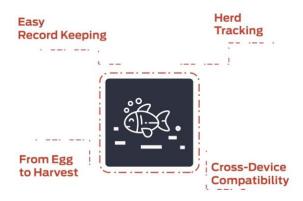


# Aqua Farming & Harvest Processing

Discover automation of process flow for aqua farms, harvest, processing with fresh and frozen market ready products with controlled supply chain deliveries.



Prudence Consulting SEPTEMBER 2024 | NEW DELHI, INDIA

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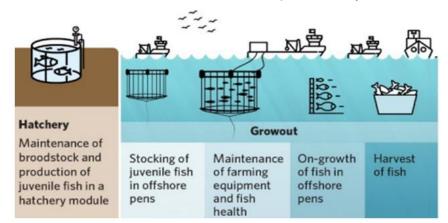


# 1. Synopsis

Oceans provide abundant natural food contributing to improving the health of the environment. The best alternate source of food, protein, nutritious diet is Meat. Our experience in consulting in the food industry allow us to offer you the most practical and efficient integrated forward and backward solutions, with maximum attention to animal welfare and hygiene.

Heart experts have published and recommend that one should eat fish at least twice a week, since fish are high in protein, low in saturated fats and rich in omega-3 fatty acids. According to FAO, by 2030, fish farming, one of the fastest growing methods of producing food in the world, will be responsible for almost two-thirds of the fish we eat. From the moment Fishling are received, our software ensures that they are registered and all operations from receipt to finished product are carried out and carefully monitored. With a core objective to achieve following.

- Increased Demand
- Higher Shelf Life
- Easier to store and sell
- Nourished and Vitamin Rich
- Sustainable
- Food quality and safety
- Health and safety
- Control / Traceability

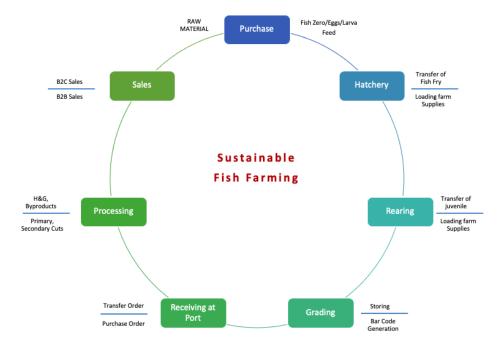


If you are looking for a breeding farm, hatchery or into cohort or cage farming solution, then this document is intended for you. Objective is this document is to help you understand how we will establish integrated process in a controlled environment.

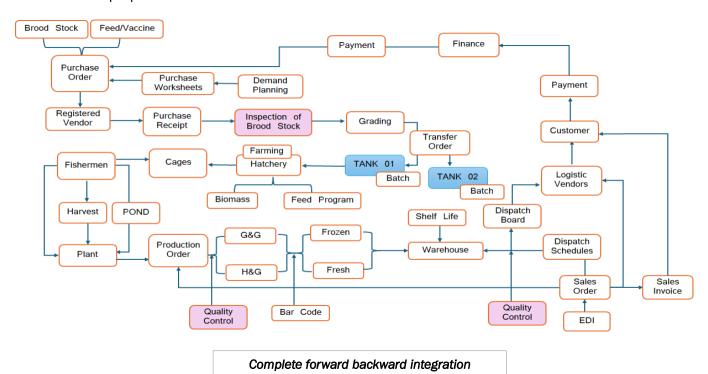
- Purchase of larvae, Brood Stock/Juvenile Fish or transfers from Vendor, Internal farms or harvest.
  - With tracking
  - o Other information like Farm Weight, DOA etc.
  - Weigh Bridge Information
  - Other charges like freight, commissions etc.
- Quality Control
- Production Order via
  - HNG
  - Lion
  - Primary Cut
  - Secondary Cut
- By Product
- Frozen Production
- Re-Processing
- Waste- Processing
- Packaging & Labelling
- Sales Delivery Schedules with Route Tracking
- Financials and Statutory Compliances
- Management Reporting



Track your fish production in real-time with Navfarm fishery management software!



