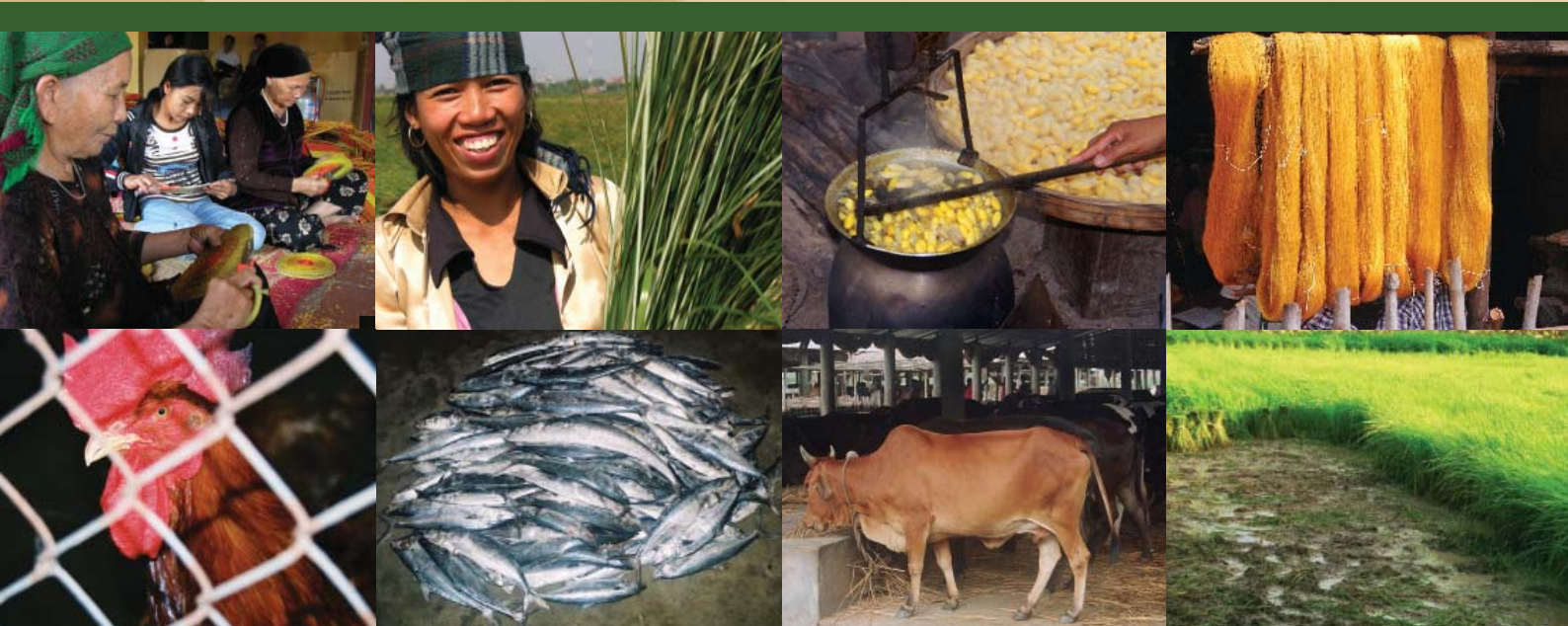**m4p**

Making Markets Work Better for the Poor

Making Value Chains Work Better for the Poor

A Toolbook for Practitioners of Value Chain Analysis

m4p

Making Markets Work Better for the Poor

Making Value Chains Work Better for the Poor

A Toolbook for Practitioners of Value Chain Analysis

December 2008

Reference:

Disclaimer:
The views and opinions of the authors expressed in this publication do not necessarily state or reflect those of DFID.

Foreword

This toolbook is the result of a concerted effort of a large number of people. Currently in its third version, substantial updates have been made since 2005 when this toolbook was first envisaged. This version of the toolbook has benefited enormously from the establishment of a network of collaborators from around the world (currently 73 persons) who have contributed to the wikibook hosted at www.valuechains4poor.org. While the wikibook is a continually evolving resource, version 3 of this toolbook presents the state of the book as at 30 November 2008.

The working group of authors would like to gratefully acknowledge the support of the many people who contributed to the conception and preparation of this toolbook. These include Alan Johnson from the Department for International Development (DFID), Thomas Finkel and the staff of the Gesellschaft für Technische Zusammenarbeit – Development of Small and Medium Enterprises (GTZ-SME) promotion project, Kees van der Ree, Bas Rozemuller and Ingrid Hultquist of the ILO-PRISED (International Labour Organisation - Poverty Reduction through Integrated Small Enterprise Development Project) project.

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PART 3 - VALUE CHAIN ANALYSIS TOOLS - QUALITATIVE TOOLS

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List of Abbreviations

ABD	Agro Business Development A/S (Denmark)
BCAS	Bangladesh Center for Advanced Studies
CAMIP	Cambodia Agricultural Market Information Project
CF	Collaborating Farmers
CIDA	Canadian International Development Assistance
CIEM	Central Institute for Economic Management (Vietnam)
DFID	Department for International Development
DVC	Domestic Value Chain
EU	European Union
FMS	Farmer Marketing School
FTE	Full Time Equivalent
GAP	Good Agricultural Practices
GTZ	Gesellschaft für Technische Zusammenarbeit (German Development Cooperation)
HACCP	Hazard Analysis and Critical Control Point
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
ILO	International Labour Organisation
IPM	Integrated Pest Management
ITTCP	Information for Tourism and Trade Promotion Center (Vietnam)
LF	Lead Farmers
M4P	Making Markets Work Better for the Poor
MPDLC	Micro Projects Development through Local Communities (Vietnam)
MPFD	Mekong Private Sector Development Facility
NEED	North-East Economic Development Project (Thailand)
NERI	National Economic Research Institute (Vietnam)
NESDB	National Economic and Social Development Board (Thailand)
NCF	Non-Collaborating Farmers
OEM	Original Equipment Manufacturer
OTOP	One Tambon (Village) One Product
PRISED	Poverty Reduction through Integrated Small Enterprise Development
R&D	Research and Development
RDMA	Rural Development in Mountainous Areas
ROI	Return on Investment
Rs	Rupees
SME	Small and Medium Enterprise
SNV	Netherlands Development Organisation
UK	United Kingdom
UNDP	United Nations Development Programme
USD	United States Dollar
VND	Vietnam Dong
ZMK	Zambia Kwacha

Value Chain Toolbook – Introduction

1. Introduction

The toolbook provides value chain practitioners with an easy to use set of tools for value chain analysis, with a focus on poverty reduction. Although a number of handbooks on value chain analysis already exist, the aim of this toolbook is to strengthen the links between value chain analysis and development interventions that improve the opportunities available to the poor. Hence, the tools presented here are similar to those presented in other handbooks, but the unique feature of the toolbook is that each of the tools has a clear focus on analysing the impact of the value chain from the point of view of the poor.

2. Who should use the Toolbook?

The toolbook is designed as a concise manual to be used in the field and by those involved in project development and/or assessment of investment opportunities. The focus is on providing easy to follow tools and clear explanations about their use. This includes examples of how these can and have been used in real value chain analyses in the past. Although the value chain analysis theory that underpins the tools presented in the toolbook is an important element, the practical aspects of analysis dominate the toolbook content.

One of the basic assumptions for using this toolbook is that the starting point of the value chain analysis is market development aimed at making an impact on the poor by providing them with better income or employment security through market participation. This means that farmers/producers are not looked upon as small surplus sellers from within a self-sufficiency strategy but rather as commercial (micro-) entrepreneurs for whom participation in the market is a deliberate and focused choice.

As much as the toolbook is developed for field-based practitioners it is also a useful resource for local policy and decision makers. The toolbook can provide them with a better understanding on how markets can be organised, and the role they can play as decision makers to facilitate the development of value chains and improve the position of the poor within the value chain. The principles presented in the toolbook can also help inform the decision to select certain value chains in which e.g. a province or district wants to be more competitive and to commission value chain analysis research to determine development strategies.

3. Organisation of the Toolbook

The toolbook is organised in two sections. The first section gives a theoretical background to value chains and also explains the pro-poor entry points for value chain analysis described in this toolbook.

The second section contains eight practical value chain analysis tools that can be used to analyse different dimensions within value chains; see Table 1.

Table 1: Tools for analysing various dimensions of the value chain.

The eight tools presented in the toolbook relate more closely with some dimensions than others, as indicated by a greater number of ticks for that association.

