

## **Towards development of sustainable food value chain: Concepts and its application in marine capture fisheries in India**

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The concept of value chain has attracted the attention of academicians and management professionals, such that its usage has transcended from the level of a marketing management tool to that of a policy analysis one. A value chain describes the full range of activities which are required to bring a product or a service from conception, through the different phases of production and delivery to final consumers (Porter, 1980). Often the concept of value chain is interchangeably used to denote a market chain, but there are very critical differences between them. While the market chain analysis intends to provide information on profitability for various agents along the market chain (Ferris *et al.*, 2001), a value chain analysis describes the range of activities required to bring a product to the final consumer and, the extent to which intermediaries/agents gain from participating in the chain (Jacinto, 2004). In that context, a value chain describes the distribution of the benefits or value addition to different economic agents, and touches the realms of development economics. In the initial days of the development of the concept, it was used for analyzing a single company, a sector, an organization or a product; however, later it was developed to analyze single or multiple sectors and to develop policies.

Kaplinsky and Morris (2000) identify three sets of reasons for the importance of value chain analysis. With the globalisation of labour and capital, and emergence of division of labour, achieving efficiency of production has gained greater policy focus. The corporate world tries to attain systematic competitiveness in the context of growing division of labour and global dispersion of production components so as to achieve efficiency in production to penetrate global markets. Value chain analysis is also done to understand the dynamic factors that play, so as to make the best out of globalisation. This approach essentially focuses on markets, with the aim of achieving overall efficiency in terms of increasing productivity and reducing cost. However, the attainment of efficiency needs to factor in the opportunity cost of the resources and optimise the benefits over a long period of time. The trade-off between efficiency attainment and equity in distribution of the benefits for the stakeholders has also attained significance. Development of a win-win situation calls for imparting efficiency in attaining targets while generating maximum benefits to the actors along the value chain. In that

context, sustainability of the value chain emerges as an important consideration.

### **Porter's value chain concept**

The concept of value chain has its origins from the commodity chain approach, which focused on the physical product flow from the producer to final consumer. Michael Porter (1985) put forward value chain as the value addition in competitive markets. It is the core element in the production-to-consumption chain of activities, within an organisation framework. The value added should be more than the marginal cost of that activity, for the particular intervention to be sustainable. However, the concept doesn't address the larger concern of economic development of the sector, but was limiting itself to the organisational management. Porter's VC concept in that way deals essentially with firm-level strategy and not with broader economic development.

In Porter's concept, the activities of the firm can be broadly split into 'primary activities' and 'support activities', depending on the whole functioning (Figure 1). The primary activities include inbound logistics, which include sourcing of the raw material; operations which include conversion of the raw material into final products; outbound logistics which include system of distribution centres, wholesalers, retailers and consumers; services including trainings. The primary activities, either alone or in combination of them are essential for the firm to develop the competitive advantage for the value chain to be economically successful. On the other hand, the support activities assist the primary activities in helping the organisation achieve its competitive advantage. They involve procurement including quality management; technology development to obtain competitive advantage within the organisation including development of online facility; human resource management which includes recruitment, trainings, motivation, competitive advantage etc.; and, managing firm infrastructure, including managing finances, legal structure, and management structure. A co-ordination of all the activities are necessary for successful value chain development.