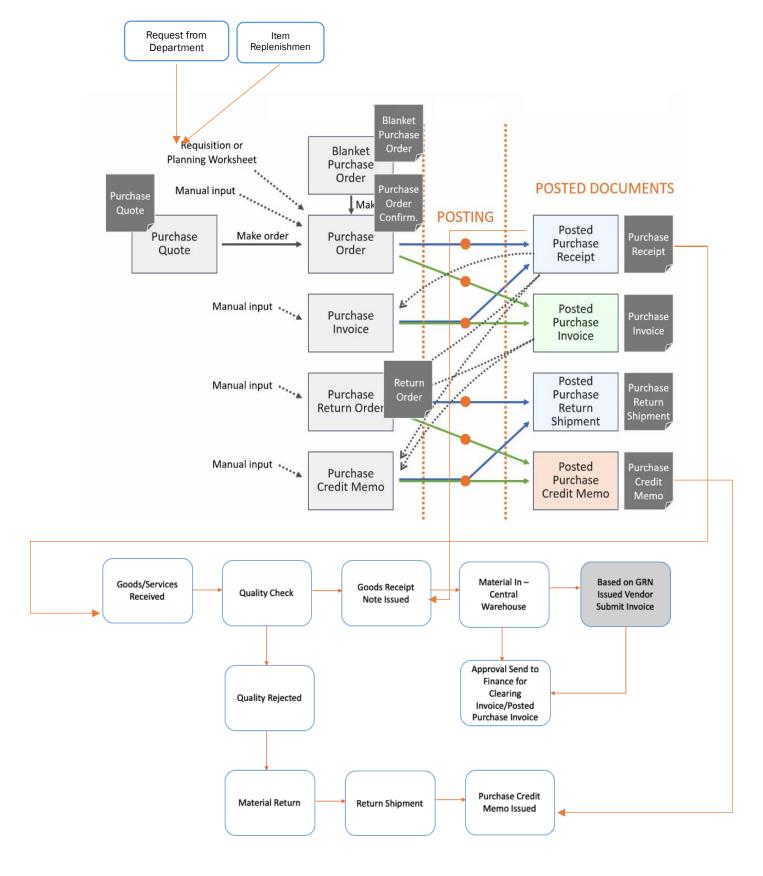
- **Breeding:** Fish reproduce by bearing live young or by laying eggs. Livebearers give birth to fully formed and functional young called fry. The eggs are fertilized and hatch within the female and capturing data like feed consumption, Medicine Consumption and more information in the process.
- Hatching: The brood stock is reared to lay eggs, wherein once eggs are hatched, turn into larvae and finally into fingerlings to 15-20 GMS which then moves into cages/ponds and grows for 8-10 months.
- **Harvesting:** Aquaculture finfish and shellfish are harvested from a controlled environment in which they have been raised to market size from fingerling or larval stage and transferred to meat plant.
- **Processing:** Fish slaughter for meat production, typically after harvesting at sea or from fish farms for sales purposes.



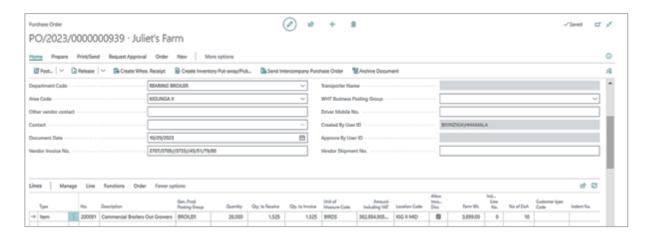


# 2. Procurement Process Flow

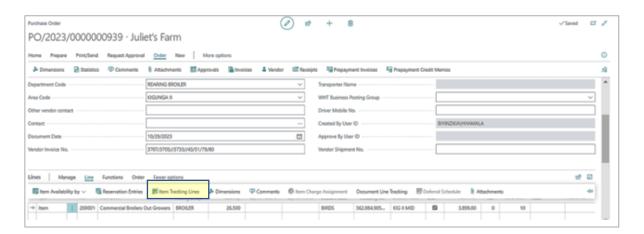
The purchase of larvae, brood stock, feed, medicine, equipment etc. for breeding and hatcheries. Once the procurement is complete, the material is transferred to the respective ponds. The purchases can be made specifically to location and pond with capturing of logistic details.







Purchase order can be comprehensive to capture information like Vendor details, statistics, vehicle details, driver name and location where you want the purchase to be booked. Yes, you can also book location-based purchase. However, the payment is centralized, and material gets shipped to the location directly. GRN's can also be done at the sub-location/batch location.



Each Purchase order is registered with a lot number which comes from the supplier. This helps in creating a traceability to the source. Slaughter ready batch sourced from other farms that can be traced back in case of any adversities or disease outbreak. Also, critical information's are captured like:

- Batch Weight
- Farm Weight
- Dead On Arrival
- Farm Location
- Weigh Bridge Details etc



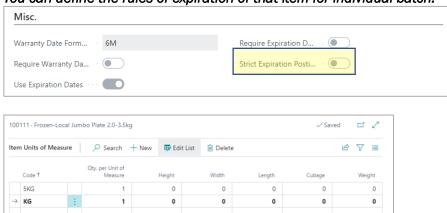
Weigh Bridge Integration



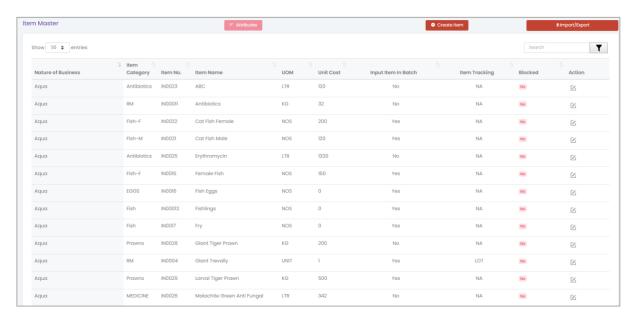
Nature of the item can also be defined in terms of shelf life and tracking as per batch or serial number.



You can define the rules of expiration of that item for individual batch.



Maintaining multiple units of measurement and conversions is so easy with Dynamics 365 BC.



Item masters can be planned and configured specific to your business needs like:

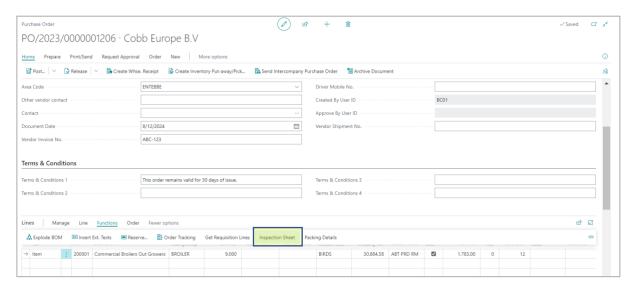
- Uniformity
- Reduced Mortality
- Standardization across different locations
- Cost effective
- Improved harvest



# 3. Quality Inspection and Control

Let's discover how we can control quality process for a purchase of brood stock or any other item. Below is an example of a purchase order where procurement of the batch/lot is being done from the fellow farmer who has reared the animal to be slaughter ready.

