

## Decision Making Choices: Prioritization Predicaments in Agribusiness

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Mr. S.K. Nanda, Executive Director of Utkal Agrotech was quite disturbed with the underutilization of the plant capacity of his company for processing tender coconut water. Against the rated capacity of processing 10,000 coconut per day, total procurement, on an average turned out only 2000 nuts per day. In August 2012, he called a meeting of senior managers dealing with coconut (research and extension, purchases, production, finance and marketing) to chalk out a strategy for the year 2013. Nanda opened the discussion with the following remarks:

*“All of us are aware that in spite of our best efforts, we are not able to buy the required quantity of coconut from the market. Most of the produce of coconut of the Odisha is consumed without undergoing much value addition. Negligible existence of coconut based industries is the clear testimony of this fact. On the other hand, coconut processing industries like ours in the State are becoming defunct over time due to lack of quality raw material in required quantity. Farmers are crying that they are not getting good price of their produces. Friends, I need your inputs to solve the problem of non-availability of quality raw material in the required quantity for us”.*

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Mr. P. K. Behera, Manager, Purchase wondered *“It looks that the farmers’ interest in coconut crop going down? Coconut is not priced well at farm-gates. I am sure; no farmer will grow the crop if it is not remunerative. If we want higher production and quality product, we need to give price incentive to farmers”*.

*“Yes, you may be correct, Mr Behera, but the problem is not related to price of coconut. Although, market is still there, marketing activities are taking place, but the production and quality of produce are not up to market expectations. There exist large number of market channels with potential to manage both increased supply and increased demand of coconut in the State. Further at every channel level, there exists some margin for all the players, although all the intermediaries are worried that actual volume of transaction had reduced and also the quality of nuts available had come down”*. Mr. Pradeep Samant, Manager Research and Extension, tried to sum up his opinion.

Mr. Nanda, sensing the mood of dejection, proposed, *“We need to see the larger picture of coconut production in the State and focus on increasing production. How can we incentivize coconut production for the farmers? Why don’t you collect the information dealing with current production of coconut in the State, factors affecting its production, and make some recommendation too. What can we do to invigorate coconut production in the State? I want you to come out with appropriate recommendations, in sequence of their priority, which will give us early results”*.

Everyone nodded in affirmation as the concern was already visible on the face of every officer. In spite of having considerable coastal stretch and favorable agro-climatic conditions required for coconut cultivation, the data from the state, which not only had considerable area under coconut cultivation and had also traditionally known as one of the major coconut producing states of the country, had indicated decreasing production, productivity, and interest of farmers in coconut production.