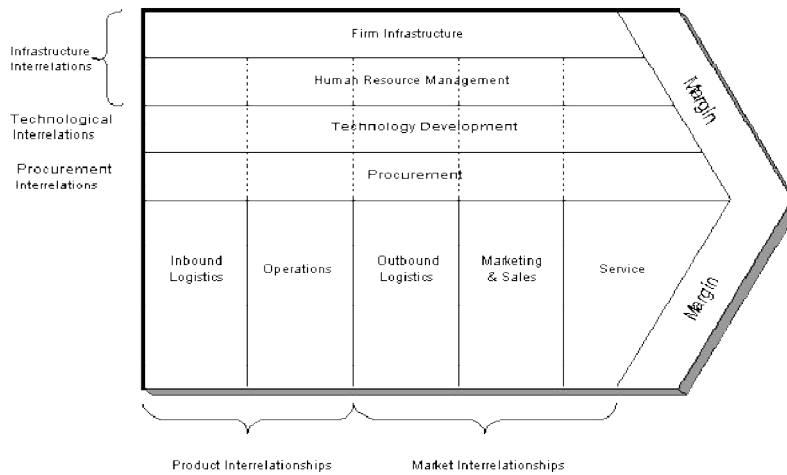


Figure 1: Michael Porter's value chain concept

### Global Commodity Value Chain

On the otherhand, the global commodity value chain (GCV), as introduced by Gereffi and Korzeniewicz (1994), provides a developmental dimension, by introducing chain governance. The element of chain governance envisages how various firms across the entire chain are coordinated (or strategically linked) in order to be more competitive and add more value. Under this framework, the value chains are derived by the nature of demand from the final consumers and the process of globalisation.

The concept of global commodity value chain (GVC) shifts the focus of the analytical framework to demand side factors, compared to the supply side factors that are seen in case of Porter's value chain concept (Gereffi, 1994; Kaplinsky, 2000). This shift in the orientation of the value chain has been a result of the substantial influence that the global retailers wield over the food systems of the developing countries. The control is more forceful in those food commodities that undergo relatively low level of processing and therefore flexible. As the demand consideration varies across markets of different countries, primarily on account of different quality standards emphasised, the producing nation needs to take into account the cost of compliance. For example, the quality criteria prescribed by export markets like US is considerably different from that of Europe. This creates redefinition of markets according to quality criteria, and leads to an association which mutually reinforces quality and demand driven value chains. In such circumstances, the capability of the supplier to adhere to the quality prescriptions ceases to be a major consideration for the hegemonic retailers, and the sunk cost turns irrelevant. The cost of compliance could be prohibitively high for many firms, and the global hegemony of the retailers can be a critical factor that affects the sustenance of the value chain. One prime contribution of the global commodity value chain is the recognition of

globalisation as a powerful economic phenomenon in determining food system performance and retailer hegemony as a prime factor that affect the value chain.

### **Sustainable food value chain**

In recent times the value chain analysis has gained wide popularity, mainly to identify and prioritize the intervention points and development strategies for a sector. While the development economics has been focusing more towards the sustainability issues, value chain development literature has not addressed the issue of sustainability as the bottom line of developmental thinking (FAO, 2014). Of particular importance is how the value chain analysis addresses the issues of environment, economics and society at large. Further, the extant value chain framework is criticised for not being subjected to scientific scrutiny as well. The issues of food value chain are quite different from that of other value chain, as they have certain unique characteristics. Firstly, food is a social concern as it affects the health of all consumers, and, therefore, need to be subjected to larger public scrutiny. The factors like residential location of the consumers, habits and preferences related to food, place of origin, country of origin, form of food in terms of the extent of processing etc. have a strong impact on the nature of the VC. Second, the agricultural value chain in general and food value chain in particular affects the food and livelihood security concerns of large section of the population. This predisposes the value chain to larger political considerations. Third, the food value chain depends on the natural environment and, therefore, the costs needs to internalise the externalities out of the environmental factors (that are outside its reach). Four, the quality of food product is difficult to control, in terms of various parameters, and therefore, calls for institutional, organisational and technological interventions throughout the value chain.

The sustainable food value chain (SFVC) concept, as used by FAO, visualises an element of sustainability and applies it to specific nature of food production, value addition and distribution. However, many services used in a single commodity approach are common to many agricultural products- for example, marketing, financing, information etc are used by many commodities, and therefore a more holistic approach would gain currency in the times to come. However, for analytical purpose, the concept of SFVC has to look into commodity chains, so as to delineate the broader trends, identify intervention points and estimate the impacts. The concept of SFVC is relatively newer one, and is largely developed by FAO. Consequently, this session largely relies on the concepts as provided by FAO (2014).