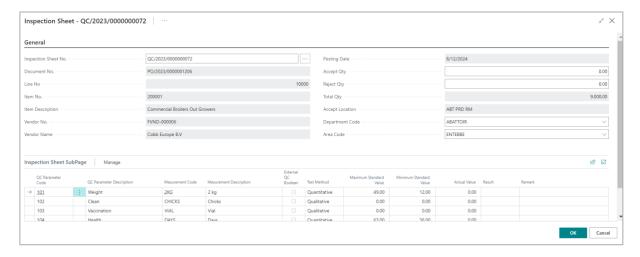
We have reduced the cycle of going through multiple screens and in this case, we shall be doing Purchase Order, GRN, Quality control, Weigh Bridge integration and Purchased receipt on a single screen. Highlighted is an inspection being conducted on the Purchase Order.



Now this is enabled at the time of item creation, wherein as a process its mandatory to define whether item is subjected to QC or not. Apart from accepted and rejected, a detailed inspection can be carried out with qualitative and quantitative parameters which can be self-defined.



Below is a posted inspection sheet related to that PO, and item wherein user can post the actual value. User can proceed with the purchase invoice only and once QC inspection sheet is completed.





Also, below is a QC Certificate, which can be given to the vendor from the system with the results and status of accepted and rejected quantities.

2	Quality Inspection						
FISHSFARM							
Inspection Sheet No : QC/2023/000000072			Posting Date	8/12/2			
PO No.: PO/2023/0000001206			PO Date :	8/12/2024			
Vendor No.: FVND-000006			Location:	AST PRD RM			
Vendor Name:	Cobb Europe B.V						
Item No.	Item Description	Accept Qty	Reject Qty				
200001	Brood Stock	9,000.00	0.00				
QC Parameter Description	Measurement Code	Max Std Value	Min Std Value	Actual Value	Result	Remarks	
Weight	2KG	49.00	12.00	45.00	Pass		
Clean	Brood	0.00	0.00	0.00	Pass		
Vaccination	VIAL	0.00	0.00	0.00	Pass		
Health	DAYS	63.00	36.00	62.00	Pass		
Entry By							

#### Posted Inspection Sheet

No INSP0001 I					Item Unit Of Measure			L					
Document Type Purchase Order				User ID			FARM01						
Refrence Doc. Number 106027				Remarks									
Refrence Do	frence Doc. Line No. 10000				Rem. Quantity			1000					
Vendor No.	Vendor No. 10000				Accepted Qty			200					
Vendor Name London Farms				Rejected Qty			0						
Sample Size	Sample Size 0				Posting Date			3/17/2024					
Item No	n No 70069 Location Code				ode								
Item Description			Commercial Broiler Outgrower										
Document No	Document Type	Mim Value	Max Value	Unit of Measure	QC Code	QC Description	QC Measurement Code	QC No.	Test Method	Actual value	Actual Value 1	Status	Remarks
INSP0001	Purchase Order	0.14	0.16	L	RK_ACID-01	Acidity	% LACTIC ACID	108027	Quantative	0.15		Accepted	
INSP0001	Purchase Order	0	0	L	RK_ALCO-01	Alcohol test		108027	Quantative	0		Accepted	
INSP0001	Purchase Order	0	0	L	RK_ANTB-01	Antibiotics		108027	Quantative	0		Accepted	
INSP0001	Purchase Order	0	0	L	RK_BOIL-01	Boiling		108027	Quantative	0		Accepted	
INSP0001	Purchase Order	1.02	1.03	L	RK_DENS-01	Density @ 20 °C	G/ML	108027	Quantative	1.02		Accepted	
INSP0001	Purchase Order	3.7	4.5	L	RK_FATS-01	Fat	PERCENTAG E	108027	Quantative	3.8	·	Accepted	
INSP0001	Purchase Order	0	0	L	RK_FORM-01	Formalin		108027	Quantative	0		Accepted	

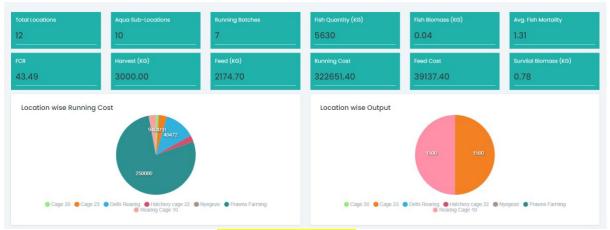
### Quality inspection has its own advantages:

- Uniformity
- Reduced Mortality
- Standardization across different locations
- Cost effective
- Improved harvest
- Better control
- High Yield resulting higher revenue
- Improve sustainability.



# 4. Farm Operations: Rearing, Hatchery or Cage farming

Whether you are a breeding or a hatchery, you need reports, dashboards and KPI to monitor the operations. To build strong governance at the farm level, SOP's needs to be created and implemented in timely manner. Discover how navfarm will be able to help you in achieve this in an effective manner.



