



Commodity Chain Analysis

Constructing the Commodity Chain Functional Analysis and Flow Charts





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by

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See also FAO's Value Chain Analysis software

The FAO-VCA software tool carries out value-chain analyses for agricultural and rural development policies. By storing relevant data it can calculate flows of physical outputs and inputs, flows of aggregated costs, value-added and net benefits. In addition, it allows users to directly compare different hypothetical scenarios. [FAO-VCA Software Tool»](#) [Value Chain Analysis for Policy Making: Methodological Guidelines for a Quantitative Approach»](#)

See all VCA material on EASYPol resource package: [Value Chain Analysis](#)

About EASYPol

EASYPol is a multilingual repository of freely downloadable resources for policy making in agriculture, rural development and food security. The EASYPol home page is available at: www.fao.org/easypol.





Objectives

After reading this module, you should understand what is commodity chain analysis and be aware:

- How to construct a commodity chain analysis;
- How to develop a functional analysis;
- How to analyze the commodity flows (flow chart).



The definition of a Commodity Chain

What is the meaning of commodity chain ?

- **The term *Commodity Chain* is used to refer to the overall group of economic agents (or the relevant activities of those agents) who contribute directly to the determination of a final product. Thus the chain encompasses the complete sequence of operations which, starting from the raw material, or an intermediate product, finishes downstream, after several stages of transformation or increases in value, at one or several final products at the level of the consumer**
- **More precisely, it is used to mean the group of agents (or part thereof) who contribute directly to the production, then to the transformation and delivery to final market of a single agriculture or livestock product**



Existing methodologies in Commodity Chain Analysis

Different methodologies have been developed for analysis of commodity chains.

- **The value chain**
- **The Global Commodity Chain**
- **Commodity Chain Analysis**



Existing methodologies in Commodity Chain Analysis

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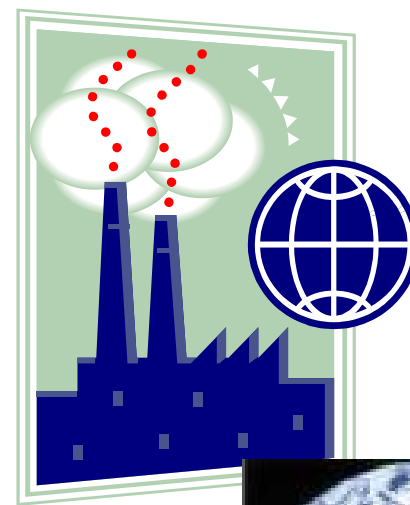
The value chain: describes describes the activities that take place in a business and relates them to an analysis of the competitive strength of the business. Value Chain Analysis is one way of identifying which activities are best undertaken by a business and which are best provided by others ("out sourced"). What activities a business undertakes is directly linked to achieving competitive advantage.



Existing methodologies in Commodity Chain Analysis

Different methodologies have been developed for analysis of commodity chains.

The Global Commodity Chain whose primary focus is analysis of the international trading system and the increasing economic integration of international production and marketing chains. It was developed primarily for analysis of the impact of globalization on industrial commodity chains. It highlighted the power relations which are imbedded in chain analysis



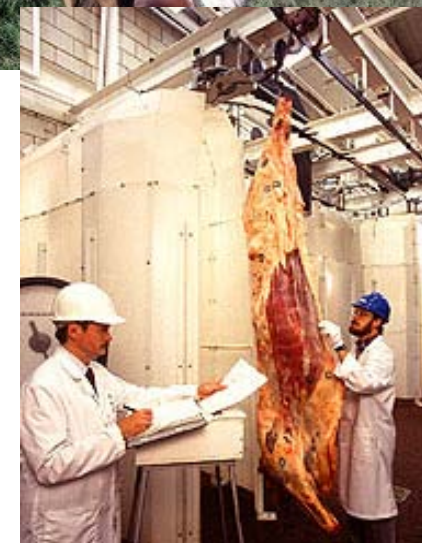
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Existing methodologies in Commodity Chain Analysis

Different methodologies have been developed for analysis of commodity chains.