Dimensions	General Tools		Qualitative Tools			Quantitative Tools		
	Tool 1 Prioritising Value Chains for Analysis	Tool 2 Mapping of the Value Chains	Tool 3 Governance: Coordination, Regulation and Control	Tool 4 Linkages, Relationship and Trust	Tool 5 Analysing Options for Demand Driven Upgrading: Knowledge, Skills, Technology and Support Services	Tool 6 Analysing Costs and Margins	Tool 7 Analysing Income Distribution	Tool 8 Analysing Employment Distribution
Participation of the poor	✓	✓	✓	✓✓	✓		✓✓✓	✓✓✓
Employment and working environment	✓	✓	✓		✓✓	✓	✓	✓✓✓
Wages and income	✓	✓	✓			✓✓	✓✓✓	✓
Access to assets	✓	✓		✓	✓✓✓	✓		
Access to information and technology	✓	✓	✓✓✓	✓✓	✓✓✓	✓		
Access to infrastructure	✓	✓	✓✓		✓			✓
Access to services	✓	✓	✓✓	✓✓				
Security and vulnerability	✓	✓	✓✓		✓	✓	✓✓	✓
Empowerment	✓	✓	✓✓	✓✓✓				✓✓✓

> ## Terminology: dimension
>
> Dimension in this toolbook means an area of interest or focus for the analysis. For example, a specific dimension targeted in this toolbook is the participation of the poor.
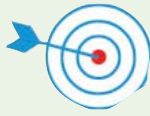
The eight tools are grouped in three sub-sets. The first sub-set contains two general tools on value chain selection and mapping of value chains. The second sub-set contains three qualitative tools to analyse the governance structure, linkages, and opportunities for upgrading. The third sub-set contains three quantitative tools to analyse costs and margins, income distribution and employment distribution.

Specific examples of the use of these different tools in value chain analysis appear in the toolbook as boxes, or are presented at the end of each tool. Other important points in the toolbook are highlighted with the following icons:

Take Note   Terminology   Warning   Try This Idea

4. How to use the Toolbook

Using the tools presented in the toolbook is not meant to be a linear process of working one's way from Tool 1 to 8. Value chain analysis is not a linear process but should try to capture the dynamics and flexibility within the value chain as well. Depending on the main pro-poor interests, time available for analysis and experience with value chain work, some tools may be used more intensely than others.

Table 1 shows various dimensions of pro-poor value chain analysis and the tools that could be utilised to analyse those dimensions. The relevance of each tool to a specific dimension is indicated by the number of ticks; the greater the number of ticks (to a maximum of three ticks), the more relevant the tool is for analysing that particular dimension.

5. Scope and Objective of Value Chain Analysis

Having various tools available to analyse value chains does not mean that all of the tools should be used at all times. The choice of tools to be used (general, qualitative and/or quantitative) will depend largely on the scope and objective of the analysis itself (often dictated by financial or time constraints, or other limitations).

Pro-poor growth has been chosen as the main objective of value chain analysis in this toolbook. Therefore, the focus of the analysis should be on gaining a good understanding of the context in which producers and/or small traders operate as participants of the value chain. In chains that are in an early stage of development the same persons often carry out these two functions. It should be taken into account also that actors at the producer/trader level are often involved in more than just the single activity that is being analysed.

Terminology: actor

The term actor refers to any person (e.g. farmer, trader, supplier, buyer) who plays a role in the value chain.

Once the direct context of the activity to be analysed is understood, it becomes important to look at the wider environment in which the value chain operates. For example, the broad government economic policies and the extent to which pro-poor policies have been integrated into and are in tune with these broader government policies, rather than standing on their own.

Once the value chain analysis has been completed it is important to decide which of possible interventions identified are realistic in the sense that there is a genuine possibility of implementing such interventions, and what the timeframe of implementation could be.

PART 1   CONCEPTS

1

PART 1 – CONCEPTS

Contents

Mulberry Herb Tea

HIN HURB

ชาใบหม่อน

Manufactured by:

HIN HURB SILATHIP'S WOMEN GROUP

20 bags

PRODUCT OF THAILAND

Concepts

1 Definition

The idea of value chain is quite intuitive. The term value chain refers to the full range of activities that are required to bring a product (or a service) from conception through the different phases of production to delivery to final consumers and disposal after use (Kaplinsky 1999; Kaplinsky and Morris 2001). Further, a value chain exists when all of the actors in the chain operate in a way that maximises the generation of value along the chain.

This definition can be interpreted in a narrow or broad sense.

In the **narrow sense**, a value chain includes the range of activities performed **within a firm** to produce a certain output. This might include the conception and design stage, the process of acquisition of input, the production, the marketing and distribution activities, and the performance of after-sale services. All of these activities constitute the 'chain' which links producers to consumers and each activity adds 'value' to the final product.

For example, the availability of post-sale assistance and repair services for a mobile phone company increases the overall value of the product as a consumer may be willing to pay a higher price for a mobile phone that has a good after-sale service. The same is true for an innovative design or for a highly controlled production. For example, in agribusiness enterprises an appropriate system of storing fresh raw materials (e.g. fruits) positively impacts on the quality of the final product and, consequently, increases its value.

The **broad approach** of defining a value chain looks at the complex range of activities implemented **by various actors** (primary producers, processors, traders, service providers) to bring a raw material through a chain to the sale of the final product. The 'broad' value chain starts from the production system of the raw materials and will move along the linkages with other enterprises engaged in trading, assembling, processing, etc.

The broad approach does not only look at the activities implemented by a single enterprise. Rather, it includes all its backward and forward linkages, until the level in which the raw material is produced will be linked to the final consumers. In the remaining part of this handbook, the term 'value chain' will refer exclusively to this broad definition.

The concept of value chain encompasses the issues of organisation and coordination, the strategies and the power relationships of the different actors in the chain. These and other relevant issues will be discussed in this toolbook. For now it is important to understand that conducting a value chain analysis requires a thorough investigation of what is going on between the actors in a chain, what keeps these actors together, what information is shared, and how the relationships between actors is evolving.

In addition, the idea of value chain is associated with the concept of governance, which is of key importance for those researchers interested in the social or environmental facets of value chain analysis. The establishment (or the evolution) of value chains may put pressure on natural resources (such as water or land) which may produce degradation of the soil, loss of biodiversity or pollution. Additionally, the development of value chains might affect

social ties and traditional norms. For example, power relationships within households or communities may be modified or the vulnerable or poorest population groups may be negatively affected by the operations of value chain participants.

These concerns are highly relevant to agricultural value chains because agricultural value chains are critically dependant on environmental resources. Also, the agricultural sector is often characterised by the prevalence of traditional social norms. Finally, due to the high incidence of the poor in the agricultural sector, the value chain framework can be used to draw conclusions on the participation of the poor and the potential impact of value chain development on poverty reduction.

2 Value Chain Main Concepts

This section provides an overview of the main concepts of value chain from an academic perspective. This serves to clarify the concept and the concise literature review presented here introduces some of the main issues related to value chain analysis. The three main research streams in the value chain literature are: (i) the filière approach (Duruflé, Fabre et al. 1988), (ii) the conceptual framework elaborated by Porter (1985) and (iii) the global approach proposed by Kaplinsky (1999) and Gereffi et al (Gereffi 1994; Gereffi and Korzeniewicz 1994; Gereffi 1999; Gereffi, Humphrey et al. 2003).

Filière

The 'filière' approach (filière means thread or chain) includes various schools of thought and research traditions. Initially, the approach was used to analyse the agricultural system of developing countries under the French colonial system. The analysis mainly served as a tool to study the ways in which the agricultural production systems (especially rubber, cotton, coffee and cocoa) were organised in the context of developing countries. In this context, the filière framework paid special attention to how local production systems were linked to processing industry, trade, export and final consumption.

The filière concept has therefore always encompassed a strong empirical perspective which was used to map the flow of commodities and to identify actors and activities. The rationale of the filière is similar to the broader concept of value chain presented above. However, the filière mainly focused on issues of physical and quantitative technical relationships, summarised in flow-charts of commodities and mapping of transformation relationship.

There are two strands of filière approach which share some insights with value chain analysis:

- the economic and financial evaluation of filières (presented in Duruflé, Fabre and Yung (1988) and used in a number of French-funded development projects in the 1980s and 1990s), focuses on income generation and distribution in the commodity chain, and separates costs and incomes between local and internationally-traded components to analyse the spill-over of the chain onto the national economy and its contribution to GDP along the "effect method" ("méthode des effets").

■ the strategy-focused analysis of filière, especially used in the university of Paris-Nanterre, some research institutes (e.g. CIRAD and INRA) and NGOs working on agricultural development (e.g. IRAM), researching in a systemic way the interplay of objectives, constraints and results of each type of actors in the chain. Individual and collective strategies are analysed, as well as patterns of regulations, for which Hugon (1985) defines four main types of commodity chains in Africa: domestic regulation, market regulation, state regulation and international agri-business regulation. Moustier and Leplaideur (1999) have provided an analytical framework on the organisation of the commodity chains (mapping, individual and collective strategies), and its performance in terms of price and income generation, taking into account African food farmers' and traders' specialisation versus diversification strategies.

Porter's Framework

The second research stream refers to the work of Porter (1985) on competitive advantages. Porter has used the framework of value chains to assess how a firm should position itself in the market and in the relationship with suppliers, buyers and competitors. The idea of competitive advantage of an enterprise can be summarised as follows: how can a firm provide customers with a product or service of equivalent value compared with competitors, but at lower cost (strategy of cost reduction)? Alternatively, how can an enterprise produce a product or service that customers are willing to pay a higher price for (strategy of differentiation)?

