Methods for value chain analysis in fisheries

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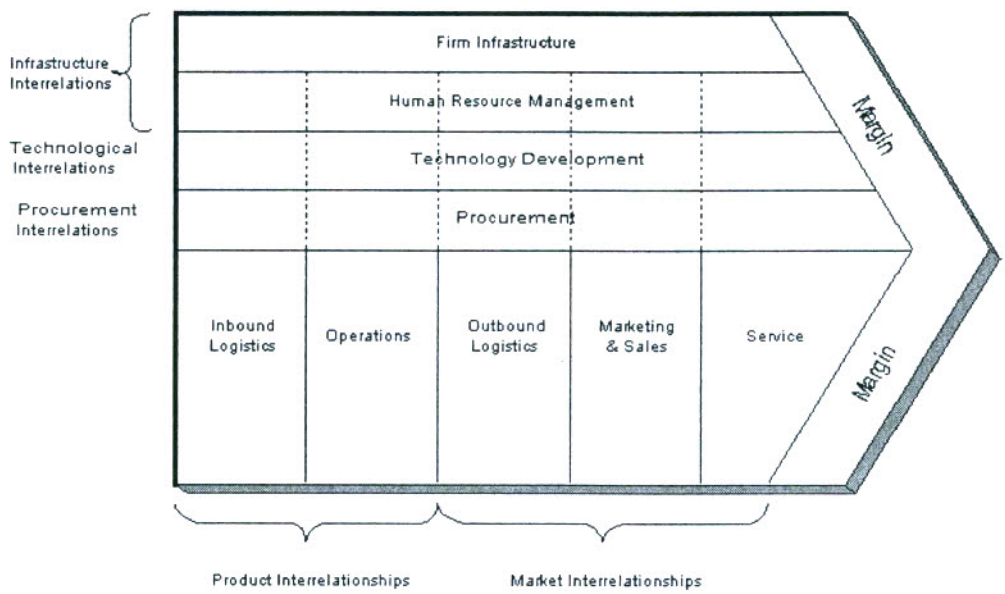
Introduction:

Value chains are concerned with what the market will pay for a good offered for sale. The main objectives of value chain management are to maximize gross revenue and sustain it over time. Michael Porter (1985) introduced in his book 'The Competitive Advantage' the concept of the Value Chain and book highlighted that the activities within the organisation add value to the service and products that the organisation produces, and all these activities should be run at optimum level if the organisation is to gain any real competitive advantage. If they are run efficiently the value obtained should exceed the costs of running them i.e. customers should return to the organisation and transact freely and willingly. Michael Porter suggested that the organisation is split into 'primary activities' and 'support activities'.



Primary activities

Inbound logistics: Refers to goods being obtained from the organisations suppliers ready to be used for producing the end product.

Operations: The raw materials and goods obtained are manufactured into the final product. Value is added to the product at this stage as it moves through the production line.

Outbound logistics: Once the products have been manufactured they are ready to be distributed to distribution centres, wholesalers, retailers or customers.

Marketing and Sales: Marketing must make sure that the product is targeted towards the correct customer group. The marketing mix is used to establish an effective strategy; any competitive advantage is clearly communicated to the target group by the use of the promotional mix.

Services: After the product/service has been sold what support services does the organisation have to offer. This may come in the form of after sales training, guarantees and warranties.

With the above activities, any or a combination of them, maybe essential for the firm to develop the competitive advantage which Porter talks about in his book.