Commodity Chain Analysis “l’approche filière”, is a value-free technique applied to analyzing existing marketing chains for agricultural commodities assessing how public policies, investments and institutions affect local production systems. It consists of quantitative analysis of inputs and outputs, prices and value added along a commodity chain through accounts by agent



Bibl. information in the notes



A tool to build from agents accounts towards sector value added

The dominant idea behind the economic analysis of commodity chains is to lay out the overall activities of all the participants, or agents, who contribute to the production and/or transformation of a given commodity. This involves:

- identifying the outline of the chain and the position of the various agents within it,
- developing the economic accounts corresponding to the activities of the agents involved in the chain.



This reduction of activities and operations to their monetary value makes this economic technique a powerful tool of analysis. It allows to use commodity chain analysis to produce properly quantified and significant results, calculations at new levels of aggregation, sensitivity and simulation analyses, and to interpret these results at the macroeconomic level.





The concept of the economic agent

The term agent is used to describe an economic actor, i.e. a basic unit in the economy, who undertakes activity and makes decisions autonomously. This could consist of a physical person (farmer, trader, consumer) or a legal entity (a business, an authority, a development organization)

It is normal to use the generic term to refer to all agents of the same type: the agent "farmer" refers to all farmers, the agent "trader" for all traders, the agent "abroad" for all economic partners located outside of the national economy.

From the point of view of exchange, an agent comprises a kind of "territory", enclosed by a frontier. In (production) flowcharts, this is classically represented by a rectangle:

AGENT





The concept of the economic agent

Transfers of goods, services or funds (money, economic rights of all kinds) made between agents are referred to as flows. These exchanges can be identified by the fact that they, in some sense, cross the boundary of the agent (either in an inward or outward direction).

The total number of agents operating in the national economy is obviously very large. Nonetheless, it is possible to classify them on the basis of their principal activity: consumption, production of goods and services, financial operations, distribution.

An agent may be a household (farmer, retailer, collector, processor) a private firm (wholesaler, exporter, agro-industry) a public institution, a credit agency, the Government.

AGENT





The Productive agent

From the point of view of other agents in the economy, each productive agent is rather like a “black box” within which the production of goods and services takes place. The productive agent or enterprise uses factors of production to create a new product or service. This can be represented as follows:



Sometimes the more general terms, inputs and outputs, are used in place of factors of production and product.

Factors of production can originate externally to the agent. In this case they must “cross the boundary” of the agent before being employed: this results in an economic exchange usually represented as a physical flow, input, and a corresponding monetary flow, output. They may also be of internal origin (family labor in farming, self-provision of seeds, tools and land).