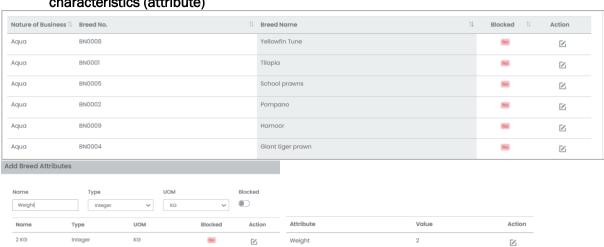
Consolidated Dashboard

#### Build your farm rules with navfarm:

• Capture location details like nursery, ponds with critical attributes like capacity in gallons:

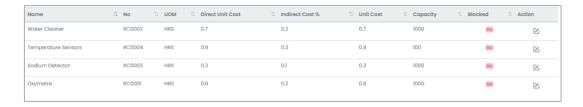


• Capture breed along with attributes to measure the performance based on the characteristics (attribute)

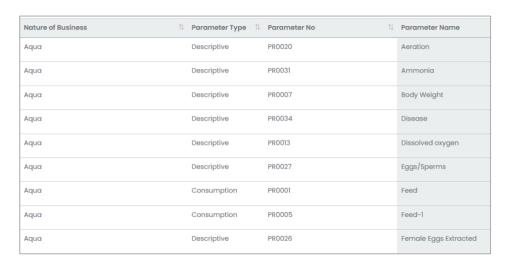




 Capture resources (asset) used at the farms, along with nature of consumption so that the cost whether its direct or indirect can be added to the batch cost to give accurate fish cost.



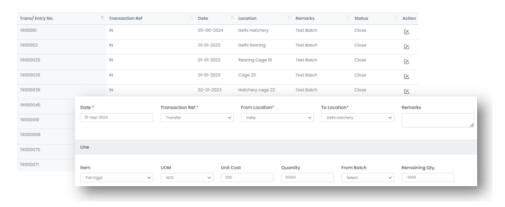
- Capture activities based on their nature where they are
  - o consumable like feed, vaccine and
  - descriptive like biomass, temperature,
  - o Batch Expense like direct or indirect
  - Output i.e. harvests



Descriptive parameters can also be classified into values and dropdown for more extensive data capturing purpose



• Inventory Transfers: Whether it's a transfer to nursery, hatchery, cage or processing plant.

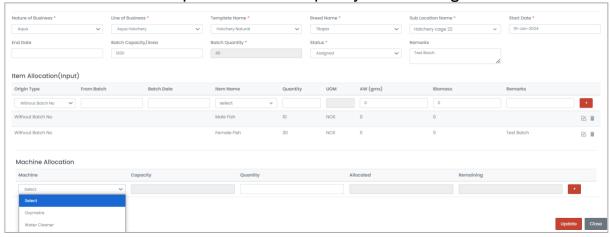




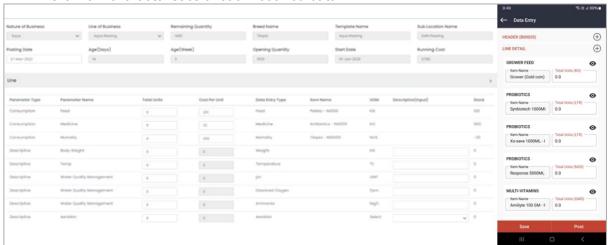
• Define Farm SOP's with KPI for Deviation Alerts: Define your own rule with frequencies.



Create Batch: Just capture the items with quantity and either weight or biomass.



 Making Periodic Batch Entry: Minimum inputs, Maximum outputs. Post larvae or fingerlings are received in the nursery, total number, and average body weight (ABW) are the main characteristics of each received batch.





- Analyze Batch: Whether it's a nursery, hatchery, or a cage. Critical information is being captured like
  - Growth
  - Sampling Biomass
  - Specific growth rate (SGR)
  - O Production efficiency factor (PEF) etc



Rearing with Standard and Actual Deviation Chart



Hatchery with Standard and Actual Deviation Chart

Once the harvest is achieved, the same is transferred for the processing plant for production. Its important to maintain breeding or hatcheries with following points in consideration.

- Indirect economic losses such as mortality due to feed deficit, cannibalism, or the degradation of water quality.
- Feeding is the most crucial procedure in nursery, it represents the key to success of the nursery phase the economic impact is very important:
  - Direct economic losses such as food distributed and not consumed or the throwaway of expired feed.
  - Feed ration is the amount of feed proffered per individual or per group of individuals.
  - Underfeeding and overfeeding: Underfeeding was defined as energy intake &
     <80% and overfeeding as &>110% of estimated requirements.
  - Pellet size: The of pellets is depending on the species and the ABW. Following table is indicative only. Depending on the species, following feed size can be readjusted.
  - Feed is calculated as per the Feeding SOP and quantity is depending on the species, ABW, and water temperature. Ex



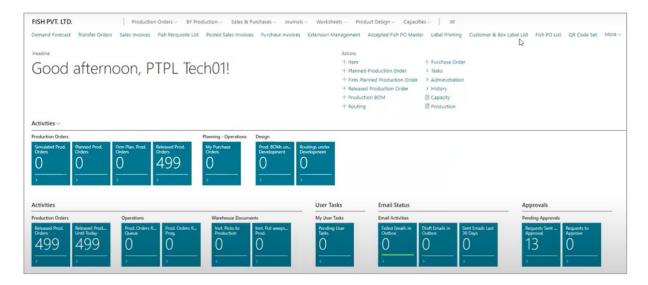
ABW (g)	Hamoor (% of Biomass)	Yellow Fin (% of Biomass)			
<0.2	13	8			
0.20.5	11	6			
0.51	9	5			
13	7	5			
34.5	5	4			

 Feed conversion ratio (FCR) or feed conversion rate is a ratio or rate measuring of the efficiency with which the bodies of livestock convert animal feed into the desired output.