Support activities

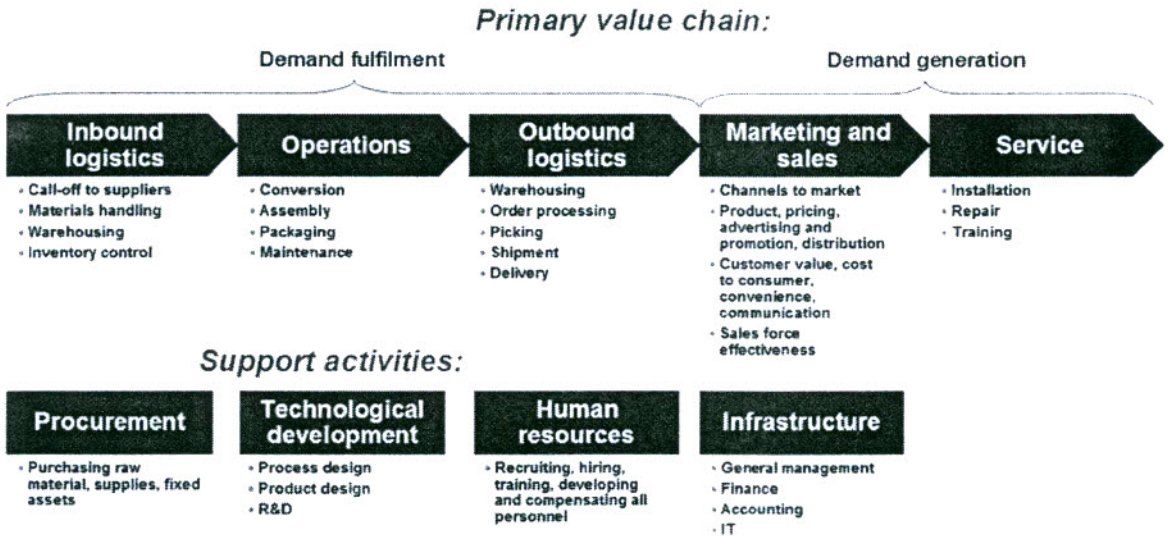
The support activities assist the primary activities in helping the organisation achieve its competitive advantage. They include:

Procurement: This department must source raw materials for the organisation and obtain the best price for doing so. For the price they must obtain the best possible quality

Technology development: The use of technology to obtain a competitive advantage within the organisation. This is very important in today's technological driven environment. Technology can be used in production to reduce cost thus add value, or in research and development to develop new products, or via the use of the internet so customers have access to online facilities.

Human resource management: The organisation will have to recruit, train and develop the correct people for the organisation if they are to succeed in their objectives. Staff will have to be motivated and paid the 'market rate' if they are to stay with the organisation and add value to it over their duration of employment. Within the service sector, eg: airlines it is the 'staff' who may offer the competitive advantage that is needed within the field.

Firm infrastructure: Every organisation needs to ensure that their finances, legal structure and management structure works efficiently and helps drive the organisation forward. As you can see the value chain encompasses the whole organisation and looks at how primary and support activities can work together effectively and efficiently to help gain the organisation a superior competitive advantage.



What is value chain analysis?