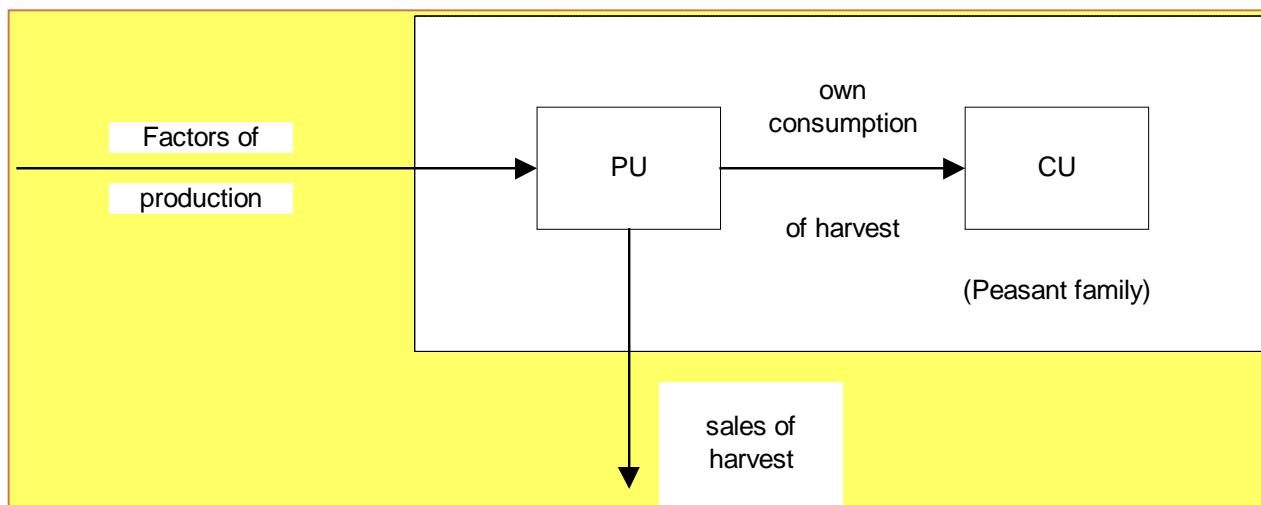




The family farm: production unit (PU) and a consumption unit (CU) (UC)

In the case of family farms, it is useful to separate the function of production from that of family consumption. The peasant farm family is divided into a production unit (PU) and a consumption unit (CU).

Any subsistence consumption of the harvest by the family itself can be represented as a transfer from the production unit to the consumption unit, as shown below.



Making these simple types of model, which emphasize the fundamental elements of economic behavior, can help the understanding of peasant family behavior.





Issue: Specification and operation of the commodity chain

The production chain is defined to include all those economic agents (or aspects of agents) who contribute directly to production, then to the transformation and marketing of a specific agriculture or livestock product.

From the growing of sugar cane to the output of refined sugar, from the production of cotton to the manufacture of cotton textiles, commodity chains enable the description from beginning to end of the chain of those transformation and distribution functions which give economic and financial value to a country's resources.





Issue: Specification and operation of the commodity chain

The definition of a commodity chain for an agricultural product starts with the raw material, as grown in the country and can then be divided into a system of “sub-chains”, representing the different uses and processes involving the product after harvesting.

Cotton chain example

The “cotton chain” is an example of a chain which divides into several final products starting from two primary products: cotton fiber and cotton seed.

Rice chain example

Another example comes from different processing systems for rice; hulling on farm or in an industrial factory can lead to different market outlets.





Issue: Demarcating the boundaries of the chain

The identification of activities and flows between them

It is usual to start from the primary activity of agricultural production of the commodity which gives its name to the commodity chain under analysis, e.g. maize, rice, whether in the peasant or farm household.

The analyst then proceeds:

- on the one hand, to follow the product downstream, through various marketing and processing channels to the final market,
- on the other hand, to identify, upstream, the principal providers of inputs and services which feed into production.

In this way the commodity can be followed through its successive transformations.





Issue: Demarcating the boundaries of the chain

The identification of activities and flows between them

As one goes downstream, the major problems arise from the precise determination of the “sub chains” linked to different processing techniques and to different products or by-products

Following the chain upstream, setting the borders of the study become even more important. The main issue here is how far back should the analyst go in including the process of supplying agricultural inputs, such as fertilizer, phytosanitary products, and agricultural machinery. The general rule is that only agents who deal directly with the commodity (e.g. rice) should be included in the chain.

it is a matter of common sense to include essential upstream suppliers in the technical or economic accounts. This may be justified particularly when complete systems of input supplies are put in place with the sole aim of servicing the chain.





Issue: The identification of agents in the chain

How the roles and functions of these agents are identified and allocated has to be looked at very carefully. In particular, the situation of agents who perform multiple roles, must be analyzed in detail, and will possibly require specific surveys.

Separating out the different functions they perform is a pre-requisite for a technical analysis of the operation of the chain and, eventually, to developing the analytical accounts of each function.

Where possible, it is important to group agents into categories which are homogeneous from the point of view of economic, technical and/or socio-economic analysis: small family farms and large commercial plantations are usually treated separately as much for socio-economic reasons as for the differences in production techniques used.





