

SOLEMN DECLARATION - GROUP ASSIGNMENT

Solemn declaration by students

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We as a result of this declare that the assignment which we herewith submit to the North-West University as partial completion of the requirements set for the MBA degree is our work.

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1. Abbreviation

Abbreviation	Meaning
APU	Aquaculture Product Unit
RAS	Re-circulating Aquaculture System
NWU	North-West University
DIY	Do It Yourself
SHE	

Table 1 - Abbreviation

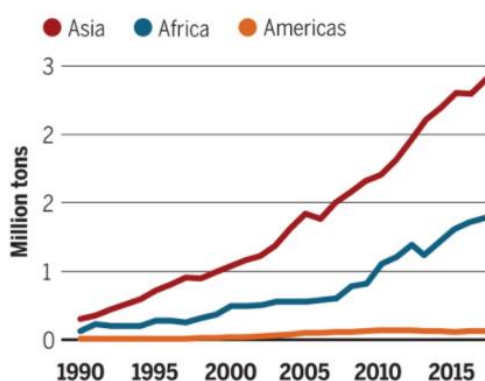
2. Technological Innovation

David Fincham Aquaculture's developed an APU (Aquaculture Product Unit) than can be used to start on a small scale Tilapia fish farm. APU farming technology is highly efficient, productive, and ecologically friendly. It has a small footprint, requires minimal water, energy and labour, and it generates useful plant nutrient waste and compost. (Fincham, 2020)

1.1 Why Tilapia fish farming?

Tilapia fish farming is the future of food supply and food security. For the past two decades, the expansion of the sector has shown growth of 10% average per annum worldwide.

Figure 1 World increase in demand for Talapia (Stokstad, 2020)



1.2 What is APU (Aquaculture Product Unit)

An APU is a small-scale Re-circulating Aquaculture System.

The system consists of:

- A 10 000 litres PVC supported pond. The pond is for the tilapia to breathe, eat, and produce waste.
- A custom filter designed & engineered to process all the waste produced and maintain good water quality, ensuring that the fish have a suitable environment for growth. The filter is responsible for two functions:
 - The mechanical/static bed filter section of the filter is responsible for removing all solid waste from the system. Solids found in the system include fish faecal matter, suspended algae, particle from feed not digested. The solid waste is flushed from the system daily at the turn of a valve. It provides 40-60 litres of water which can be used to irrigate plants or vegetables. Wastewater can also be mineralized and used in aquaponics.
 - The biological section of the filter contains a product called BioMedia and is the aerobic section of the filter. This section is responsible for the nitrogen cycle. The protein in a fish diet is converted by the nitrogen cycle into Ammonia-Nitrates-Nitrites. This process is part of the natural biological order and is toxic to fish and plants. This process is part of the natural biological order. The biological filter stops the water from becoming contaminated and affecting the fish.
- The aeration system - This supplies aeration to the fish and the biological filter.
- The Pump – This allows for water circulation through the filters.
- Heat Pump
- UV Lights
- Solar Panel
- Batteries
- Controller: Siemens Logo

1.3 Business Plan

The following business plan indicates what the concept of the business and how to develop and implement the idea. The business plan can also be used to attract or approach an investor/s.

1.3.1 Executive summary

The farming with tilapia's on a technological concept differentiate from traditional agriculture. This way of farming will not only penetrate the farming sector but will also give the business an advantage above competitors.

Figure 3 Controller for controlling system

The Siemens Logo controller will be used to control and monitor the system.

Logo! logic module series 8.3 now with direct cloud connectivity
Guided setup for cloud connection with Logo! Soft Comfort 8.3
Logo! Web Editor V2.0 with extended functionality (All basic units with integrated web server)
Ethernet interface for communication with LOGO! 8, LOGO! TDE, SIMATIC Controllers, SIMATIC Panels and PCs
Use of standard micro CF cards

Siemens Logo



3.1 Human resource skills and succession plan

The following key human resources will be required to implement and operate our organization in a sustainable manner:

- Management:
 - General manager,
 - Financial and admin manager,
- Production / Farming:
 - Supervisor,
 - Gardeners,
 - Cleaners,
 - Pond & fish assistance,
- Processing:
 - Supervisor,
 - Fish butchers,
 - Cook (Fresh, pickled, curried, or smoked Tilapia),
- Engineering:
 - Supervisor,
 - Mechanical & piping assistant,
 - Electrical & controls assistant.
- SHE supports:

- Safety & risk officer,
 - Occupational & health officer,
 - Environmental & water management officer
- Office support:
 - Accountant,
 - Payroll,
 - HR officer,
 - Purchasing officer,
 - Debit clerk,
 - Credit clerk,
- General support:
 - Client relations,
 - Marketing officer,
 - Driver (supplies & deliveries).

A detailed resource plan can be seen in Table 1. The main deliverable is to establish a structure within the organization that establish the roles and responsibilities of the teams. Further to this, a succession plan can be implemented from this. Resources within the same department will be able to achieve each other's work if they are not more than 1 rating apart.