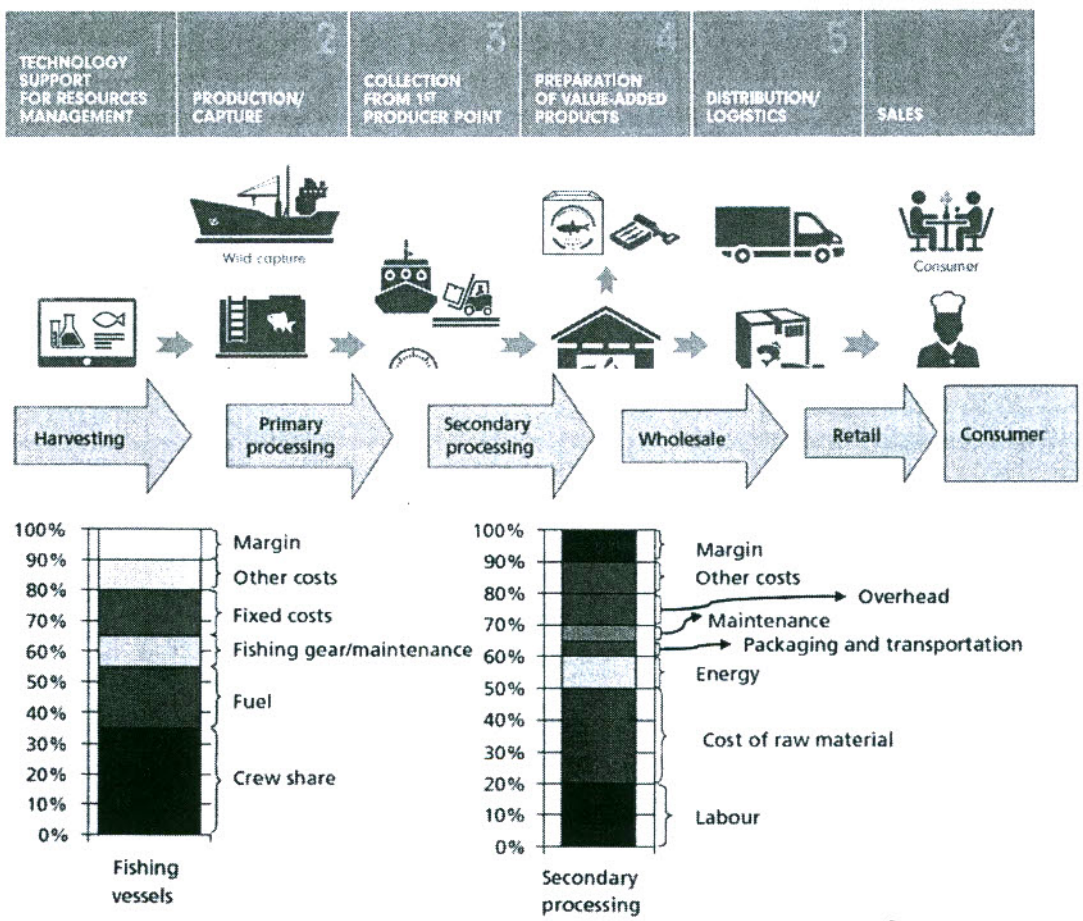
Value chain analysis (VCA) is a method for accounting and presenting the value that is created in a product or service as it is transformed from raw inputs to a final product consumed by end users. Value chain analysis is about identifying the full set of economic cost along the value chain, to determine where how much value is added and what the relative importance of different actors. Then have a good look also at the available services and the supporting institutional framework.

Value chain analysis is a way of assessing competitive advantage by determining and understand the various segments like costs related to every single activity, price points ,product differentiation, selling propositions etc. activities within the company and outside the company will yield the greatest competitive advantage. Research point of view take the help of statistical tools like factoring analysis, chi-square test, regression analysis and other measures of dispersions are used for getting better results. Choice experiments are definitely among the tools that can be useful for value chain research. You may want to assess farms' and firms' preferences for alternative business models. This may provide information on which institutional innovations are needed for value chain upgrading.

The value chain is an important construct for understanding the distribution of returns arising from design, production, marketing, coordination and recycling. Essentially, the primary returns accrue to those parties who are able to protect themselves from competition.

Value chain analysis in fisheries

Value chain in fisheries is used as a managerial tool to reduce processing costs and improve quality and productivity of the product and reduces distribution cost. The advantages of studying value chain in fisheries are,



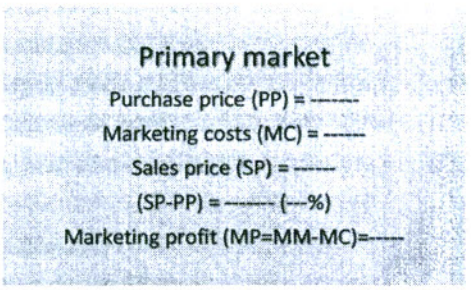
The value chain approach is a useful practical tool towards assessing the status of development of fisheries and aquaculture. It also analyzes the opportunities and constraints for future development. It is useful for the key actors such as fishers, managers and policy makers towards streamlining their activities in a cost effective way.