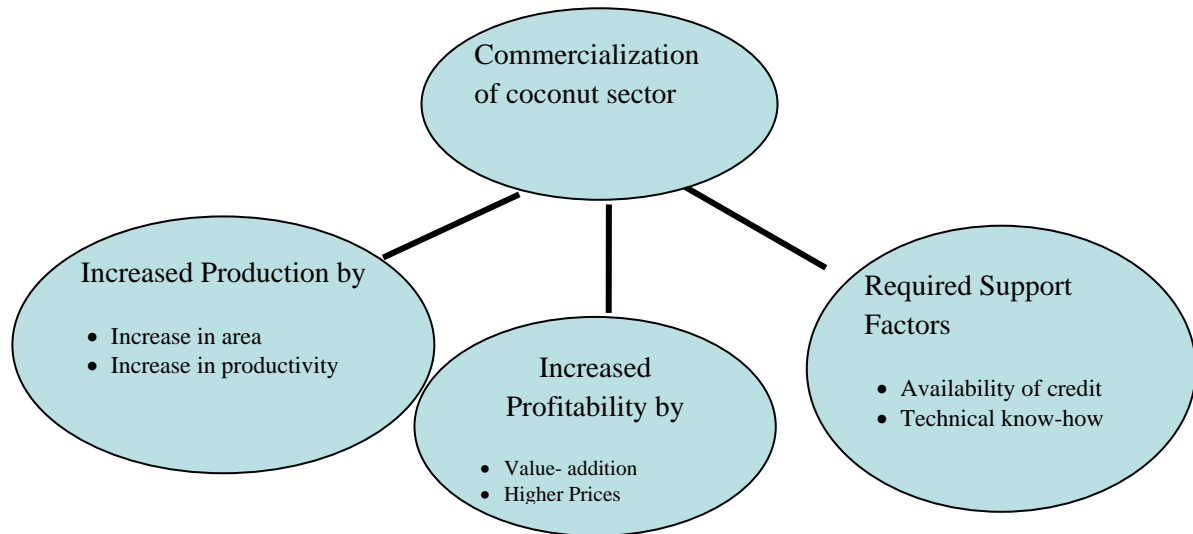
**After 2 months...**

Mr. Pradeep Samant was ready with the findings of the study. Although he was sure of veracity of the findings and pertinency of various recommendations, however, he was uncertain about sequence of those recommendations. He knew that it will be imprudent for him to recommend starting with all the recommendation simultaneously, and Mr. Nanda will expect early and maximum return from the suggested interventions. The question - 'how should he prioritize his recommendations?' which has haunted him since last week was still on the top of his mind.

He made his presentation as follows:

***Theoretical Foundation:***

Besides the agro-climatic and natural factors, commercialization of coconut like any other crop, is dependent on various factors which can be categorized in to production factors, market factors, and support factors (Figure 1). Production factors include increased area and improved productivity through quality and timely usage of agricultural inputs like, seeds, fertilizers, pesticides, irrigation and technology. Market factors deals with issues like, selling price for the farmers, availability and access of market and market infrastructures, value addition through processing; whereas availability of support like, credit, technical know-how, policies support for production of coconut, and establishment of coconut based industries etc., constitutes the supporting factors. It is important to understand that the above factors are not mutually exclusive, but are dependent on each other, and also affect each other.

**Figure 1: Strategies for Commercialization of Coconut Production**

### 1.1 Increasing Coconut Production by increase in Area under Cultivation

Increase in area under coconut cultivation can take place through two different routes, namely (a) substituting the area from other crops to coconut, what is called as substitution effect for change in cropping pattern, and (b) increasing the net sown area under coconut by bringing additional area into cultivation from fallow or uncultivable land categories (known as addition effect of cropping pattern change).

Based on economic logic, the substitution effect for change in cropping pattern can take place if the farmers perceive coconut as more profitable and less risky crop as compared to its competitive crops. Analysis of Farmers' interest to increase the area of reveals that the farmers are interested to cultivate more of coconut for their own use (Table 1). Ranking scales to the factors like 'more profitable' and 'less production and price risk' indicate that

the farmers neither consider this crop as a profitable nor without the production and price risks. This clearly brings out the subsistence nature of coconut production in the State.

**Table 1 - Ranking of Reasons for increasing area under Coconut**

District	Puri	Cuttack	Jagatsingpur	Khurda	Ganjam	Overall
Factor	Rank	Rank	Rank	Rank	Rank	Rank
More profitable	5	3	5	2	5	5
Less production & price risk	4	4	4	5	3	4
Marketing of coconut is easy	3	2	1	3	2	2
No recurring cost	2	5	3	4	4	3
Own use	1	1	2	1	1	1

In the state of Odisha, 0.9% of the total net sown area is under the cultivation of coconut crop. The analysis of land utilization pattern of the State since the year 1990-91 indicates that the net sown area in Odisha has been reducing. The net sown area in the State has reduced from 6304 thousand hectares in 1990-91 to 5654 thousand hectares in 2006-07 (Table 2). Another important feature of land utilization pattern in the State is that area under the categories of fallow, barren and uncultivable land has been increasing over the same period.