Table 2 Resource skills and competence

Designation	Management	Production / Farming	Processing	Engineering	SHE support	Office support	Client relations
Management							
General manager	5	4	3	3	3	3	4
Financial and admin manager	4	2	3	2	3	3	3
Production / Farming							
Supervisor	3	5	4	3	4	3	3
Gardener	1	4	2	2	2	1	2
Cleaner	1	4	3	1	2	1	2
Pond & fish assistance	2	4	3	1	2	1	2
Processing							
Supervisor	3	4	5	3	4	3	3
Fish Butchers	1	3	4	1	2	1	2
Cook	1	2	4	1	2	1	2
Engineering							
Supervisor	3	4	4	5	4	3	3
Mechanical & piping assistant	2	3	2	4	2	1	2
Electrical & controls assistant	2	3	2	4	2	1	2
SHE support							
Safety & risk officer	3	3	3	2	5	2	3
Occupational & health officer	2	3	3	2	4	2	3
Environmental & water mng. officer	2	3	3	2	4	2	3
Office support							
Accountant	3	3	3	1	3	5	3
Payroll	2	2	2	1	3	4	3
HR officer	2	2	2	1	3	4	4
Purchasing officer	2	2	2	1	3	4	4
Debit clerk	2	2	2	1	3	4	4
Credit clerk	2	2	2	1	3	4	3
Client relations							
Client relations officer	2	3	3	3	3	2	5
Marketing officer	2	3	3	3	3	2	5
Driver (supplies & deliveries)	1	3	3	3	2	1	3

Highly skilled
 Semi skilled
 Not skilled
 Skilled
 Poorly skilled

2.2 Technology resources requirements

- Dam management and control:
 - Water temperature control,
 - 3-way automated valve to regulate dam temperature,
 - Water level control,
 - Automatic solenoid valve for water inlet,
 - Ultraviolet (UV) lights (sterilising water from bacteria & algae),
 - Low energy high output centrifugal pump.
- Energy management:
 - Solar system,
 - Dam,
 - Offices,

- Process rooms.
 - Heat pumps (using refrigeration cycle and using 70% less energy),
 - Dam,
 - Cleaning facilities,
 - Induction stoves for the kitchen (for processing of fish),
- Software and applications (App's):
 - SCADA (Wikipedia, 2020),
 - CCTV system (monitoring fish activity etc),
 - Blockchain systems for procurement and finance (Coupa / Ariba),
 - Data loggers (RIAC),
 - Logistics and transport tracking.



Figure 4 SCADA example

- Occupational health:
 - Thermal monitoring of personal at the entrance of the workplace,
 - UV air sterilising recirculation fans,

3.3 To implement the system, ask the following questions

- Where will the project provide whole gutted and cleaned tilapia to?
- Where is the location of the farm?
- What is the planned production per annum? (in Kgs)
- What is the budget for the project?
- Does the site have power, borehole water and a greenhouse?

3.4 The timelines and process for the project are:

- Research and project plan
- Visit other Tilapia farming operations
- Complete project plan
- Apply for permits
- Training of staff?
- Marketing Plan and Take Off agreements in place
- Place orders for Equipment
- Start Construction
- Complete Construction
- Stock first fish
- Harvest first cycle (6 months later)
- Scalable, modular growth

4. Institutionalize a Technological Innovation for the future

4.1 Change Management

Wikipedia defines change management a collective term for all approaches to prepare, support, and help individuals, teams, and organizations in making organizational change.



Teamwork

"Great things in business are never done by one person; they are done by a team of people."

— Steve Jobs" (Jobs, 2011)

4.2 Ways to Prepare the Team for Innovation. (Root, 2019)

1. Share the Vision,

Ensure employees understand why the change is necessary.

2. Communicate regularly,

One on one conversations, team meetings and digital communication assist with understanding the need for change and creates a platform for discussion.

3. Create Opportunities for Two-way Feedback,

Two-way discussion allows employees to express their concerns, clarify and resolve any confusion. Two-way conversation can reduce anxiety or fears by supporting each other and understanding what role they contribute and can result in embracing change.

4. Identify training needs,

Determine the type of training needed to assist employees in coping with change effectively.

5. Designate change champions,

Preparing for change is a team effort by identifying other excited team members to assist in driving growth will set the tone for embracing change.

Figure 5 Human Factors in changing management



Figure 10.2 Human Factors in Change Management

Table 3 Benefits of Teams in an Organisation

BENEFIT	TYPE OF BENEFIT
ENHANCED PERFORMANCE Members feel empowered and experience job satisfaction.	Increased productivity Improved quality Improved Customer service
EMPLOYEE BENEFITS Teams offer synergistic benefits	Quality of work-life absenteeism Lower stress
REDUCED COSTS Assisting each other avoiding significant errors	Lower turnover,
ORGANIZATION ENHANCEMENT Create opportunities for new ideas that advance innovation	Increased innovation, flexibility

Figure 6 Kotters 8 steps process for change (Kotter, 2020)



Eight steps for motivating and improving by working in a collaborative environment (Kashyap, 2018)

Step 1: Identify individuals' Strengths

It is essential to be truthful about one's weaknesses. Start building the team around individuals that complete and compensate the shortcomings of one another. Aligns tasks with strength

Step 2: Create realistic expectations and goals and explain,

- Ways to clarify goals:
- Assess an individual's roles and responsibility,
- Clarify what is expected,
- Permit cross-learning,

Step 3: Collaboration tools

Identify collaboration technology to enable an organization to access data from any location to facilitate collaboration from any platform assisting with real-time communication and sharing of information.

Step 4: Inspire open-mindedness

The sharing of individuals experience of ideas and behaviour will create a sense of security for different cultures and backgrounds and will positively impact performance and motivation.

Step 5: Reward innovation

Creating a culture of innovation is the key to upholding a competitive edge, and by rewarding employees for innovation will result in encouragement and feeling valued.

Step 6: Celebrate teams accomplishment publicly

Celebrating success will improve performance and team spirit. Success primarily mainly does not include money and are applicable when achieving a goal. Ways of celebrating success can be by means of buying lunch that will show their efforts and not taken for granted and boost confidence.

Step 7: Support a strong sense of community

By making individuals feel comfortable, sharing knowledge and making them feel like part of a team will result in teams being more committed.

Step 8: Spread the allocation of tasks

By delegating tasks, individuals will feel their actions will have an impact and make them feel powerful and purposeful.

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