In Porter's (1985) framework the value chain provides a tool that firms can use to determine their source (current or potential) of competitive advantage. In particular, Porter argued that the sources of competitive advantage cannot be detected by looking at the firm as a whole. Rather, the firm should be separated into a series of activities and competitive advantage found in one (or more) of such activities. Porter distinguishes between **primary activities**, which directly contribute to add value to the production of the product or services and **support activities**, which have an indirect effect on the final value of the product.

In the framework of Porter the concept of value chain does not coincide with the idea of physical transformation. Porter introduced the idea that a firm's competitiveness does not relate exclusively to the production process. Enterprise competitiveness can be analysed by looking at the value chain which includes product design, input procurement, logistics, outbound logistics, marketing, sales, after-sales and support services such as strategic planning, human resources management and research activities.

In Porter's framework the concept of value chain therefore has a strict business application. Consequently, value chain analysis mainly aims at supporting management decision and executive strategies. For example, a value chain analysis of a supermarket in Europe may point out that the competitive advantage of such a supermarket over competitors is the availability of exotic vegetables. Detecting the source of competitive advantage is valuable information for business purposes. Following on this finding, the supermarket is likely to strengthen the relationship with producers of exotic fruits and advertisement campaigns will pay special attention to such issues.

Figure 1: Porter's value chain.

The model created by Porter identifies a number of primary and support activities that are common to a range of businesses. The value chain highlights specific activities through which firms can create value and therefore is a useful tool to simplify analysis.

Figure 2: The value system.
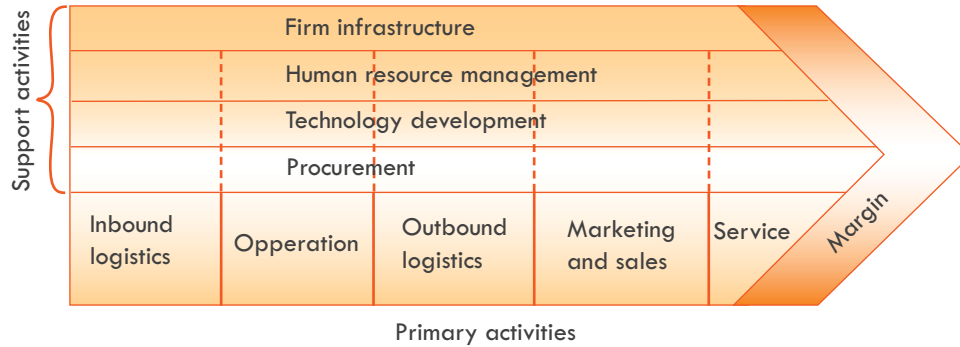
An alternative way of approaching the search of competitive advantage is based on the concept of a value system; see Figure 2. Instead of limiting the analysis of competitive advantage to a single firm, the firm's activities are considered as a part of a larger stream of activities, termed 'the value system'. A value system includes the activities implemented by all firms involved in the production of a good or service, starting from basic raw materials to those engaged in the delivery of the final product to consumers. The concept of value system is therefore broader compared to the one of 'enterprise value chain' and resembles what this toolbook refers to when dealing with value chains (broad approach). However, it is important to point out that in Porter's framework the concept of value system is mostly a tool for assisting executive management in strategic decisions.

Figure 2: The value system.

With this approach the value chains of each firm are analysed to provide an overview of the value system.

The Global Approach

More recently, the concept of value chains has been applied to the analysis of globalisation (Gereffi and Korzeniewicz 1994; Kaplinsky 1999). This literature used the framework of value chain to examine the ways in which firms and countries are globally integrated and to assess the determinants of global income distribution.

Kaplinsky and Morris (2001) observed that in the course of globalisation, there has been a perception (usually well-justified) that the gap in incomes within and between countries has increased. They argue that value chain analysis can help to explain this process, particularly in a dynamic perspective.

Firstly, by mapping the range of activities along a chain, a value chain analysis breaks down total value chain earnings into the rewards that are achieved by different parties in the chain. This method will be introduced in the second part of this toolbook. A value chain analysis is the most accurate way of understanding the distribution of earnings. Other ways of viewing global distributional patterns provide only partial insights into these areas. For example, trade statistics only provide data on aggregate, gross returns rather than on net earnings, and branch-specific analyses (agriculture, industry, services) only capture part of the story.

Secondly, a value chain analysis can show how firms, regions and countries are linked to the global economy. This will largely determine the distributional outcomes of global production systems and the capacity which individual producers have to build in order to upgrade their operations and thus to launch themselves onto a path of sustainable income growth.

In the value chain framework international trade relations are considered part of networks of producers, exporters, importers, and retailers, whereby knowledge and relationships are developed to gain access to markets and suppliers. In this context, the success of developing countries and market actors in developing country lies in the ability of accessing these networks.

A key contribution of this tradition is a well-developed theory of governance of globally integrated production systems that is relevant to the power of lead firms to set standards that define the terms on which producers participate in these systems. Particularly, Gereffi, Humphrey, and Sturgeon (2003) attribute the mode of governance of a value chain to a combination of complexity of transactions, ability to codify (or formally describe) transactions, and the competency of the supplier base, the combination(s) of which result in different coordination structures of value chains. According to this approach, low supplier competency is a key barrier to participation of the poor in globally integrated chains.

3 A Pro-Poor Entry Point into Value Chain Analysis

Value chain analysis is reasonably flexible and the value chain can be analysed from the point of view of any one of the large number of actors in the chain. Value chain analysis as presented above can help design projects and programs to provide support to a value chain, or set of value chains, in order to achieve a desired development outcome.

Examples of desired development outcomes could include: increasing the level of exports, generating maximum employment, benefiting a particular group in society, using locally produced raw materials, or concentrating development benefits in underdeveloped or disadvantaged regions of a country. The entry point, and therefore the concentration of the value chain analysis, is directly related to the desired development outcome from supporting the value chain.

The entry point and orientation of value chain analysis in this toolbook **is making value chains work better for the poor**. Therefore, the tools used in the analysis are oriented toward analysing the value chain from the point of view of the poor. The final objectives of improving value chains for the poor are two-fold. The first is to increase the total amount and value of products that the poor sell in the value chain. This results in higher absolute incomes for the poor as well as for the other actors in the value chain. The second objective is to sustain the share of the poor in the sector or increase the margins per product, so that

the poor do not only gain more absolute income but also relative income compared to the other actors in the value chain; see Figure 3. This is shown as T = 2 and can be defined as pro-poor growth.

Figure 3: Pro poor growth.

The baseline situation is shown as T = 0. Economic growth in which all participants of the value chain see increased income is shown in T = 1. In T = 2 the poor actors in the value chain get a relative increase in growth compared with the other actor in the value chain.

| T = 0 | T = 1
Economic growth:
pie grows | T = 2
Poverty reduction:
piece stays same or
grows |
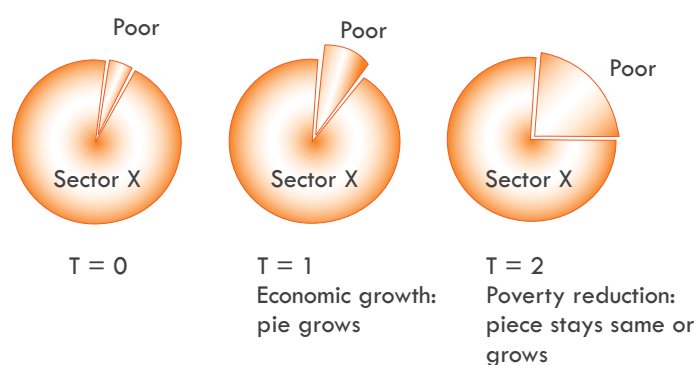
The value chain approach is mainly a descriptive tool to look at the interactions between different actors. One advantage of value chain analysis is that it forces the analyst to consider both the micro and macro aspects of production and exchange activities. The commodity-based analysis can provide better insights into the organisational structures and strategies of different actors and an understanding of economic processes which are often studied only at the global level (often ignoring local differentiation of processes) or at the national/local levels (often diminishing the larger forces that shape socio-economic change and policy making).

Kaplinsky and Morris (2001) stress that there is no "correct" way to conduct a value-chain analysis; rather, the approach taken fundamentally depends on the question that is being asked. However, four aspects of value-chain analysis of agriculture are particularly important.

First, at its most basic level, a value-chain analysis **systematically maps the actors** participating in the production, distribution, marketing, and sales of a particular product (or products). This mapping assesses the characteristics of actors, profit and cost structures, flows of goods throughout the chain, employment characteristics, and the destination and volumes of domestic and foreign sales (Kaplinsky and Morris 2001). Such details can be gathered from a combination of primary survey work, focus groups, participatory rural appraisals (PRAs), informal interviews, and secondary data.

Second, value-chain analysis can play a key role in **identifying the distribution of benefits of actors in the chain**. That is, through the analysis of margins and profits within the chain, it is possible to determine who benefits from participation in the chain and which actors could benefit from increased support or organisation. This is particularly important in the context of developing countries (and agriculture in particular), given concerns that the poor in particular are vulnerable to the process of globalisation (Kaplinsky and Morris 2001). One can supplement this analysis by determining the nature of participation within the chain to understand the characteristics of its participants.

