation and Development (BMZ).

The Department of Fisheries, Assam (DoF, Assam) operates with the motto of "Grow More Fish" and has a multi-faceted mandate. Its primary objectives include increasing fish production and the quality of fish seed in the state while optimizing available resources. The department also focuses on implementing various fishery-related schemes initiated by both the Government of Assam and the Government of India. In addition to this, it extends vital extension services to fish farmers, fishermen, and fishery entrepreneurs, contributing significantly to the growth and sustainability of the sector in Assam. DoF Assam is an implementation partner of SAFAL at state-level.

Assam State Rural Livelihoods Mission (ASRLM) focuses on stabilizing and promoting existing livelihoods portfolio of the poor through three pronged approach. It focuses on enhancing livelihoods by expanding and improving existing income-generating options in both agricultural and non-agricultural sectors while exploring new opportunities. Additionally, ASRLM nurtures self-employment and entrepreneurship through the development of micro-enterprises, fostering economic self-sufficiency and fostering sustainable growth among marginalized communities in Assam. ASRLM is also a partner organisation for SAFAL.

SAFAL, GIZ is working towards empowering individuals and communities in business decision making through ABS in Assam in collaboration with Department of Fisheries (DoF), Assam and Assam State Rural Livelhood Mission (ASRLM) for improved income and livelihood through a tri-partite MoU. The interventions are implemented to promote aquaculture as a business along with allied activities and support farmer producer organizations to enhance production, market access and marketing of agricultural along with aquaculture produce.

Implementing partners in India:

Department of Fisheries, Assam and Assam State Rural Livelihood Mission.

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