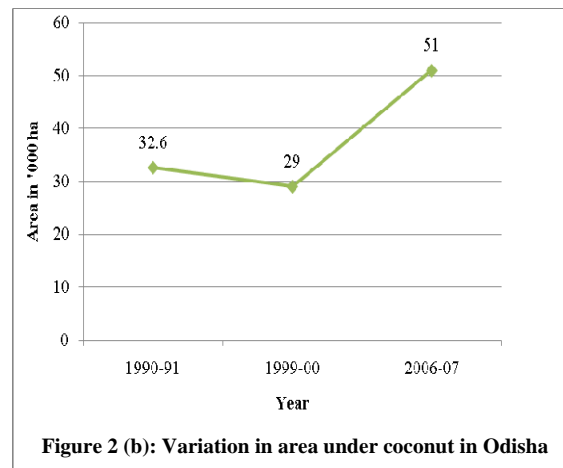
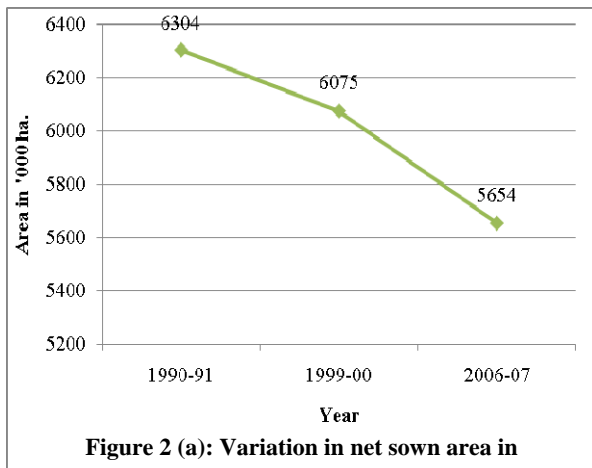
**Table 2 - Land Utilization Pattern in Odisha**

(Area in ' 000 hectare)

Year	Geographical Area	Forest Area	Misc. Tree	Permanent Pastures	Cultivable Waste	Land Put to Non-argl. Use	Barren & Unculturable Land	Current Fallow	Other Fallow	Net Area Sown
1990-91	15571	5476	859	726	597	746	499	150	214	6304
1995-96	15571	5722	715	514	435	858	553	241	323	6210
1999-00	15571	5606	774	534	445	838	618	345	336	6075
2000-01	15571	5813	482	443	392	999	843	430	340	5829
2005-06	15571	5813	482	443	392	999	843	474	434	5691
2006-07	15571	5813	342	499	375	1298	840	526	229	5654

Source: Directorate of Economics & Statistics, Govt. of Odisha.2006

It is interesting to note that between the years 1990-91 and 2006-07, the trend in the total net sown area and area under coconut cultivation in the Odisha went in opposite direction (Figures 2 (a) and 2 (b)). In comparison to the trend in the net sown area, the trend in the area under coconut in the State showed a progressive trend. As seen the net sown area has reduced over the years 1990-91 to 2006-07 whereas during the same period, the coconut area coverage has increased from 32600 hectares to 51000 hectares in the State. These are indicative of continuing interest and importance of crop for the farmers.



### ***Increasing Coconut production by increase in Productivity of Coconut***

The average productivity of coconut at State level turned out to be 8379 nuts per hectare, which is quite less as compared to other coastal States of the country. In the coastal districts of the State, the productivity of coconut is higher not only to average State productivity figure, but also to that of the other coconut producing districts of the State. This is mainly because of the better agro climatic and soil conditions prevalent in these districts. There had been replenishment plantations with better quality of samplings particularly after the super cyclone in the year 1999. This replenishment plantation has resulted in increased productivity in the major coconut growing districts of the State.

### ***Production Techniques***

The Government of Odisha and CDB have been conducting awareness programs for the farmers about scientific cultivation of crops. Almost all the farmers grow the traditional tall (popularly known as east coast tall) varieties of the coconut. Farmers are ignorant about the existence of such varieties or have impression that it cannot be grown as easily as the traditional varieties. Moreover, good dwarf quality saplings are not available in the nurseries at an affordable price. Farmers use traditional methods of farming and maintain the distance of just above 15 feet, between plants and around 18 feet between the rows against the recommended spacing for plant to plant and row to row of 20 feet and 30 feet, respectively. Farmers do not cite any scientific reasons for it other than their own tradition since long time.

Irrigation is one of the important requirements of coconut cultivation; however, most of the farmers do not consider it very important to plan for the schedule irrigation as per the scientific recommendation. Farmers believe that coconut trees manage their water requirements on their own; and wherever farmers take inter-cropping, they consider that irrigation provided to second crop will serve the purpose of coconut trees also. The use of fertilizers by the farmers in coconut cultivation particularly after the trees have matured and have started fruiting is almost negligible.