SFVC can be defined as the full range of farms and firms and their successive coordinated value-adding activities that produce particular raw agricultural materials and transform them into particular food products that are sold to final consumers and disposed-off after use, in a manner that is profitable throughout, has broad-based benefits for society and does not permanently deplete natural resources (FAO, 2014). The concept is comprehensive in term of number of actors and the activities undertaken, and takes into consideration the external environment and vertical coordination in some activities. Full range of actors include the direct actors who own each component of the business as well as those who participate in service provision, like credit, R&D, market intelligence and other support services. Further, the concept gives emphasis for ecology as well, as it visualises a non-declining natural capital stock. The core economic activity in the entire process is value addition, through various activities like processing, storing, grading, transporting etc. The major component of the value added can be captured under five head, viz. (a) Salaries for employees; (b) Net profit for asset owners; (c) Tax revenues; (d) Consumer surplus (e) Externalities . The externalities can be positive or negative, or a combination of both. The externalities are unintended effects caused by an economic agent, which are not internalised in terms of compensation, such as increased pollution, biodiversity loss etc (which are negative in nature); and increased water availability useful for the locality (which emerges as positive).

The behaviour and performance of farmers and other agri-food enterprises are determined by a complex environment. The central element of the framework is the value chain actors, who form the core value chain. They represent those who produce or procure from the upstream level, add value to the product and then sell it on to the next level (FAO, 2014). The value chain actors could either be private sector enterprises (as in most cases) or public-sector as in case of Food Corporation of India (who collects foodgrains for buffer stocking as well for distribution through PDS outlets). In a value chain several such agencies can co-exist, who bears striking difference in terms of the size, technology, goals etc., catering to a multiple market segments.

The chain distinguishes four core functions (links): production (e.g. farming or fishing), aggregation, processing and distribution (wholesale and retail). Each of these steps involves costs, which vary depending upon the participants in the value chain. In a small holder dominated agrarian economy, aggregating and storing poses challenges, and will not allow economies of scale, and therefore may be costly. Institutional intervention, in terms of farmer's collectives or producer organisation can be a good option at

these levels. Many agencies, including aggregators, distributors, processors etc can be a major actor at this point of time.

In the entire core value chain activities, the major element is value chain governance structure. It refers to the nature of linkages between various actors- both vertical and horizontal. The value chain governance involves various core activities/ functions such as payment mechanisms, price determination, information exchange, market power, wholesaling etc. The value chain governance in that sense is a function of technology development, the extent of market imperfection, and rules and regulatory framework.

The support providers helps the value chain actors by providing essential roles that helps value creation by value chain actors. The SFVC visualises three kinds of support services

- a. Physical input suppliers (such as seeds, irrigation, chemicals, ice, packaging materials etc.) at different levels of activity
- b. Supply non-financial services (include transport, quality checking, market research, trainings, etc)
- c. Financial services (Provision of capital in terms of credit, which requires growth of the banking systems).

The support system can arise from the public sector, private sector, NGOs, civil society organisations, farmer organisations etc. In some cases, all the services could be provided by a single agency, as a package. For example, many input dealers provide all the services together to the farmers, which may even to extent a buyback arrangement, not necessarily of a contract farming nature. In some cases the aggregator of the producer would be providing these services as a package along with the extension inputs.

### **Societal and natural environment**

The external environment- like society and natural conditions- exerts significant influence on the functioning of the value chain. The societal elements can be broadly classified into four types, viz informal socio-cultural elements (like religious requirements), formal institutional elements (like regulations, laws and policies), organisational elements (like educational facilities) and infrastructural elements (like roads, ports, communication networks etc) (FAO). The value chain operates in an enabling environment shaped by the domestic and international policies. The value chain which caters to the export market is influenced by the international environment more strongly compared to the one which caters more to the domestic consumers. The food safety regulations including CODEX Alimentarius, HACCP etc prescribed by the importing countries are costly and cost of



compliance is higher. The certification procedures are tedious and needs international collaboration and verifications.

### **Interaction of economic, social and environmental elements**

The sustainability of the value chain is determined by the economic, social and environmental elements. A value chain is considered economically sustainable if the required activities at the level are economically viable and or profitable. However, the outcome of the economic activity needs to be socially and culturally acceptable to characterise it to be socially sustainable. The environmental sustainability is attained largely if the value chain activities doesn't impact the environment adversely and maintains a non-declining natural capital stock.