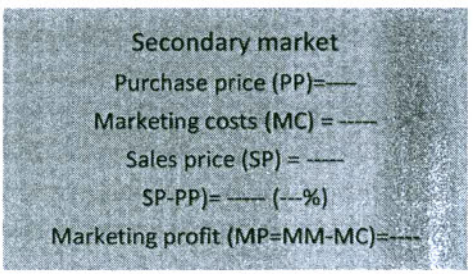
Methodology for undertaking Value Chain analysis

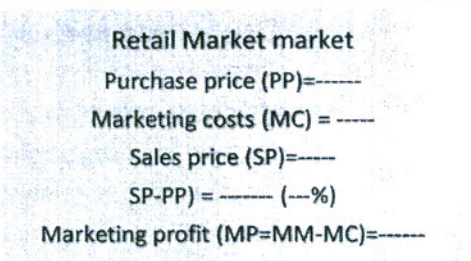
The world of production and exchange which we are observing is complex and heterogeneous. So there is no mechanistic way of applying value chain methodology. Each chain will have particular characteristics. The methodology outlined in following sections will address the following issues, and begins with understanding the nature of final markets, which are increasingly the driver in many value chains:

1) The point of entry for value chain analysis;
2) Data collection;
3) Mapping value chains;
4) Product segments and Critical Success Factor's in final markets;
5) How producers access final markets;
6) Benchmarking production efficiency;
7) Governance of value chains;
8) Upgrading in value chains;
9) Distributional issues.

Calculating the market profit along the value chain to each stakeholder for the primary, secondary and retail markets







1. The point of entry for value chain analysis

Which chain – or chains – is/are the subject of enquiry therefore very much depends on the point of entry for the research inquiry. Some possible points of entry, reflecting concerns with are: the global distribution of income, small scale fishermen and firms, women, etc. In each case, the point of entry will define which links and which activities in the chain are to be the subject of special enquiry.

2. Data collection

Collecting data about a value chain includes gathering information from chain participants (firms, individual, stakeholders); about their functions and the quality of their relations; about the factors that affect the industry's performance such as the business enabling environment, end markets, supporting markets and inter-firm linkages; and about the presence or lack of investments to upgrading the value chain's product or service.

3. Mapping value chains

Having identified, the value chain in question, the task is then to put numbers and values to the variables under investigation. It is crucial to choose which dimensions are to be mapped, based on available resources, the scope and objectives of the value chain analysis and the mandate of the organization". Regardless of what choices are made, the following dimensions are of necessity and therefore should be mapped to provide an overview of the studied value chain:

- What are core processes through which the product has to pass in order to reach the final customers?

- Who are actors directly involved in such processes?
- The product flow has to be identified. The product flow will tell the story of the product's life.
- In addition to internal actors directly involved in the core processes, there exists external, although indirectly involved, do have effects on the performance of the chain in one way or another
- When mapping services feeding into the value chain, it is worthwhile to keep in mind that services could be classified into transactional services and embedded services. The value chain map will include the initial identification of difficulties faced by different actors in the value chain while they are performing their functions.

Constructing a value chain map is started with a rough map. Then during the value chain analysis, more information will be gathered and added to the map to make it more detailed. Mapping a chain means creating a visual representation of the connections between businesses in value chains as well as other market players. Value chains can become complex when they reflect multi-stage production systems with multiple types of firms operating in different locations in one country or multiple countries around the world.

4. Product segments and critical success factor's in final markets

It will almost always be important to decompose the final market in the value chain into different market segments. Contemporary global markets comprise a number of segments and key characteristics which will need to be analysed to understand value chain dynamics. These market characteristics are referred to as Critical Success Factors (CSFs). Not only are markets increasingly segmented, with each segment having distinctive combinations of CSFs, but they are also increasingly volatile. The Critical Success Factors in each market can be readily grouped into those factors which are "order qualifying" (that is, producers need to achieve these in order to participate in these markets), and those which are "order winning" (that is, these are the critical factors which lead particular firms to succeed, perhaps by selling at a price premium).