More than half of the farmers practice intercropping with the crops like banana (*Musa acuminata*), pineapple (*Ananas comosus*), papaya (*Carica papaya*), jackfruit (*Artocarpus heterophyllus*), and mango as (*Mangifera indica*); vegetables crops like brinjal (*Solanum melongena*) and some other crops like, sugarcane (*Saccharum*), betel nuts (*Areca catechu*), betel leaf (Piper betle), peanut (*Arachis hypogaea*), jute (*Corchorus olitorius*), and even bamboo (*Bambusa vulgaris*) as the intercrops with the coconut. Some farmers even take pulses along with the coconut.

## **Strategies for Promotion of Coconut**

### **Area increase**

Increase in area under coconut cultivation is a plausible and feasible option for increasing the production of coconut in Odisha. The State has suitable agro-climatic conditions for the production of coconut. The farmers have experience and interest in growing coconut. In spite of favorable conditions, the state has less than 1% of its net sown area under the coconut cultivation. Even in the coastal districts which have most suitable conditions for coconut production, the area under coconut is just more than 3% of their net sown area. It is suggested that in next five years, State should increase the area under coconut cultivation by 0.5% of net sown area. Seventy five percent of the area increase should be in the coastal districts where productivity is very high, and rest 25% in other districts.

It is important to note most of the farmers belong to small and marginal category (refer table 3) . However, as the strategy and for early result large farmers can not be ignored.

**Table 3 – Land holding in Odisha**

Category of farmers	No. of holdings (lakh nos.)	% of total holding	Area (lakh ha.)	% of total area holding
Marginal (< 1.0 ha.)	22.95	56.43	11.55	22.73
Small (1 - 2 ha.)	11.14	27.39	15.44	30.39
Medium (2 - 4 ha.)	5.00	12.29	13.44	26.45
Large (> 4 ha.)	1.58	3.9	10.38	20.43
Total	40.67	100.00	50.81	100.00

*Source: Directorate of Agriculture and Food Production, Odisha, Bhubaneswar (2008)*

The strategies which will help bringing more acreage under coconut cultivation have been developed based on “Segmentation, Targeting and Positioning” (STP) approach for initiating possible interventions by Coconut Development Board and State Government.



**Segment 1:** Areas where the farmers are aware about the coconut crop and its marketing channels are well established.

**Segment 1.1:** Small and marginal farmers

**Characteristics:**

- Small land holdings
- Subsistence farming
- Farmers know the benefits but can't put considerable land under coconut cultivation; and can't withstand the long gestation period.
- Coconut crop can't be pushed as the cash crop; but can be as the fruit crop with long term income, if planted in good numbers.
- Motivation to take proactive steps for planting the crop among the farmers is not very high.
- The crop has established its attractiveness and farmers may take it up with little efforts.

**Approach of Intervention:**

- Farmers need to be encouraged to plant coconut on the bunds of their fields, in kitchen and backyard gardens.
- Saplings to be provided to the farmers at the place of plantation along with extension inputs about the cultivation techniques.

- Variety for such farmers would be traditional with comparatively less resource requirements, and more chances of survival in the given agro-climatic situation.
- Providing extension help for initial few years till the time when the tree is established.

**Positioning Theme:**

*“A crop with great social and religious importance; takes less space and resource to grow and gives regular income for long time”.*

**Segment 1.2: Medium farmers****Characteristics:**

- Farmers can put some part of their total land under coconut cultivation but will still be interested in annual / seasons crops.
- Farmers are usually not so resourceful, and may like to put initially a given patch of land only under the coconut crop.
- Farmers may also try the coconut crop on bunds and also as an inter-crop with their existing seasonal / annual crops.
- Farmers will like to cultivate the coconut crop if convinced about its profitability as the crop is well known to them.