Issue: Functional analysis

Once the activities and agents in the chain have been identified, it is useful to show their interaction in a functional analysis table which includes:

1. the principal functions in the chain, i.e. the stages of processing and transport, as well as any activities associated with the supply of inputs which it has been decided to include as part of the chain;
2. the agents, (or aspects of agents) carrying out these functions;
3. the products concerned in the chain: i.e. the principal product of the chain, in the various forms into which it is transformed in the course of the chain.





Issue: Functional analysis

Functional analysis is indispensable, both as a construct for ensuring analytical clarity and as a useful presentation tool.

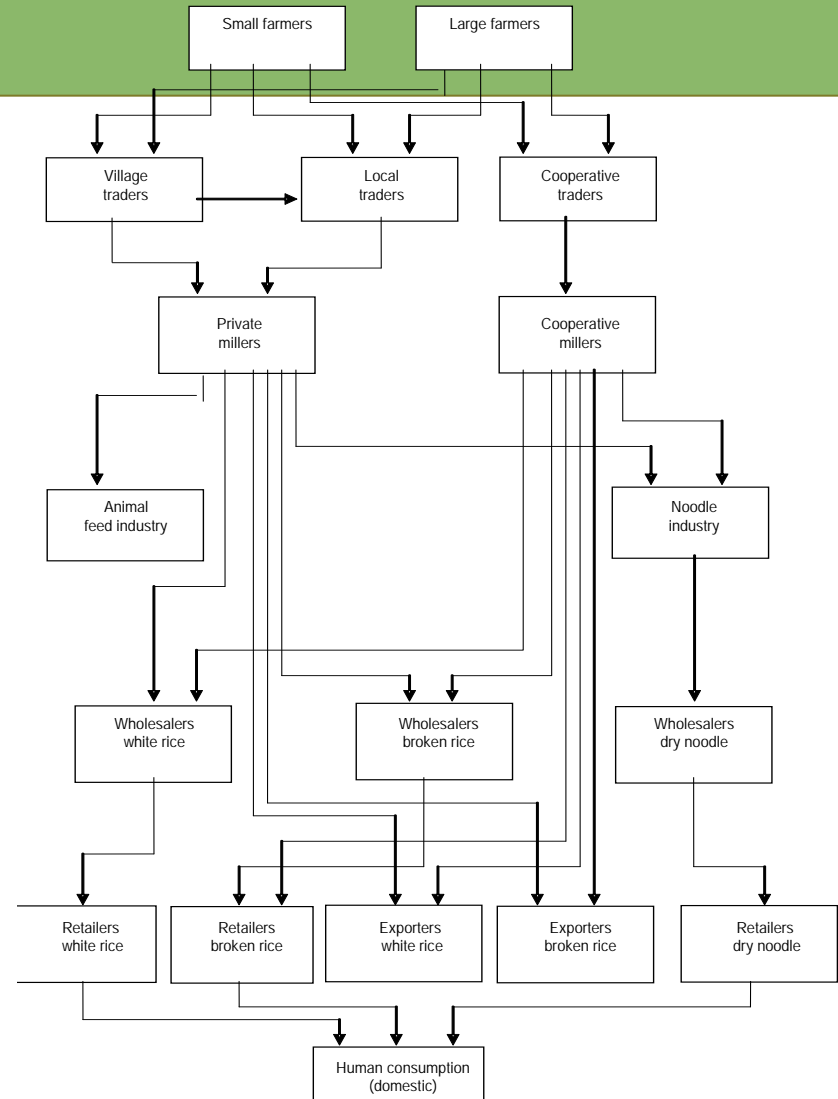
Stage of the Chain	Function	Agent	Output
production	cultivation cultivation	small farmers large farmers	rice paddy rice paddy
primary marketing	marketing transport to mill	village traders local traders co-operative traders	paddy delivered to private millers paddy delivered to private mills paddy delivered to co-operative mills
millers	milling	private millers co-operative millers	delivered to wholesalers white rice broken rice to noodle industry milled rice to animal feed industry rice bran to exporters white rice broken rice to retailers broken rice
factories	processing	noodle industry	noodles to wholesalers noodles to exporters
marketing	marketing transport	wholesalers - white rice wholesalers - broken rice wholesalers - noodles	broken rice white rice noodles





Issue: Creating a flowchart for a commodity chain

The information contained in a functional analysis table can also be represented in a commodity flow chart.