Third, value-chain analysis can be used to **examine the role of upgrading within the chain**. Upgrading can involve improvements in quality and product design or diversification in the product lines served, allowing producers to gain higher value. An analysis of the upgrading process includes an assessment of the profitability of actors within the value chain as well as information on limitations that are currently present. Governance issues (see below) play a key role in defining how such upgrading occurs. In addition, the structure of regulations, entry barriers, trade restrictions, and standards can further shape and influence the environment in which upgrading can take place.

Finally, value-chain analysis **highlights the role of governance** in the value-chain, which can be internal or external. Governance within a value-chain refers to the structure of relationships and coordination mechanisms that exist between actors in the value-chain. Governance is a broad concept which basically ensures that interactions between chain participants are organised, rather than being simply random. Generally speaking, governance within the chain occurs when some actors in the chain work to criteria set by other actors in the chain, for example quality standards or delivery times and volumes set by processing industries. Commercial rules that govern commercial relationships in global or local value chains may constrain or restrict the role of the poor, but also may create important learning and upgrading opportunities. Commercial rules can be very specific (codified), e.g. clearly set and described quality grades of agricultural produce with corresponding transparent prices or pricing formulas.

External governance is important from a policy perspective by identifying the institutional arrangements that may need to be targeted to improve capabilities in the value-chain (e.g. research), remedy distributional distortions, and increase value-added in the sector. External governance also relates to chain specific legislation and regulation, but also describes general public sector interventions relevant to value chain development.

Figure 4 illustrates the methodology used in value-chain analysis. At the heart of the analysis is the mapping of sectors and key linkages. The value-added of the value-chain approach, however, comes from assessing these intra- and inter-actor linkages through the lens of issues of governance, upgrading, and distributional considerations. By systematically understanding these linkages within a network, one can better prescribe policy recommendations and, moreover, further understand their impact on the chain.

Value chains are complex, and particularly in the middle levels, one firm may feed into several of chains. Which chain (or chains) is the subject of enquiry depends on the point of entry for the research inquiry. Table 2 lists some possible points of entry.

In each case, the point of entry defines which links and which activities in the chain are the subject of further enquiry. For example, if the focal point of the enquiry is in the design and branding activities in the chain, then the point of entry might be on design houses, or the branding function in key global marketing companies. This will require the research to go backwards into a number of value chains which feed into a common brand name (for example, the different suppliers to Nestle). At the other end of the scale, a concern with small and medium sized firms, which feed into a number of value chains, might require the research to focus on final markets, buyers and their buyers in a number of sectors, and on a variety of input providers.

The key entry point that will be used in this toolbook is the impact of the development and operation of value chains on the poor. This entry point will be incorporated into each of the tools described in the toolbook. Although the tools contained in the toolbook are a standard set of tools for value chain analysis, the distinguishing feature of the tools presented in the following sections are that they are explicitly slanted toward the analysis of how the value chain is "working for the poor".

Figure 4: A schematic of a value chain analysis.

In this analysis the value chain linking actors from production to final consumption is overlaid with the three main issues of governance structures, upgrading strategies and distributional and equity.
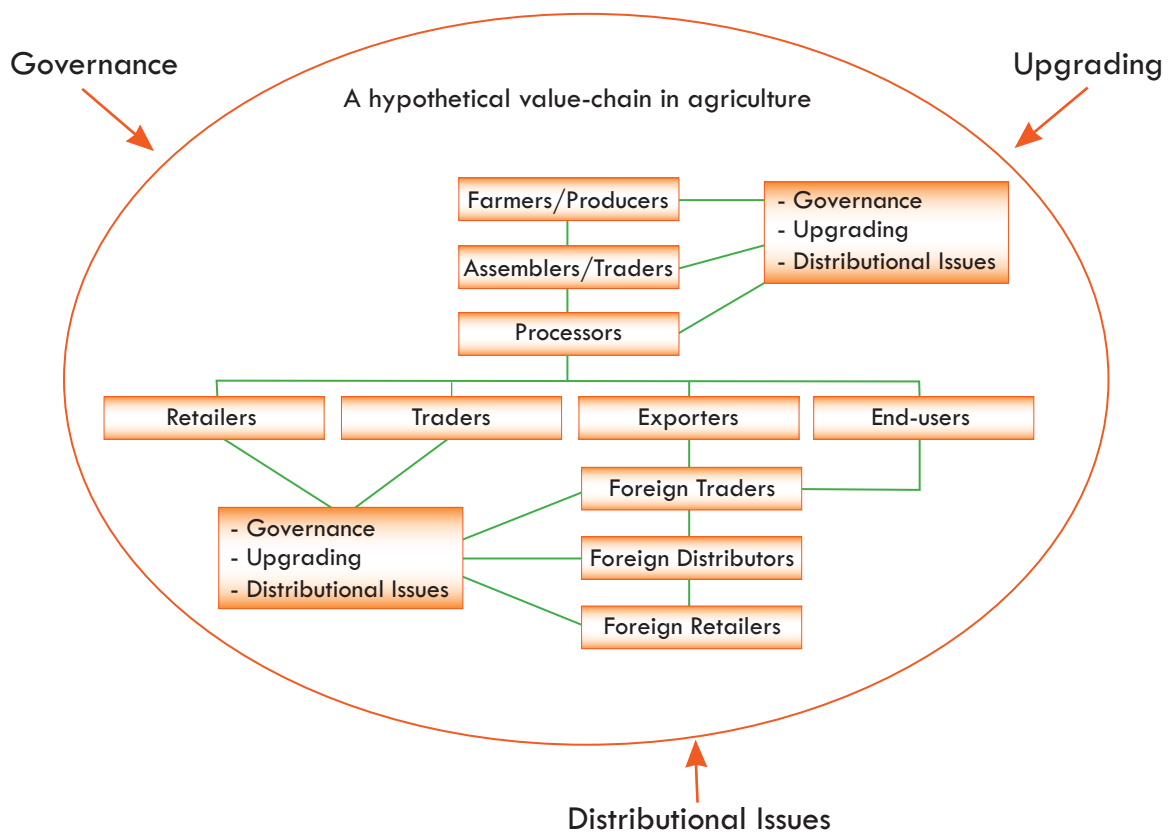
Source: (Rich 2004)

Table 2: Examples of different points of entry for value chain research.

The entry point in to the value chain will be determined by the primary research interest. Note in this table OEM denotes Original Equipment Manufacturer and SME denotes Small Medium Enterprises.

Primary area of research interest	Point of entry	What to map	Example
The global distribution of income	The final consumer (and recycling) in a sector	Backwards down whole chain to retailers, buyers and producers	For furniture, begin with groups of customers of department and specialist stores in rich countries
Role of retailers	Supermarkets or retail chains	Forwards to type of customer, backwards though buyers, producers and their suppliers	For food, begin with supermarkets
The role of independent buyers	Independent buyers, wholesalers	Backwards to producers and their suppliers in same chain, forwards to retailers	For shoes, begin with specialist buyers, in fruit and vegetables with category buyers
Design	Independent design houses, advertising agencies or large firms with global brands	Forwards to retailers in various final markets, backwards to variety of producers and their suppliers	For clothing, begin with Prada and the GAP in the volume markets and to Gucci in Haute Couture markets
Role of key producers	Large OEMs assembling final products	Forwards to retailing, backwards to suppliers and their suppliers	For autos, Ford; in consumer electronics, Sony
First tier suppliers	Large firms providing sub¬assemblies to OEMs	Forwards to OEMs and their customers, perhaps in more than one sector; backwards to suppliers and their suppliers	For autos, Magna and Delphi; in computers, with motherboard and monitor manufacturers
2nd and 3rd tier suppliers	Generally small firms	Forwards to customers in a variety of sectors, backwards to suppliers and their suppliers	For food, to firms printing packaging materials; in banking, to providers of software modules
Commodity producers	Generally large firms	Forwards to producers, buyers and final markets and backwards to machinery and input suppliers	For copper, to major buyers at London Metal Exchange and to suppliers to the telecoms sector
Agricultural producers	Farms	Forwards to processors, buyers and their customers, backwards to input suppliers	Fresh vegetables to salad packers and category buyers in final markets
Small firms and farms	Small farms, industrial SMEs	Buyers in a range of value chains, input suppliers	Handicraft suppliers to exporters, small farms to processing plants
Informal economy producers and traders	Home based workers, street traders	Forwards to processors, assemblers or third party organisers/distributors, backwards to retailers	Outsourcing in clothing and shoes, recycling cardboard cartons to mills, street based tourist handicrafts
Gender, age and ethnicity	Female labour	Use of female labour throughout value chain	For clothing, women in cotton farms, factories, export agents, design houses, advertising agencies, retail stores

1

PART 2 **VALUE CHAIN ANALYSIS TOOLS – GENERAL TOOLS**

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PART 2 - VALUE CHAIN ANALYSIS TOOLS

GENERAL TOOLS

Tool 1 - Prioritising Value Chains for Analysis

Contents

Tool 1 - Prioritising Value Chains for Analysis

1. Introduction

Prior to starting a value chain analysis it is necessary to decide which sub-sectors, products or commodities should be prioritised for analysis. As resources for undertaking analyses will invariably be limited, it is important to identify appropriate value chains for analysis and follow up activities.