5. How producers access final markets

From the perspective of value chain analysis, the key issues to analyse are:

- The identification of the key buyers in a particular chain;
- The dynamics of the buying function;
- The critical success factor's which these buyers exercise;
- The strategic judgements buyers will often have about specific sources of supply;
- The supply chain management policies ;
- The supply chain upgrading policies.

6. Benchmarking production efficiency

Having charted the dynamic nature of final markets, and the ways in which producers are inserted into these markets, it is then necessary to analyse the productive efficiency of different parties in the value chain. This is referred to as "benchmarking". The key drivers which this chain faces are cost competitiveness, quality, lead times to satisfy customer orders , the capacity to make changes, etc. Meeting each of these market drivers requires operational practices, and will be reflected in performance outcomes; both these performance outcomes and practices can be benchmarked.

7. Governance of value chains

The extent of chain power may be related in complicated ways to the relative size of a particular firm in the chain. In general, the larger the firm, the more influential its role. There are a number of possibilities, of

which the most important are the share of sales, of value added, of profits, of relative rate of profit and of buying power; the control over a key technology and distinctive competence, the holder of chain "market identity". Which of these indicators is important will be contingent on the characteristics of a particular chain and the question being pursued. But it will also be important to distinguish the territory of enquiry, that is whether the relevant size is indicated by the firm's share of global, national or local activities.

8. Upgrading in value chains

Value chain analysis examines activities and services required to bring a product or service from inception to end markets. It helps design interventions to increase competitiveness while ensuring equitable distribution of the benefits from growth. It is particularly useful in creating a private sector driven vision for change, and a plan to reach that vision.

In value chain analysis, upgrading is used to identify the possibilities for producers to 'move up the value chain', either by shifting to more rewarding functional positions, or by making products that have more value-added invested in them, and that can provide better returns to producers. In the value chain approach, the upgrading process is examined through the lenses of how knowledge and information flow within value chains from 'lead firms' to their suppliers (or buyers). Hence, upgrading is about acquiring capabilities and accessing new market segments through participating in particular chains. Humphrey and Schmitz have developed a typology of upgrading based on four categories, which are less conspicuous improvements that may in fact be the most common forms of upgrading among poorer producers:

- **Process upgrading**: achieving a more efficient transformation of inputs into outputs through the reorganisation of productive activities.
- **Product upgrading**: introducing new products or improving old products faster than rivals. This involves changing new product development processes both within individual links in the value chain and in the relationship between different chain links;
- **Functional upgrading**: increasing value added by changing the mix of activities conducted within the firm or moving the locus of activities to different links in the value chain;
- **inter-chain upgrading**: applying competences acquired in one function of a chain and using them in a different sector/chain.

9. Distributional issues

Distribution has both power and income components. The former concerns the balance of leverage which different parties have in determining the distribution of who does what in the chain and the returns which accrue to different parties. It is necessary to work through the following components of value chain analysis:

- What are the different forms of rents and barriers to entry which are the underlying determinants of the distribution of the returns from global production chains?
- In what circumstances value added and turnover data illuminate the analysis?
- How is profitability to be measured, and are profits an appropriate measure of distributional outcomes?
- The locational dimensions of global value chain distribution - global, national and local
- Decomposing income streams - class, income groups, gender and ethnicity.
- How a knowledge focus can be incorporated into the analysis, opening up the distribution between skills
- How do SMEs fit into global value chains.