**Approach of Intervention:**

- Farmers need to be encouraged to plant coconut on the bunds of their land.
- The crop can be introduced as the inter-crop on any suitable patch of land.
- Farmers need personal or group based counseling highlighting benefits from growing coconut as the inter-crop with existing crops.
- The counseling meeting should be followed by making the saplings available at subsidized rate along with advices related to scientific cultivation of the crop as the inter-crop.
- Farmers may continue to require advices for a year or two till the time the coconut plants are well established and farmers have learnt the inter-cropping with coconut.
- Presence of an appropriate agency to anchor the entire activities and also to meet the information needs of interested farmers will be required. The agency / agency's representatives should be easily approachable and available for advise the farmers on the related subject.

**Positioning Theme:**

*“Assured, more and more income from same land”.*

**Segment 1.3: Large farmers****Characteristics:**

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- Large land holdings so the farmers can put substantial land under the coconut cultivation.
- Farmers are interested in commercial agriculture and are capable of investing for future benefits.
- Farmers are either unaware or ill-informed about costs and benefits of coconut plantation.
- Most suitable group of farmers, who can undertake coconut cultivation on large chunk of their land, if convinced.

**Approach of Intervention:**

- Making farmers aware about the various costs and benefits of coconut cultivation and assuring good return on investment.
- Encouraging farmers to take intercropping with coconut on any piece of land which is most suitable for it.
- Making farmers aware about various government/ CDB's schemes to promote coconut cultivation.
- Providing subsidies and other incentives for planting coconut on big chunk of land.
- Organizing workshops in the villages with all the stakeholders highlighting the benefits for farmers of coconut cultivation, and explaining various schemes / incentives for potential coconut growers.

- Organizing farmers visit to villages where farmers have taken coconut growing on large scale.

**Positioning Theme:**

*“More trees, more income, for longer period, but at lesser cost”.*

**Segment 2:** Areas where the farmers are not aware about the coconut crop, but marketing channels are well established.

**Segment 2.1:** Medium and large farmers

**Characteristics:**

- Medium farmers will get interested in the coconut crop because it has been growing in the district successfully or /and extension efforts will make farmers interested in crop by demonstrating successful cultivation of crop in their own field situation.
- Secondly, availability of market in the district will help intervening agency to convince the farmers that coconut can be grown on a larger scale.

**Approach of Intervention:**

- The approach being followed awareness – facilitated introduction – seeing results – interest – expected action. (Farmers will first see the crop feasibility in given area, will see the success of the crop and then once convinced will be interested in taking the crop).

- First, medium farmers need to be encouraged to plant coconut in their backyard garden or in the field where regular supervision is possible.
- Species need to be introduced should be fast growing and early fruiting.
- Farmers visit to the field of successful farmers' farms.
- Saplings and technology needs to be delivered as a package.
- Intensive extension support will be required during the initial days of crop as farmers will have many questions and also some failure of crops.
- Once the crop is getting established in backyard gardens and in nearby fields, we need to promote the crop as the crops on bunds and as inter-crop.
- During the gestation period, appropriate markets for coconut need to be identified or developed where farmers can sell their surplus with some benefits.
- The entire work has to be executed in the form of a project with initial duration of five years.

**Positioning Theme:**

*"Investing in your backyard for long duration returns"*

**Increasing Productivity:**

It is no doubt that that coastal areas of the state provide most suitable agro-climatic conditions for coconut cultivation, but in some other non-coastal districts also, coconuts have been growing well. Overall the productivity in the state is satisfactory but certainly not up to its potential, particularly in coastal districts. Productivity in the state can be increased by making good quality inputs available to the farmers and making them aware about scientific usage of those inputs. It is expected that the productivity of the coconut can be increased by 10% in next ten years by providing different inputs particularly by promoting dwarf varieties of coconut.

**Irrigation:****Present Context:**

- There are two major issues related to irrigation in coconut crop in the State. The first is the perception in the mind of farmers that coconut does not require scheduled irrigation, and secondly that farmers need not to plan for irrigation to get better production.
- Scheduled irrigation in non-coastal districts is very much required for the commercial production of the crop.
- Awareness about the duration and timing of irrigation is very important to achieve maximum productivity of coconut crop, which is lacking among the farmers.