2. Objectives

To involve value chain actors in the learning process and select a limited number of value chains to be analysed.

3. Key Questions

1. What are the key criteria on which to base the selection of value chains to be analysed?
2. Which value chains are most appropriate to analyse?

Participants in assessment of value chain priority

Participants involved in this exercise should have a common understanding of the value chain's development in the region. It may be helpful to carry out a pre-evaluation by visiting sub-sectors, product or commodity partners to identify representatives, actors and/or key informants to ensure that the participants have (i) relevant knowledge and (ii) adequate representation on the value chains. It is advisable to keep participant numbers small. Likely participants are local policy and decision makers, farmers, private sector actors, service providers, development organisations and community representatives.

4. Steps

The prioritising process follows four steps that are common to processes of making allocation choices under a situation of scarce resources. The final priority can be determined on the basis of the ranking obtained. For each of the following steps, two methodologies will be proposed; a rigorous participatory methodology and a less rigorous methodology that could be adopted if time and resources are limited or participatory methods are not appropriate.

Step 1   Determine criteria and build understanding of priorities

Value chain analysis starts with the selection of a value chain. As the key entry point of the value chain analyses proposed in this toolbook is poverty alleviation and achieving pro-poor outcomes, the criteria selected would reflect this entry point. The first step is to make considerations of the priorities in the ranking of a potential value chain. These can include the following integrated criteria:

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(1)   Potential of the value chains to improve livelihoods of the poor people;

- Present integration of the poor in the market (what are they producing, selling, employment)
- Potential of the product/activity for poverty reduction
- Potential for labour intensive technology
- Low barriers to entry for the poor (capital, knowledge)
- Low risk
- Poverty incidence and/or absolute poverty figures

(2) Market potential

- Strong domestic and/or international demand for the product
- Growth potential of certain products/activities
- Possibility for scaling up
- Potential for leveraging public investment with private investment
- Involves a large number of people

(3) Other criteria, such as

- The value chain actors have entrepreneurial capacity to achieve improvement.
- Environmental sustainability
- Within framework of national and regional strategies
- Social inclusion and gender

Take Note

These are not the only criteria that could give a pro-poor outcome, and the list above should be viewed as a starting point for deciding which criteria to use. The criteria used will vary according to the local conditions and situation.

If time and resources permit, then the decision of which specific criteria to use for value chain selection should be made in a participatory manner, with discussions among participants as to which criteria are most relevant for the local conditions and requirements of the analysis. This serves to increase ownership of the process and also can strengthen common understanding among participants in identifying the potential value chains for the final selection. Once selection of the criteria is agreed upon, participants should move to weighting of the criteria (Step 2).

If time and resources are limited, or it is not possible to undertake a participatory process of criteria development, then pre-selecting a smaller set of criteria for value chain selection prior to the participatory meeting should be considered. These could take the form of the first two integrated criteria discussed above - in other words the two selection criteria would be (i) potential for improvements of the livelihood of the poor and (ii) market potential.

Step 2 Weighting of criteria

Some of the criteria will probably be considered to have a higher level of importance in the decision making process and so should have a greater influence on the ranking of value chains.

Weightings are commonly assigned in two main ways:

1. Simple numeric– for example, 1, 2, 3 or 4 - where the relative importance of criteria is in direct proportion to the numeric weighting. This means that a criterion with a weighting of 4 is considered to be twice as important as a criterion with a weighting of 2, and 4 times as important as a weighting of 1.

2. Proportional, where all of the criteria have a combined weighting of 100 %, and the relative importance of each criteria is reflected in the proportion of the total weighting that is assigned to that criteria. For example, if there are three criteria, then they could be weighted as Criteria 1 (50%); Criteria 2 (30%) and Criteria 3 (20%).

Take Note

Regardless of which weighting system is used, a rough rule is that the more pro-poor you wish the selection of value chain to be, the higher the weighting that should be given to the criteria that emphasise pro-poor characteristics.

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If time and resources permit, deciding on the weighting of the various criteria should be undertaken in a participatory manner, with inclusion of all participants in the decision making process. As was the case with the selection of criteria, this is important in building ownership of the process and increasing understanding of the reason for value chain selection. However, if time and resources are limited then the weightings for various criteria can also be pre-determined prior to a participatory identification process.

Step 3 Identifying a list of potential products/activities

Once the criteria for selecting the value chain to analyse have been chosen and weighted, the next step is to make a list of all the potential value chains/ products/commodities in the geographic area under consideration. This list could be developed in a participatory manner with actors, who may or may not be the same as the actors who developed the criteria in Step 1. The value chains identified are usually based on products that are already produced in the area, products which are technically feasible to produce in the area, products which have a pro-poor focus, or products that are judged to have a good market (local, regional, national or international market).

The participants then discuss and share their understanding of the potential value chains identified and agree to make the list.

Box 1: List of potential value chains in Son La, Vietnam

The range of value chains identified may be quite broad. A value chain exercise conducted by the SNV Market Access for the Poor Program in Son La Province, Viet Nam identified the following value chains as having potential:

Mushroom	Longan	Mong apple
Local rice	Pumpkin	Village pig
Bamboo shoots	Medicinal plants	Honey
Handicrafts	Maize	

Source: (Boomsma 2006)

Take Note

The participatory process of identifying potential value chains can often result in a large number of potential chains being identified. To increase the efficiency of the value chain ranking undertaken in Step 4, it is advisable to reduce this "long list" of potential value chains to a "short list" of a more manageable size (potentially between three and six chains). The case study presented in the Useful Examples section of this tool demonstrates how this can be done.

Step 4 Ranking of products/activities

A set of criteria can be developed to differentiate between potential value chains depending on the purpose of the analysis.For example, Table 3 shows some criteria used by the International Finance Corporation Mekong Private Sector Development Facility (IFC/MPDF) in evaluating potential value chains, while Table 4 shows alternative criteria used by the National Economic and Social Development Board of Thailand in selecting value chains for further study and development

Once the criteria have been agreed upon, relative weightings of importance can be attached to each of them. For example, it may be decided that "Poverty and Sustainability" is more important than "Structure of Chain", so that the sub-criteria under the first of these two categories are worth 70% of the total score.

Once the weightings have been determined, then a matrix for ranking the value chains can be constructed; see Table 5.

Once the matrix is made, participants then rank each value chain on how well it matches the criteria. A common way of doing this is to have a numeric ranking of 1 to 5, where 5 can represent the maximum compliance with the criteria and 1 represents a minimum compliance; see Example 1. The assignment of the numeric scores can be done in a number of ways, including gathering numeric rankings from all participants in the actor group and then making a simple average.

Table 3: MPDF sub-sector selection criteria for value chain identification

Positive	Negative
• Multi-country potential • Reliable existing data available • Opportunities for cooperation with other development agencies and NGOs • Potential to attract additional funding • Links to strong private sector demand • IFC clients or interests • MPDF already has knowledge or expertise in the sub-sector • Impact potential: large workforce, low income, importance to the economy etc. • Presents expansion and replication opportunities • No clear MPDF role • "Overcrowded" • Previous negative experience • Risk, reputation • Impact time frame too long • Insufficient resources	• No clear MPDF role • "Overcrowded" • Previous negative experience • Risk, reputation • Impact time frame too long • Insufficient resources
Source: MPDF.	

Table 4: NESDB sub-sector selection criteria for value chain identification

Criteria	Sub-Criteria
Poverty and Sustainability	Availability of natural resources; Sustainable development Within framework of national and regional strategies (Clusters, OTOP — one town one product) Potential for labour intensive technology Number of people involved in industry (Poor people) Future potential
Structure of Chain	Extent of value adding potential (Profitability, Stability) Number of different products produced Length of marketing chain; Number of intermediaries Maturity of industry in region Marketing potential Lack of previous research Data availability Potential for "Lessons Learned" / Replication of mechanisms
Source: (NESDB 2004)	

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Table 5:   Matrix ranking of products by scoring

Criteria	Weighting (%)	Value Chain 1	Value Chain 2	Value Chain 3
Criteria 1	50 %			
Criteria 2	15 %			
Criteria 3	20 %			
Criteria 4	15 %			

Take Note

If there are a large number of criteria, participants, or value chains, more data is generated by the ranking process. Allow enough time to calculate the final rankings.

5. What Should be Known after Analysis is Complete

After completing these four steps, one should have a thorough understanding of the potential value chain development in the region and which value chains have a high pro-poor potential and market demand.

From experience we can say that, in general, value chains which call for:
- high levels of investment
- use high levels of knowledge and technology
- demand for high risk taking strategies are not pro-poor.

Useful Examples

Example 1: Value chain selection in Thailand.