The role of learning and innovation

Learning and innovation are key to creating and sustaining an industry's competitive advantage since industry upgrading is dependent on knowledge of what the market requires and the potential returns on investments in upgrading. It is essential that learning and innovation flow through the value chain in order to optimize these returns. The most competitive industries are those that institutionalize learning mechanisms. However, even with strong incentives to limit learning and innovation, fostering access to a new market (typically requiring a change in product or process) or new support markets that deliver new technology can substantially shift the learning dynamic.

Tools used in value chain analysis

The data required for the analysis can be collected using either quantitative or qualitative or both. The questionnaire or interview schedule is used for collecting the quantitative data. The qualitative data can be collected through semi-structured questionnaire and focus group discussion.

The data collected were analysed using various econometric tools viz., means, proportions, ranks, factor analysis, cronbach's alpha and regression analysis. These analyses are used to find out the dominant actor and activities in terms of cost and value. The tools used for data collection and data analysis in value chain analysis are presented in Table. 1.

Table. 1. Tools used in value chain analysis

Data collection tools	Data analysis tools
I. Quantitative tools	I. Means, proportions and ranks
i. Questionnaire / interview schedule	II. Factor analysis
	Eigen values
	Chi-square values
	Kaiser-Meyer-Olkin (KMO)
	Barlett's Test of sphericity
II. Qualitative tools	III. Cronbach's Alpha
i. Semi-structured interview	IV. Regression analysis
ii. Focus group discussion	

Drivers and Governors of change on the Demand

Several factors are affecting on the demand function of fish and fishery products. Price, income, income distribution, substitutes, tastes and fashion, advertising and expectations of the consumers make the changes along the demand curve and demographic characters lead to change the position of the demand curve, upward or down ward shifting of the curve.

1. **Demographics**

Population growth rate and age distribution are key important factors affecting the demand function of fish and fishery products. ***Ethnicity and race*** are other important determinants on demand function. Socio-cultural values, religious concerns, and attitudes make difference among the market places. ***Geographic distribution*** is major important phenomenon to decide the demand on fish. Communities around the world have their own methods to harvest, handle, store and prepare the fish. ***Extent of travel*** passing national boundaries and exposure to different cultures is challenging experience to traditional demand curves on fish and fishery products. ***Literacy rates and level of education*** lead to create knowledgeable society which is more concern on food safety and quality. ***Health concerns*** food safety and hygiene are the key concerns in develop country markets compared to developing nations. Consumers are placing growing concerns on sustainability, depletion of fishery resources, social responsibility and climate change. Moreover, consumers of developed country markets are willing to pay extra premiums for fish and fishery products from sustainable base. ***Retailer promotion*** is another important determinant of demand function. Developed country markets are composed of giant retail chains and competitiveness among retailers are very high.

2. Consumer preferences

Price, quality, convenience, year round availability, variety, nutritional concerns, safety and hygiene are principal determinants of consumer demand on fish. Food habits and food consumption behavior directly affects the consumer concerns on price and quality.

i. Convenience

Convenience plays important role in fish and fishery product marketing. Especially busy mothers and house wives are reluctant to buy fish due to its time consuming initial preparatory work. Clean, cut ready to cook or ready eat forms of fish is demanding more and consumers are willing to pay extra premiums on it. Moreover, range of value added meat products available in markets make meat is more popular compared to fish. Fish and fish based meals are popularizing all over the world due to health concerns. Product development can play a great role in this endeavor

ii. Year round availability and Variety & nutritional content

Aquaculture, make it possible compared to capture fisheries. Especially, regular supplies to the market are essential to have loyal group of consumers. Seasonality is common with many fish species and which makes consumers to search substitutes. Fish is rich in Omega 3 fatty acids and which make fish more popular in modern markets.

iv. Safety & Greenness

Consumers of today are more concern on food safety ever before and high value markets such as EU and USA market are place much attention on it. Developing country markets are placing poor attention on food safety and sanitation measures and rising levels of market information, education and awareness programmes will help to minimize the gap. Sustainability is the end concern of the green or environmental friendliness. Fish stocks all over the world are declined in to threaten levels and remaining stocks make it possible to serve for limited time. Eco-labels, organic labels and MSC label are generating consumer awareness. Health concern consumers are paying more attention on chemical free stuff and free from antibiotics. Consumers willingness to pay premium prices on chemical free, sustainable products encourage producers to think twice on their way of production.