**Approach of Intervention:**

- In all the coconut planted areas, it is necessary to identify the status of moisture condition in the soil to ascertain that the crop should not be under the water stress at any time during a year. Based on the status of moisture in the soil, farmers need to arrange the irrigation facilities for the coconut crop.
- Farmers need to be educated about the importance of irrigation. This can be done by taking a campaign consisting of village based meetings/workshops with agricultural experts making suggestions with appropriate audio-visual aids.
- Visits of selected farmers to other farmer's farm/ demonstration plots of CDB and State Coconut Research Centre to understand the scientific cultivation practices.
- Information about the irrigation should become a part of extension package, and all extension and promotional activities for coconut production should have the suggestions on irrigation.

**Positioning Theme:**

*"Think of coconut, Think of Water – Irrigate your Coconut Trees"*

**Fertilizer application****Present Context:**

- Most of the farmers do not apply fertilizers after the coconut trees have matured.



- During the early days of the crop, farmers apply some amount of fertilizers based on their understanding of fertilizer requirement of the crop.
- Farmers are also unaware about the scientific recommended dosages of the different fertilizers for the coconut cultivation.
- When coconut is grown as the intercrop, farmers apply fertilizers to the main crop.

**Approach of Intervention:**

- Awareness among the farmers about importance of fertilizer applications on the production of coconut, required dosages of various fertilizers, and time and method of fertilizer application is foremost important task to be completed.
- On priority bases, take the help of districts level officers, fertilizers dealers and group of influential farmers from each village to spread such messages.
- Visits of selected farmers to other farmer's farm/ demonstration plots of CDB and State Coconut Research Centre to understand the scientific requirement of fertilizers.
- Information about the fertilizer application should become a part of extension package, and all extension and promotional activities for coconut production should have the suggestions on fertilizer application.

**Positioning Theme:**

*"Apply a little fertilizer to get more".*

## **Saplings, Planting and Intercropping**

### **Present context:**

- Most of the farmers are growing traditional varieties of coconut.
- Farmers are not much aware about different dwarf early fruiting species. Almost all the farmers prefer same tall varieties.
- Most of the farmers prefer saplings grown locally on farm.
- Farmers are not very much aware about the benefits of using new improvised saplings. Besides, good dwarf variety of saplings are either not available and if they are available, these are very costly.
- Most of the farmers are not aware about the scientifically recommendation about row to row or plant to plant distances required for coconut cultivation.

### **Approach of Intervention:**

- Farmers need to be made aware about the various recommended varieties of the coconut.
- An audio-visual aid showing the comparative recommended cultivation practices and performances of various varieties of the coconut will help farmers making correct decisions.

- Saplings of dwarf varieties should be made available at all the Government nurseries. Farmers of the coconut growing areas should be made aware about the availability of such saplings.
- When farmers approach nurseries to get the saplings, farmers should be made aware about its planting, and recommended practices, and also possibilities of intercropping.
- A demonstration plot of recommended varieties will be of great help to establish the superiority over the existing one. Selected parts of the demonstration plots having different combinations of intercrops with the coconut will give farmers opportunity to see the recommended cultivation in practice. Farmers visit followed by expert sessions on its cultivation practices will help farmers to adopt new and improved varieties and also the cultivation practices.
- Information about the appropriate species, suitable soil and land, planting distances should be a part of extension package and promotional activities.
- Research centres within the State needs to be strengthened and research finding needs to be shared among the various stakeholders.

**Positioning Theme:**

*“Learning to make money”*

**The Final Questions:**

Mr. Nanda found the presentation convincing. However, there were few questions, which were still stirring his mind. He, after thinking for some time and looking the paper on which he was scribbling during the presentation of Mr. Samant, posed direct questions to Mr. Samant:

- i. What are the Management Decision Choices (MDCs) before the company to incentivise the coconut crop in the State of Odisha?
- ii. How these decision choices can be prioritized? How can we develop a set of indicators to choose a particular choice?
- iii. Why the recommendations are based on STP approach?
- iv. Whether we should implement the recommendations individually or an integrated manner?
- v. Can these recommendations be prioritized? If yes, then on what basis?

Mr. Pradeep Samant thought for a while, smiled, and then made a request “can I get another week to work upon these questions”?

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