# 5. Harvest Operations

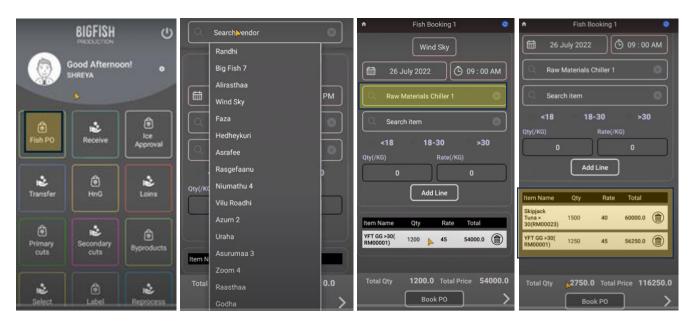
Scenario 1: Internal Farms transfer with contractual fishermen Scenario 2: Internal Farms transfer with Internal fishermen Scenario 3: External Farms transfer with Internal fishermen Scenario 4: External Farms transfer with Internal fishermen

- Scenario 2 and Scenario 4 are clear case of transfer orders wherein the stock in moving
  either through purchase with charges being added to the document or it's a case of batch
  costing.
- In case of Scenario 1 and Scenario 3, where there must be a purchase made from the contractual fishermen before transferring to the processing then we can manage the same as below:



A purchase has to be initiated wherein the fishermen will be intimating a day before to the location about the fish captured along with breed and estimated weight through the app below:





Mobile App/Create PO

Select Fishermen/Vendor

Add Drop Location

Add Breed Information

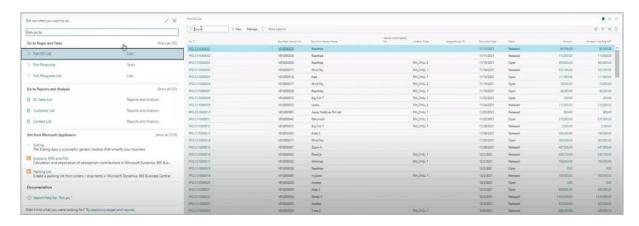
#### Additional information like below can be added:

- Crew Members.
- Catch Area and Catch Method,
- Define and Rate cleanness

Also, if fishermen have taken following items the cost for the same can be added to the purchase order like:

- Ice Box
- Water
- Ice Money
- Black Meat
- Fuel
- Snowflakes etc
- Equipment's
- Food etc

#### The above cost shall be captured into the PO and Purchase order will be created into the system:

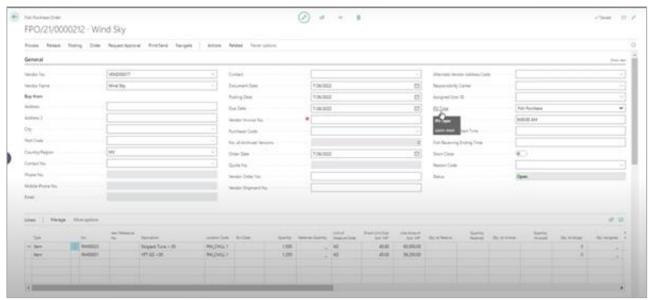


Open purchase order with details and captured fish items quantity. Now the fish has to be received from the fishermen so that the document can be released and processed for the payment to the vendor. Along with the PO lot of information can be captured like

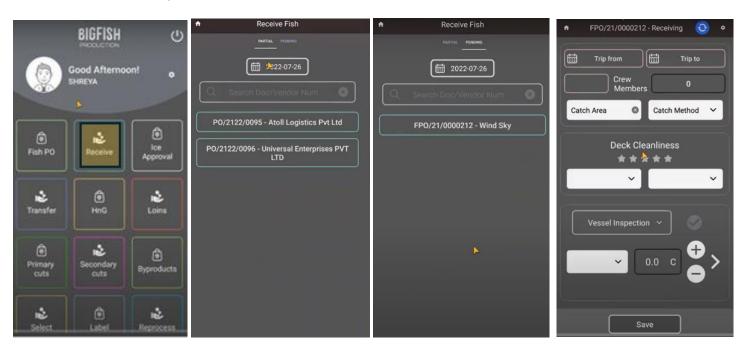
- Fish species,
- Fish size (ABW),
- Batch Number



• Temperature. etc



Once the PO must be created, the GRN has to be done and either this is either partial or pending. Please refer how you can view the same in the app.



Receiving PO via App Partial PO Pending PO Add PO Receive Information

Once the PO must be created, the GRN must be done and either this is either partial or pending. Please refer how you can view the same in the app.





Catch Method Grading Tagging Fish Breed Ispecting the vessel

The selected PO must be further detailed by providing the catch method for the specific date with details related to each tank along with the tank.