Issue: Quantifying the physical flows

The next step is to quantify these flows, both in physical and in monetary terms. This allows the analyst to assess the relative importance of the different segments or sub-chains of the chain, which in turn will allow an appropriate use of time and resources.

It is useful to draw up a matrix of the flows between agents which makes clear the nature of the product which links them. This can be done in the form of a supply utilization account (SUA), which contains a type of double entry accounting where each cell contains the volume of flows linking two agents. External agents are included in this table if imports or exports of commodities are a part of the commodity chain.





Issue: Quantifying the physical flows

On the left hand side of the SUA, are shown commodity inflows, or supplies. On the right hand side are commodity outflows, or utilization. Care must be taken to express all commodities in terms of the same physical form, and the raw material equivalent is usually used. Thus, in the example given above, this would be in terms of paddy. The following identities must hold.

Supply = Inputs from backwards agents +/- stocks
= Corresponding output of backward agents - transport losses +/- stocks

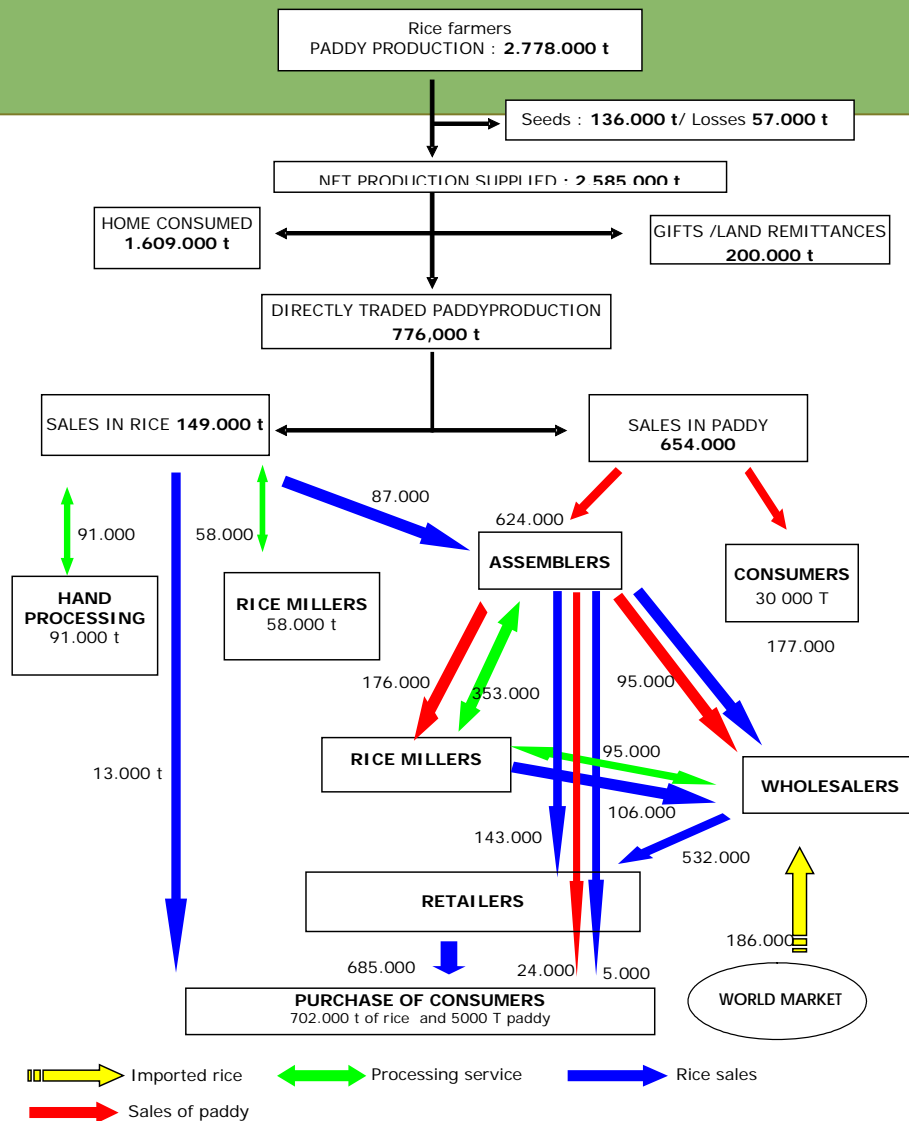
Utilization = Output supplied to forward agents + own consumption + wastage and losses +/- stocks