3. Buyer specification

Buyer specifications are very important to the marketing of fresh produce. Volume of trade differs according to the type of buyer mainly. Seasonality, economic status, cultural aspects and purchasing power of the consumers affects the trade volume. Presentation style appeals and attracts the consumers and especially important for fish and fishery products. Good packaging materials will improve the handling and shelf life of the products. Clean cut ready to cook or eat fishery products attracts more consumers than the raw whole fish. Food labeling is intended to provide information on product composition and safety. Country of Origin Labelling, meaning all fish and shellfish has to carry labels saying where they came from and whether they are farmed or fresh. Mandatory public (regulatory) standards carry with them a legal obligation for compliance and are a response to a perceived market failure; as such they are often implemented in the presence of negative externalities, to ensure the provision of public goods, or to mitigate information asymmetry. Certification and the labelling of certified products aim to identify products that follow certain minimum standards or regulations, such as standards for quality, organic production, fair trade, or sustainability. A variety of seafood certification schemes have been developed over the past decade listed below.

- Marine Conservation Society (MCS), Fish online website and *Good Fish Guide* (UK) and Northeast Atlantic)
- The Monterey Bay Aquarium Seafood Watch
- Greenpeace: International Seafood Red list
- Australian Marine Conservation Society (AMCS) produces Australia's *Sustainable Seafood Guide*, a consumer guide, advising consumers which species are in danger of being fished out.
- Royal Forest and Bird Protection Society of New Zealand, Best Fish Guide
- *The Blue Ocean Institute Seafood Guide*, Based in New York.
- Oceans Alive: Best & Worst Seafood Choices

Conclusions on the value chain

- Value chains conceptualize raw material transformation irrespective of scale, i.e. small scale or industrial fisheries.
- Value chain thinking is a systematic way to governmental perspective, improving benefits through better policies.
- Value chains determine areas of comparative advantage in supplies and markets.
- Value chain analysis can help maximise profit, but it can also identify activities that are necessary but not profitable.
- Local and regional networks enhance value addition: different institutional and end markets are linked to different forms of coordination and control of value chains.
- Need to develop vision on: skills training, investment market access, sales and export.
- Ensure that policy environment is favourable, but don't assume that will be enough
- Take a cluster approach only as the starting point for value chains, not as an end in itself
- Concentrate on competitiveness and productivity. Look for and exploit multiple ways to add value once initial success has been preliminarily attained.
- Identify and support promising value chains with assistance at key points collaborative analysis of challenges, joint definition of priorities, and expert assistance from industry experienced people.
- Recognize that some keys to success require mainly public sector intervention, others only private, some a mixture of the two.

- Government sector policy makers should seek private sector alliances at all stages of supply and value chains.

Further readings:

Karen Sau Jespersen, Ingrid Kelling, Stefano Ponte, Froukje Kruijssen "What shapes food value chains? Lessons from aquaculture in Asia" Journal of Food Policy 49 (2014) 228–240

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[i] The real cost were derived by deflating with price index for diesel and respectively.

[ii] Current inputs are seed, fertilizer, manure, insecticides, interest on variable cost; Capital inputs are draft animal, irrigation, machinery, depreciation, interest on fixed capital; labour input is human labour. The land revenue involves the value of land resources (both owned and hired) as well as other charges on land.

Some part of the write is published by the author in the research paper cited as follows:

Suresh A (2013). Technical change and efficiency in rice production in India: A Malmquist Total Factor Productivity approach, *Agricultural Economics Research Review*, 26 (Conference Issue): 109-18.