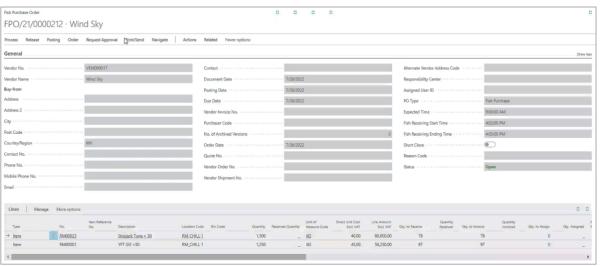


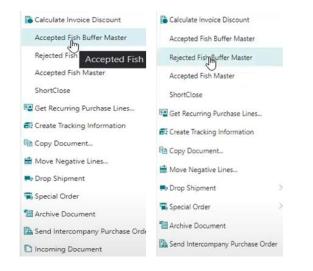
Crew Members Species Presentation for Production Defining Qualities





Once the document is successfully posted, purchase order will be released from the system & a captain statement will be generated.

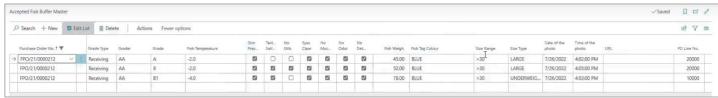




- Quantity to receive has been updated.
- Based on the criteria of acceptance/rejection, all input criteria will be reflected along with fish number.
- Information like presentation, Grade, Temperature, Organoleptic.
- Fish Weight
- Fish Tag for traceability purpose.
- Size range of fish with type
- Photo of the Fish
- PO Line for acceptance/rejection
- QR set id (for Item) and Mass QR set ID (For complete Batch)

If we have received 10 RM Tuna Fish i.e. raw material, there will be 10 individual QR code will be there. Batch is separated with mass QR code.



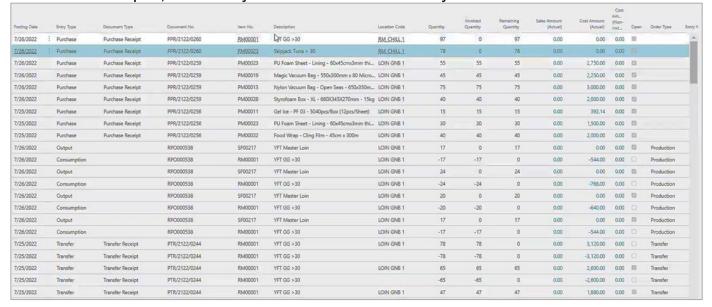


#### Once all the data is collected, the final data is moved from buffer to final acceptance along with receipt number.





#### Once the PO is accepted, the inventory will be reflected in the inventory for that location.



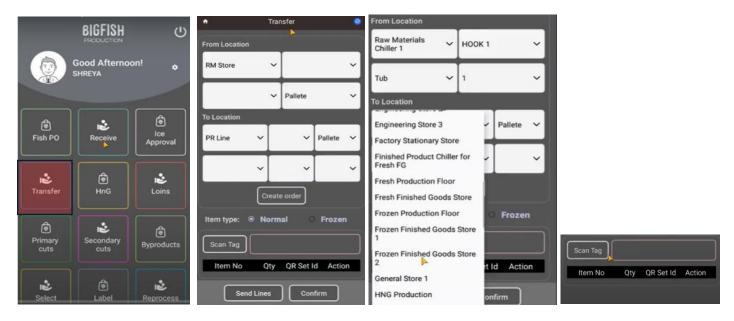


## 6. Production of Whole Fresh or Frozen meat

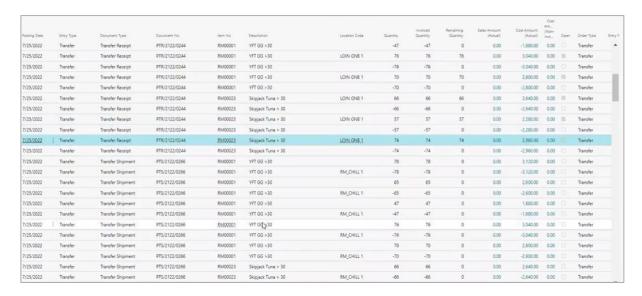
In today's global marketplace, meat processing companies are often facing low-profit margins due to fluctuating supply from farmers on one side and pressure from influential retailers and consumers on the other. Factors such as data management and improving efficiency have increased focus on key performance indicators (KPIs), monitoring how effectively their plant is running e.g.

- Yield / Throughput
- Control / Traceability
- Food Quality / Safety
- Flexibility / Cost efficiency

Using navfarm can be effective as the solution is helpful in covering all criteria of Primary and Secondary processing including machinery utilization. Once the fishes are inspected, they are transferred to the shopfloor:



Once the material is transferred from RM store to the shopfloor like HNG or Lion Grading, a transfer order can be made. You need to also define the type of item whether its normal or frozen. The same can be done via scanning of the QR tag which had been allotted during the purchase of the item. Without entering the data shall be populated automatically.



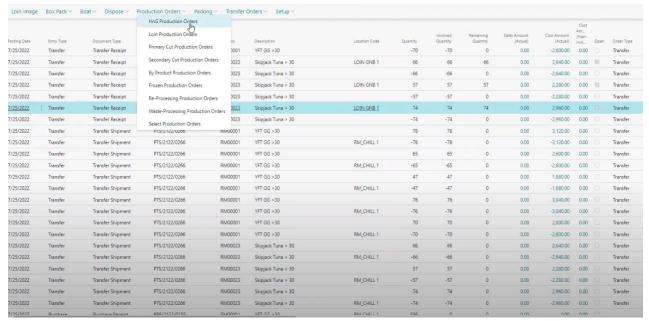


The transfer order can be reflected in ledger entry wherein the item has been transferred from one location to another.