A participatory priority setting exercise was carried out with staff from the National Economic and Social Development Board of Thailand (NESDB) staff and the North-East Economic Development Project (NEED) Steering Committee (NESDB 2004). Six commodities (rice, cassava, rubber, beef, silk, and broilers) were evaluated against 13 criteria; five criteria addressing the dimension of poverty alleviation and sustainability against the backdrop of the national strategies, and eight criteria addressing the dimension of the value chain structure.

Once the criteria were defined by the Steering Committee, the commodities were ranked against each criterion. Each commodity was ranked in relation to the other commodities. In this example there were six commodities and therefore a score of 6 meant that the particular commodity best met that criterion, and a score of 1 meant that the commodity did not meet that criterion.

Each criterion was evaluated through consensus of the Steering Committee. Once each criterion was evaluated, a simple average score was calculated, and the commodities ranked accordingly; see Table 6 below.

The results of the priority setting exercise indicated that silk and rice were the two commodities most appropriate for study under the pilot project.

Table 6: Participatory commodity priority setting exercise results

Dimension	Criteria	Rice	Cassava	Rubber	Beef	Silk	Broilers
Poerty and Sustainability	Availability of natural resources; Sustainable development	4	1	2	5	6	3
	Within framework of national and regional strategies (Clusters, OTOP — one town one product)	4	2	5	1	6	3
	Potential for labour intensive technology	4	3	5	1	6	2
	Number of people involved in industry (Poor people)	6	5	1	2	4	3
	Future potential	3	2	6	1	5	4
	Sub-Total Poverty and Sustainability	4.2	2.6	3.8	2.0	5.4	3.0
Structure of Chain	Extent of value adding potential (Profitability, Stability	3	2	5	1	6	4
	Number of different products produced	2	5	4	1	6	3
	Length of marketing chain; Number of intermediaries	1	5	4	3	6	2
	Maturity of industry in region	5	4	1	2	6	3
	Marketing potential	4	2	3	1	6	5
	Lack of previous research	1	4	5	6	3	2
	Data availability	6	4	1	2	3	5
	Potential for "Lessons Learned" / Replication of mechanisms	5	3	2	1	6	4
	Subtotal Chain Structure	3.4	3.6	3.1	2.1	5.2	3.5
	Ranking	3.8	3.2	3.4	2.1	5.3	3.3

Source: (NESDB 2004)

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Tool 2 - Mapping the Value Chain

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Tool 2 - Mapping the Value Chain

1. Introduction

After initial selection of value chains is complete (Tool 1), the next step is to map the value chain. This is a vital step in guiding the analysis of selected value chains. This chapter provides the tools and examples on how to capture the different dimensions of a value chain. To understand the value chain that is to be analysed, models, tables, figures and diagrams are used: 'A picture is worth a thousand words'. Making a value chain map is a way of making what is seen and encountered more easily understood. This chapter provides tools and examples on how to capture the different dimensions of a value chain.

2. Objectives

Mapping the value chain has a number of objectives:

- Gain a basic overview of the value chain to guide the full value chain analysis to be undertaken
- Identify constraints and possible solutions at different levels in the value chain
- Identify the location and position of the poor in the value chain
- Visualise networks to get a better understanding of connections between actors and processes
- Demonstrate interdependency between actors and processes in the value chain
- Create awareness of actors to look beyond their own involvement in the value chain

3. Key Questions

There is no such thing as a comprehensive, all-encompassing value chain map. There are many potential dimensions of the value chain that could be included in an initial mapping exercise: the product flows, the actors involved in the chain, costs and margins at different levels, etc. Therefore it is crucial to choose which dimensions are to be mapped, based on the available resources, the scope and objective of the value chain analysis and the mandate of the organisation.

The following questions can guide what dimensions to map:

- What are the core processes in the value chain?
- Who are the actors involved in these processes and what do they actually do?
- What are the flows of product, information and knowledge in the value chain?
- What is the volume of products, the number of actors and jobs?
- Where does the product (or service) originate from and where does it go?
- How does the value change along the chain?
- What types of relationships and linkages exist?
- What types of services are feeding into the chain?
- What is the location and position of the poor in the value chain?
- What key constraints exist at various levels in the chain and what are potential solutions to those constraints?
- How do products, information and knowledge flow through the value chain?

These questions will be used to provide the basis for the steps described this chapter.

Take Note

Many of the mapping dimensions covered in this tool are also addressed in other tools in this book. The difference lies in the depth of the analysis. The mapping tool is designed to provide an initial overview of the key aspects of the value chain. This initial overview will be used to guide the subsequent analysis of the chain, based on the later tools in this book.

In all dimensions that need to be mapped, the practitioner is to consider the position and role of the poor as actors in the value chain.

4. Steps

Step 1   Mapping the core processes in the value chain

The first question that must be asked in any value chain analysis is what the different (core) processes in the value chain are. In other words, what processes occur from inputs to raw material through to final consumption of end products?

The first step is to find the core processes in your value chain. As a rough guide, try to distinguish a maximum of six or seven major processes that the raw material goes through before it reaches the final consumption stage, including the provision of inputs to produce raw materials. These core processes will differ, depending on the characteristics of the chain you are mapping: industrial products undergo different phases compared to agro-products or services.

Box 2: Example of mapping core processes

One of the main products in Ninh Binh province, Vietnam is handicrafts made of sedge or sea grass. Typically, boxes or baskets are produced for export markets. As an example, the core processes in the basket export chain are as follows.

| Input provision | Cultivation | Collection | Production | Export | Import | Retail |

Source: Sedge handicrafts in Ninh Binh, SNV 2005.

The example in Box 2 above shows a relatively simple linear value chain, with two major final products (baskets or boxes) produced from the raw material (sea grass). However, for many value chains there are more than one or two products produced from the initial raw material, each of which will follow its own set of processes to final consumption. In these cases the process map will be more complex, and involve parallel sets of processes. An example of this type of value chain is cassava, where the final product could be cassava chips for animal feed, or cassava starch for numerous end uses. Figure 5 below shows the potential complexity of a full map of value chain processes.

Figure 5: Example of mapping core processes in the cassava value chain.

This value chain demonstrates the potential complexity of a chain where there are numerous end products.
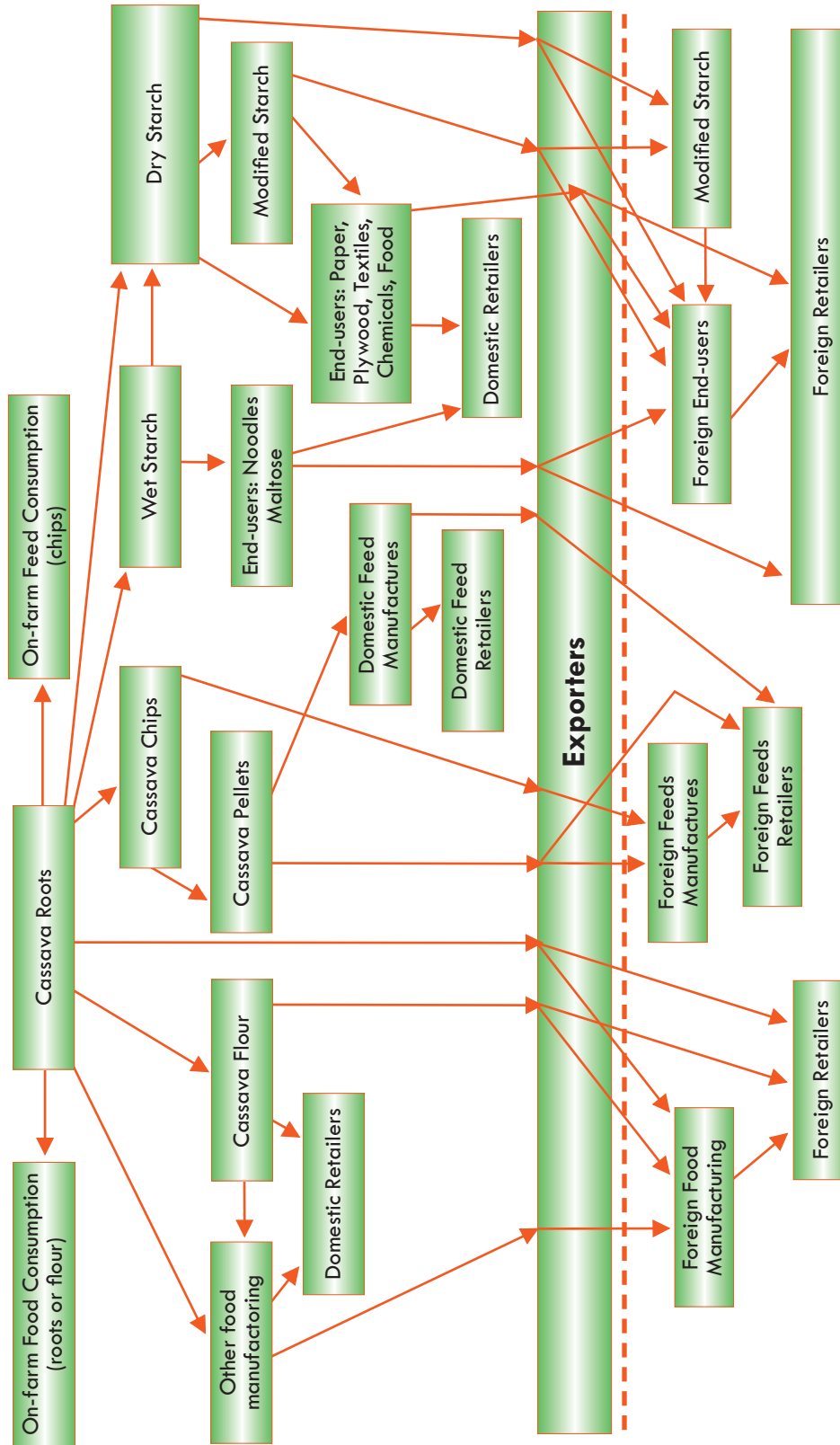
Take Note

Is the best way to view the map vertical or horizontal? Depending on the context, a choice needs to be made. There is no right or wrong. Regardless of which choice is made, try to be consistent throughout the analysis.