### **Principles of sustainable food value chains**

Though each food value chain is unique, the sustainable food value chain is characterised by 10 interrelated principles, as noted below:

- a. Economically sustainable: Commercial viability, competitiveness, growth etc. The upgraded VC should provide higher profits, income etc.
- b. Socially sustainable: Inclusiveness, equitability, social norms, social institutions and organizations. Generation of greater share of value (profit and wage income) to the poor, broad-based, and equitable distribution along the VC, with no adverse effect on the poor.
- c. Environmentally sustainable: Non-declining natural capital stock, for inter-and intra-generational equity. Minimise environmental footprint (water footprint, carbon footprint etc) is an issue.
- d. Dynamic and system based: VC is dynamic due to changes in market demand, technology, available services, profitability, risk, barriers to entry, large-firm behaviour, input supply and policy etc. VC needs to be adapt to changes. Sub-systems are linked, and identifying root cause in the system is the solution to improve.
- e. Governance centred: Needs to analyse how value chain actors of different typology transact vertically and how they collaborate horizontally. The governance needs to bring in win-win solutions, and impart element of trust among the value chain actors.
- f. End-market driven: The value is ultimately determined in the end-market when consumers purchase the product/service; and therefore consumer analysis needs to be the starting point for the VC improvement.
- g. Vision/strategy driven: to be successful, the actors have to carefully target development goals and stakeholders. The strategies need to revolve around a vision which is realistic, quantifiable (as far as possible) and targeting (as far as possible) selected stakeholders. The

improvement of VC should focus on that area where where largest impact is possible.

- h. Upgrading focused: It requires carefully assessed and innovative upgrading activities to translate a vision and strategy into an effective plan. The upgradation can be in the form of technology, organisation, institution, network etc.
- i. Scalable: The VC upgrade allow replication process that is based on realistic assumptions.
- j. Multilateral: It requires that the driver of the process of VC upgradation is private sector as driver and the other agencies (public sector and civil society organisations) as facilitators

### **Sustainable Marine Fishery Value Chain in India**

The concept of sustainable value chain is much applicable in fisheries sector. The sector provides livelihood to about 15 million people in India either directly or indirectly. The marine capture fishery sector in India has shown a deceleration in the growth performance, mainly on account of decline in stock reported to be due to several factors including climate change and over fishing. The participants in the value chain include traditional, motorised and mechanised sectors. The fish produced caters to the domestic market mostly in fresh form and export markets in processed form. Fish export is a major foreign exchange earner in India, and therefore are affected by national and international policy and political changes. The transmission of price signals affects the fish capture and processing. The high income incentives of capture fisheries and its processing have attracted investments in the sector. This has led to over-capitalisation, and consequentially over-extraction and stock depletion.

In order to address the sustainability issues of marine capture fisheries, large scale mechanised trawl fishing is banned for certain period during the breeding season of some fishes. This would have negative impact on certain stakeholders, including the labourers who are engaged in certain associated activities, but would have beneficial effect on catch and income in a sustainability perspective.

The domestic and international regulations on fishing, processing and quality control have significant influence on fish value chain, starting from production to waste disposal. Since fish is liable to quick perishability, it is subjected to strict quality controls adhering to stringent norms. The cost of compliance with the extant and emerging quality control norms is capital intensive, and therefore warrants institutional support and handholding in human resource development in the form of acquiring necessary skills. In the whole value chain, one of the major concerns is the extent of benefits accruing to the fisherman, the labourers involved, and, their linkages with



the support system. A schematic representation of the fish value chain is provided in Figure 2.

The figure provides scope for in-depth analysis of the value chain focusing on the economic agents and activities. To develop sustainable value chain, the strength and weakness of every agent/ activity need to be reflected against the sustainable value chain principles. Such an analysis is needs close observations from the field, with salient close collaboration with all the stakeholders involved including scientist, development workers, policy makers, and above all the fishers and other stakeholders.

### **Suggested Readings**

FAO (2014) Developing Sustainable Food Value Chains- Guiding Principles, Rome

Humphrey, John and Memedovic, V (2006) Global value chain in agri-food sector, UNIDO, Vienna

Donovan, J., Cunha, M., Franzel, S., Gyau, A. & Mithöfer, D. 2013. Guides for Value Chain Development – A Comparative Review, CTA & World Agroforestry Centre, Wageningen, The Netherlands.