- Select the type of production based on the material received.
- The process is automated through scanning of QR code which is applicable for each fish and cumulative batch.
- The supervisor can create the production order based on sales order or the output he wants.
- The production can be linked to the sales line also for accurate forecasting purpose.
- In case he wants to reject any fish RM based on the grade he can do the same as well.
- He can further classify with the weight and post the production order.
- Once done the released production order will be created.
- Items i.e. RM can be selected via scan which is integrated.

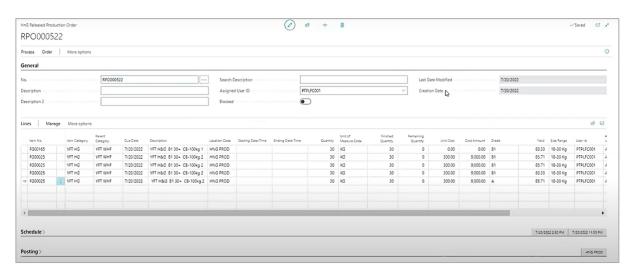


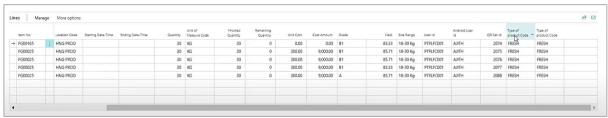
List of Production order.





#### List of HNG Production order.

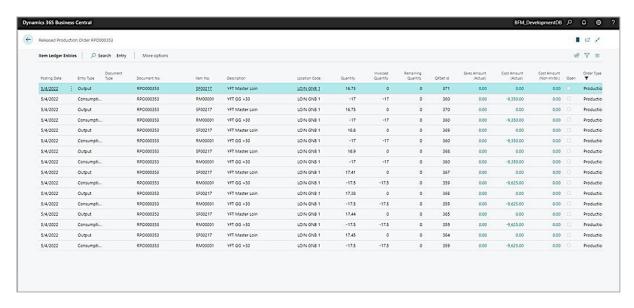




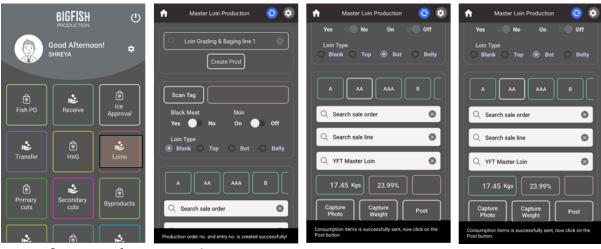








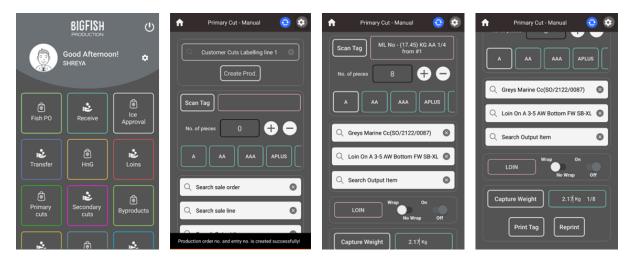
If the production is for lion, then select the tab accordingly.



- Scan a tag for consumption
- Select the Black Meat (Yes/No), Skin(On/Off), Loin Type(Blank, Top, bottom, Belly)
- Select a Grade from the options
- Select an Output Item from either of the following option:
  - o Sales order
  - o Output item
- Enter Weight of the output item and click on Capture Weight Button.
- \*Capturing Weight: Put the receiving item on the Platter. After the weight is successfully shown on the Terminal Dashboard.
- Click on the Capture Weight Button and the last captured weight on the scale will be updated inside the Weight field of the screen.
- Click on Send Button to send the Consumption Lines



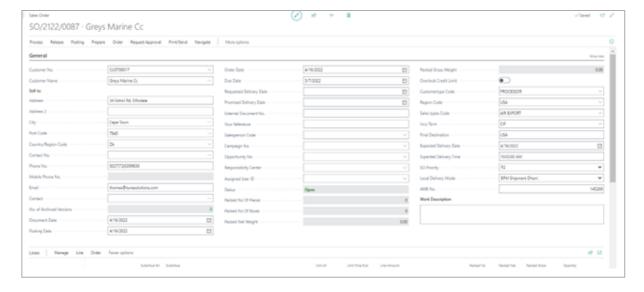
If the production if for Primary Cut, then select the tab accordingly.



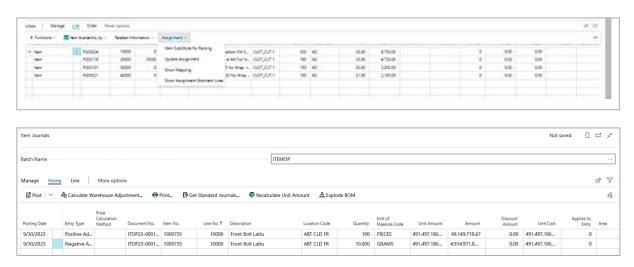
- Enter the no. of Pieces to be made
- Select a Grade from the options
- Select an Output Item from either of the following option:
  - Sales order
  - Output item
- Select the item has Wrap On/Off, Skin On/Off
- Enter Weight of the output item and click on Capture Weight Button.
- \*Capturing Weight: Put the receiving item on the Platter.
- After the weight is successfully shown on the Terminal Dashboard. Click on the Capture
  Weight Button and the last captured weight on the scale will be updated inside the
  Weight field of the screen.