Source: (ADB 2005)

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Step 2 Identifying and mapping the main actors involved in the processes.

Now that the main processes are mapped, it is possible to move on to the actors - the people who are involved in the value chain. The second key question from above prompts this step: Who are the actors involved in these processes and what do they actually do?

How to distinguish between actors depends on the level of sophistication the mapping exercise is trying to reach. The most straightforward distinction would be to categorise actors according to their main occupation. For example, collectors are involved in collection, and producers are the ones that produce. This is a starting point, but does not give sufficient information. An addition would be to categorise according to different classifications, such as:

- Legal status or ownership (e.g. government, registered enterprise, cooperative, household)
- Size or scale (number of people involved, micro-small-medium sized enterprise)
- Poverty ranking
- Location (county, district, province, country)

Remember, when conducting pro-poor value chain analysis it is vital to identify the position of the poor as actors at various processes or levels in the value chain. In agricultural value chains it is often assumed that the poor are all primary producers, but in fact the poor may be involved in many other processes, either as small scale entrepreneurs or as labour.

Warning

In many value chains, especially in small or weaker markets, there is often no pure specialisation. One actor will take on several different roles. For example, a rice miller will also collect rice and act as input provider. Try to find out what the main occupation of this actor is and categorise accordingly.

Box 3: Example of mapping actors.

An example of mapping actors comes from the Mexican honey value chain from the Calakmul region to the domestic market. This map categorises actors based on legal status and scale.
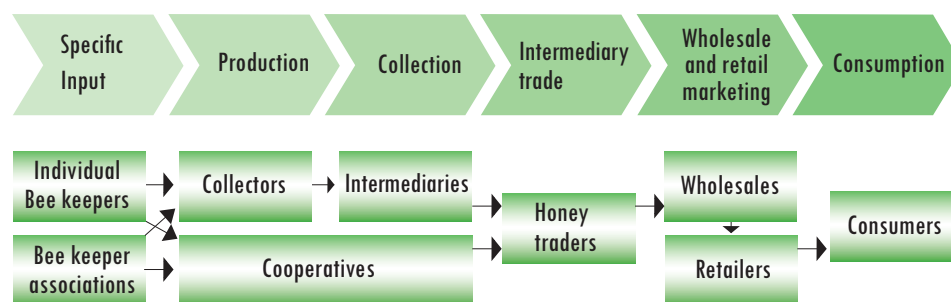
Source: A. Springer-Heinze, GTZ, 2005.

The result is a map of actors that is still fairly general. The map could be further developed by breaking down the core processes into the specific activities that are undertaken by the different actors that have been identified.

Every value chain has its own core processes and its own specific activities. The extent to which the chain is broken down to specific activities depends on the researcher's judgement. Eventually, it should result in an understanding of where there are gaps or overlapping activities, if there is a potential for upgrading, or simply a better understanding of the situation.

Box 4: Example of mapping of specific activities undertaken by actors from core processes.

The example of sedge handicraft in Vietnam is used again.

	Input provision	Cultivation	Collection	Production	Export	Import	Retail
Actors	Cooperatives, Private input suppliers	Sedge farmers	Collectors	Production enterprises	Exporters	Importers	Retailers
Activities		Growing Harvesting Cutting Drying Splitting	Collect Categorize Store Transport	Categorize Dry Weave Mould prevention Storage	Collect Quality control Storage Transport	Quality control Storage Transport	Storage Selling to final consumers

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Take Note

Breaking down core processes into specific activities is useful when we turn to analysing costs, revenues and margins (see Tool 6 - Analysing Costs and Margins). The activities can be seen as the cost or profit centres of actors.

Step 3 Mapping flows of products

Once steps 1 and 2 are completed, the processes, actors and specific activities in the value chain have been mapped. The third step is to map the flows of products through the value chain. This involves identifying the products at each stage of the process as they are transformed from inputs to raw materials, to intermediate materials and to final products. Mapping these flows creates a clear picture of what forms of products are handled, transformed and transported at each process stage of the value chain. This can be quite simple with products: the stages that the tangible product goes through are simply followed, from raw material to final product. This is especially helpful if a researcher wants to know what stages are used to reach the final product.

Box 5: Example of product flows in the pig value chain, Ben Tre Vietnam.

Process	Inputs to sow-piglet production	Sow-piglet production	Fattening	Procurement	Processing	Consumption
Input Form		Feed, medicine, replacement sows	Weaners	Fattened pigs	Fattened pigs	Pork, offal
Output Form	Feed, veterinary medicine, replacement sows	Weaners	Fattened pigs	Fattened pigs	Pork, offal	

Step 4   Mapping knowledge and flows of information

Intangible qualities of value chains, such as information and knowledge, are generally more difficult to capture in a visual map. Be aware that these flows are often going both directions. For example: a trader tells a farmer about product requirements; a farmer gives the trader information about product availability. In **Tool 5 - Analysing Options for Demand-Driven Upgrading: Knowledge, Skills, Technology and Support Services,** tools are provided that help to track down what kind of knowledge or information flows through a value chain.

The role and position of the poor is crucial in this part of the mapping: do the poor participate in the exchange of knowledge? The example in Box 6 shows a map of the knowledge held by each actor in the value chain.

Box 6: Example of mapping knowledge

One of the cash crops cultivated in Northern Laos is soybean. These soybeans are mainly exported to China to be processed into animal feed or cooking oil. A crucial issue, mentioned by all actors throughout the value chain, was the inconsistent quality of the soybeans.

Mapping the knowledge proved to be a useful tool in this case. After interviewing farmers, collectors and intermediary traders (all based in Laos), it became clear that the actors had different views on what quality requirements there were and what quality really meant. A related issue was that the buyers (Chinese processing companies) had never met any of the actors on the Lao side of the border. The map looked as follows:

What are the quality requirements for 'good' soybeans?

Farmer	Collector	Intermediary Trader
- Color: black - gray - Size: unknown, but ruond shape	- Color: black - Size: unknown, but round shape	- Color: black - Size: even - Oil content measured by Chinese trader, but how is unknown - Other dried properly
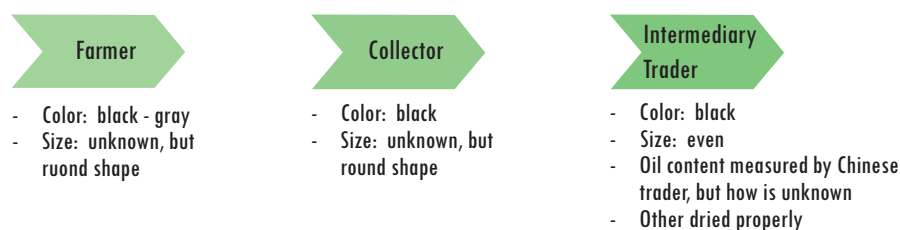
Source: RDMA 2005

Mapping information involves showing the flow of information between actors at each process in the value chain, as shown in the example in Figure 6 below.

Figure 6: An example of the type of information flows

Actor	Farmer		Collector		Exporter
		←----------------		←--------------------	
Type of information flow		Prices for various grades, timing of demand		International standards for product quality, demand for different grades of product	

Step 5 Mapping the volume of products, numbers of actors and jobs

Some dimensions in value chain mapping can be quantified. For example, what is the volume of products, the number of actors and the number of jobs?

The volume of products is closely related to mapping the product flow. The dimension of volume is added to following the product through the value chain. Finding out the volume of product makes it possible to have an overview of the size of the different channels within the value chain. The following examples in Box 7 and Box 8 map the volume as a proportion of the total volume of the whole sub-sector.