Issue: Creating a flowchart With quantified flows

To some extent, a flowchart may allow to illustrate and quantify the flows exchanged between agents as in the following example. It is also possible to illustrate different types of flows on a flowchart.





Issue: How to use commodity chain analysis

Commodity chains can be used:

- **empirically, in a technical-economic context (processing techniques for products or the chain)**
- **as a system of accounting in an economic context (inter-relationships between agents, sectoral linkages: calculation of technical coefficients, the effects of training)**
- **in the meso-economic arena (the multiplicity of actors and of strategies, of methods of organization and of regulation)**

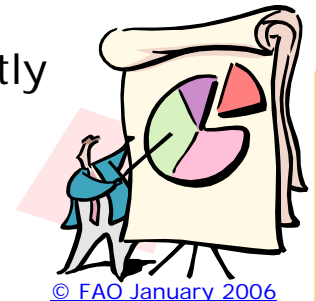




Issue: How to use commodity chain analysis

Commodity chain analysis incorporates a number of different types of analysis:

- institutional analysis: identification of the flows and of the agents at work in the existing productive system, analysis of the locations for decisions and collaboration amongst agents;
- comparative analysis: research in to the relative competitiveness of chains (a comparison of margins at different points in the chain) and of the strategies of actors;
- functional analysis: identification of bottlenecks (upstream: inputs, supply logistics; downstream: output delivery, packaging, collection, standardization and introduction of quality norms);
- economic analysis in the form of modeling, most importantly simulation.





Issue: How to use commodity chain analysis

Fields of application

Commodity chain analysis supplies an economic simulation model, not a model of optimization. This simple framework gives commodity chain analysis a vast field of application:

- descriptive studies and monographs
- sectoral, sub-sectoral and branch analysis
- project analysis (ex-ante and ex-post economic evaluations)
- studies of comparative advantage and competitiveness (regional, international)
- sectoral and macroeconomic policy analysis.





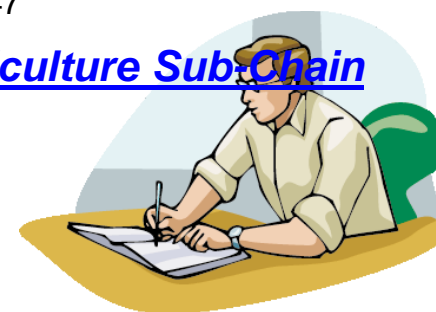
Links to other EASYPol Modules

This module is a first step introduction which drives later to the next three documents:

- [**Commodity Chain Analysis. Constructing the Commodity Chain: Functional Analysis and Flow Chart**](#), EASYPol Module 043
- [**Commodity Chain Analysis: Impact Analysis Using Market Prices**](#), EASYPol Module 045
- [**Commodity Chain Analysis: Impact Analysis Using Shadow Prices**](#), EASYPol Module 046

These modules are complemented by a set of case studies EASYPol modules 047 and 048 respectively:

- [**Case Study on Commodity Chain Analysis: Irrigated Rice Chain of the Niger's Office \(Mali\): Financial and Economic Account**](#), EASYPol Module 047
- [**Commodity Chain Case Study: Analysis of the Suburban Horticulture Sub-Chain of Bamako \(Mali\)**](#), EASYPol Module 048



These case studies can be used to replicate selected exercises during lectures or in working groups. The case studies are linked to spreadsheets with working frameworks for exercises.