# 7. Variants, Packaging and Dispatch Schedules

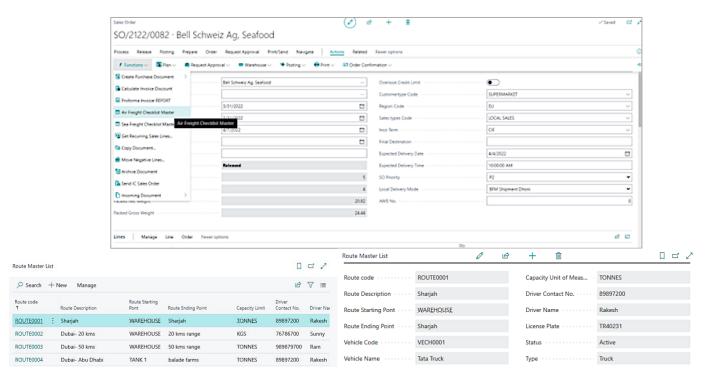
Once produced, the output can be converted to various frozen items and pieces. Sales orders created for the customers already have an address which helps in planning the route plan. Dispatching materials in time bound manners in fastest way possible.





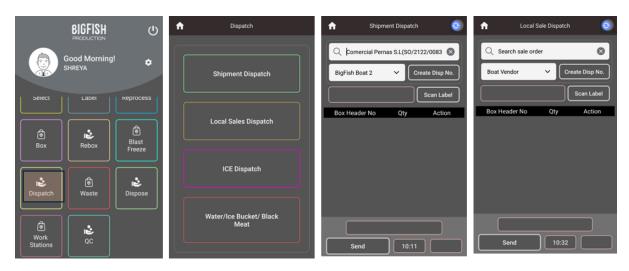


Different packaging Unit of measurements can be predetermined and mentioned in the systems. Like KG-GMS or KG to PCS etc. The output will contain QR Code. The routes are a group of destinations included in the route along with the vehicles allocated to the route.

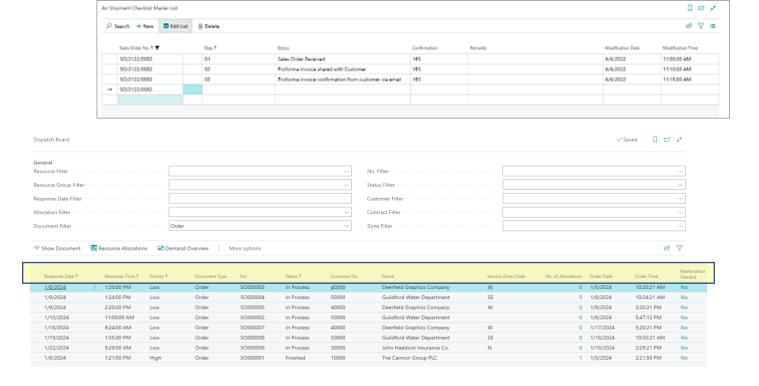


Finally, the dispatch board will let you know the status of the items sold and their respective deliveries.





- Once the SO is posted with the route plan, type of dispatch can be selected.
- Since the item is fast moving item, it cannot afford any delays and hence needs to be dispatched with some protocols.
- Apart from QR set id for the sale item, boxes are also given bar codes which can be scanned for fast movement.





## 8. Unit Economics

The system calculated the unit cost of an item based on the

- Input consumption cost (Inventory items cost is calculated on the FIFO or standard cost) based on your preference.
- Direct or indirect costs like labor, electricity, or cleaning & other overhead cost along with the other indirect cost like insurance etc. are added to the running cost.
- Equipment depreciation costs are added to the running cost.
- Capital expenditure like larvae, fish fry, juvenile fish, Feed etc.

## Advantage of having control on Unit cost:

- Input consumption cost (Inventory items cost is calculated on the FIFO or standard cost) based on your preference.
- Direct or indirect costs like labor, electricity, or cleaning & other overhead costs along with the other indirect costs like insurance etc. are added to the running cost.
- Equipment depreciation costs are added to the running cost.
- Accurate unit cost of the item produced.

## Advantages of using navfarm for Meat Production

- Yield Control.
- Estimated vs Actual Retrieval (KPI Defined in the system)
- Integrated with weigh bridge.
- Elimination of Manual record keeping on different parts
- Flock tracking to the finished food
- Multistage inventory
- Costing of the production

## **Controllability at farms**

Various programs like feed, vaccine, inspection depends also on other conditions as for example of the fish health status and right time to heap harvest.

- Range of temperature: Rearing temperature should be adjusted between 26 and 29 deg. When temperature exceed 30deg., previous percentage ratio should be reduced.
- Defining programs and protocol like Feed should be distributed late in the afternoon for the use in the next day.
  - Add 50% to 75% of total quantity in the belt feeders, remaining quantity will be distributed manually.
  - Added/reduced feed quantity must record.
- Weaned larvae and fingerlings up to 3g requires continuous feeding during the day.
- For fingerlings more than 3g, the number manual feeding must be between 3 to 5 distribution per day.
- The technician must check the oxygen level which must exceed 80% of the saturation.
- During feeding the fish require more oxygen for the metabolism.
- During feeding, oxygen level will decrease gradually, and the difference should be covered by adding more dissolved oxygen.
- Strange/abnormal behaviour (injuries, homogeneity, appetite, cannibalism, isolation, etc). has to be reported.