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Box 7: Example of mapping volumes.
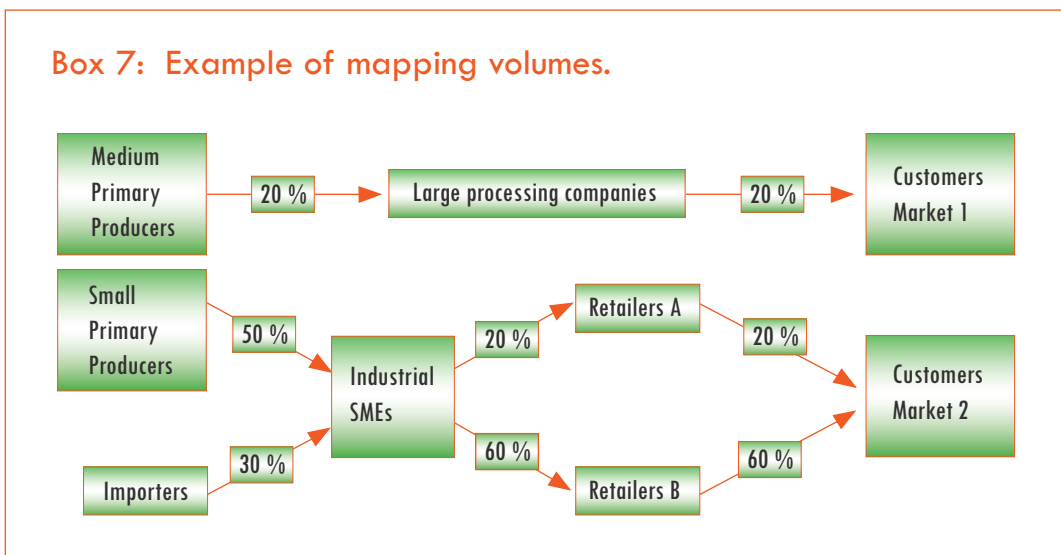
Box 8: Example of mapping volumes in a bamboo value chain.

By adding the proportional volumes of the product passing through different parts of the value chain it is possible to get an overview of the size of different parts of the chain.

```
                    ┌─────────────────────┐
                    │ Material Input Supply │
                    └─────────────────────┘
                              │
                              ▼
  ┌─────────┐        ╭─────────────────╮        ┌──────────────────┐
  │ Storage │◄───────│ Planting Farmers │───────►│ Local Construction │
  └─────────┘        ╰─────────────────╯        └──────────────────┘
                       40%       60%
        ┌────────────────┐        │
        │ Small collector │◄──────┘
        └────────────────┘
                  │
                  ▼
        ┌──────────────────┐
        │  Large collector  │
        └──────────────────┘
            95%       5%
             │         ╲
             ▼          ▼
      ┌──────────┐   ┌──────────┐
      │  Bamboo  │   │   Sale   │
      │Processing│   │ Outside  │
      │ Company  │   │ Province │
      └──────────┘   └──────────┘
```
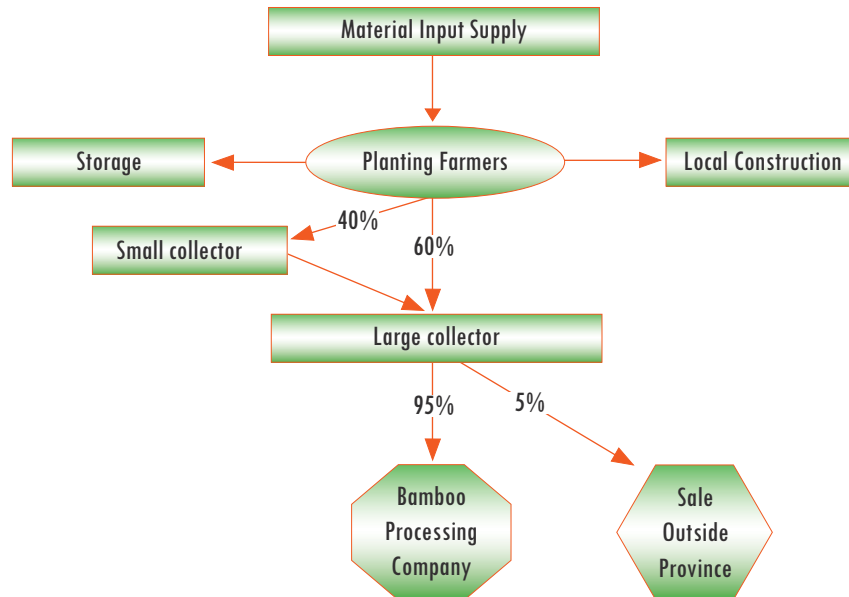
Source: (IFAD, M4P et al. 2007)

Two more dimensions that are quantifiable are the number of actors and the employment opportunities they offer. These two dimensions are closely related to each other. Following on from listing the actors in Step 2 the next step is to find out the number of each type of actor. The number of poor, being a part of the actors in the different steps, is a dimension that can be covered in this stage of the analysis.

An example of volume mapping the catfish value chain in the Mekong Delta of Vietnam is presented in Box 9. In another example, Box 10 maps employment in the vegetable retail trade in Vietnam.

Box 9: An example of volume mapping in the catfish value chain
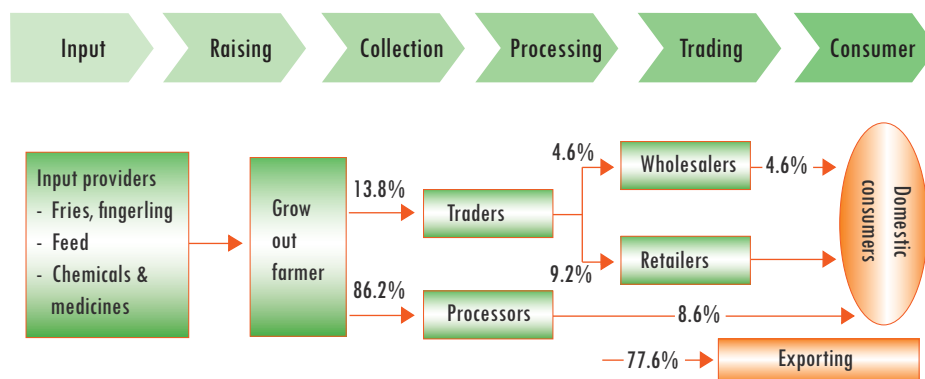
> ### Box 10: Example of mapping the number of actors and employees involved in vegetable retail in Hanoi, Vietnam
>
> Vegetable retail in Hanoi takes place through many channels. The following example shows that these different outlets differ in number, but also in number of employees.
>
> | Cultivation | Transport | **Retail** | Consumption |
> |---|---|---|---|
> | | Actors = 248 | Market retailers | Employees = 1,409 |
> | | Actors = 197 | Street vendors | Employees = 2,110 |
> | | Actors = 27 | Ordinary vegetable shop | Employees = 289 |
> | | Actors = 21 | Safe vegetable stores and stalls | Employees = 225 |
> | | Actors = 14 | Supermarkets | Employees = 31 |
>
> *Adapted from: (Moustier, Anh et al. 2006, pg 200)*
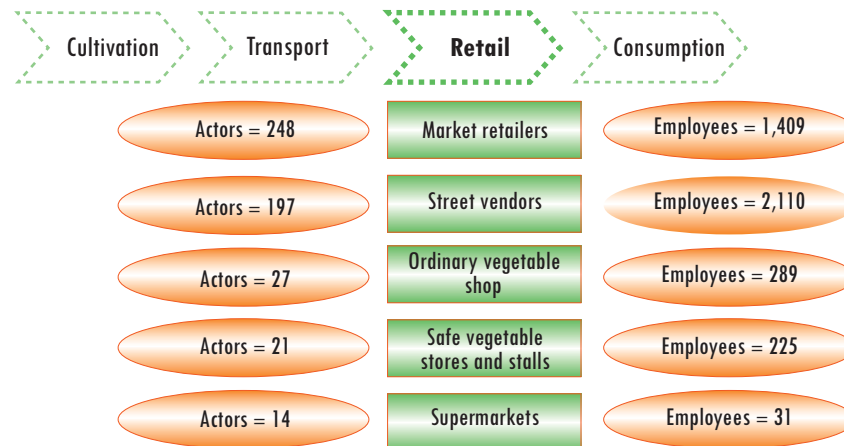
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Warning

Measuring employment can be difficult, especially when part of the value chain is in the informal sector. Some problems that arise are how to count part time employment, and what constitutes full time employment. T**ool 8 – Analysing Employment Distribution** will deal with these and other matters.

Step 6   Mapping the geographical flow of the product or service

Based on the mapping of processes, actors and product flows, it is relatively straightforward to develop a geographical map, following the trail of the product or service that is to be mapped. The first step is to identify where each of the processes in the value chain are physically located (for example, where are the farms, primary processors, and secondary processors). Start at the place of origin (i.e. where it is cultivated) and see if it is possible to map how the product travels from intermediary trader to wholesaler, retailer and final consumer. If possible, a map of the region can be used to indicate the physical flow on it. Making this kind of map will make it possible to capture a dimension of the product flow (volume, margin, number of actors) and show the locational or regional differences. The picture Figure 7 below shows information about a sugar value chain transferred onto a geographical map of the province. Preparation of this map greatly facilitated the organisation of subsequent fieldwork to conduct the full value chain analysis.

Figure 7: Example of geographical mapping of the sugar value chain.
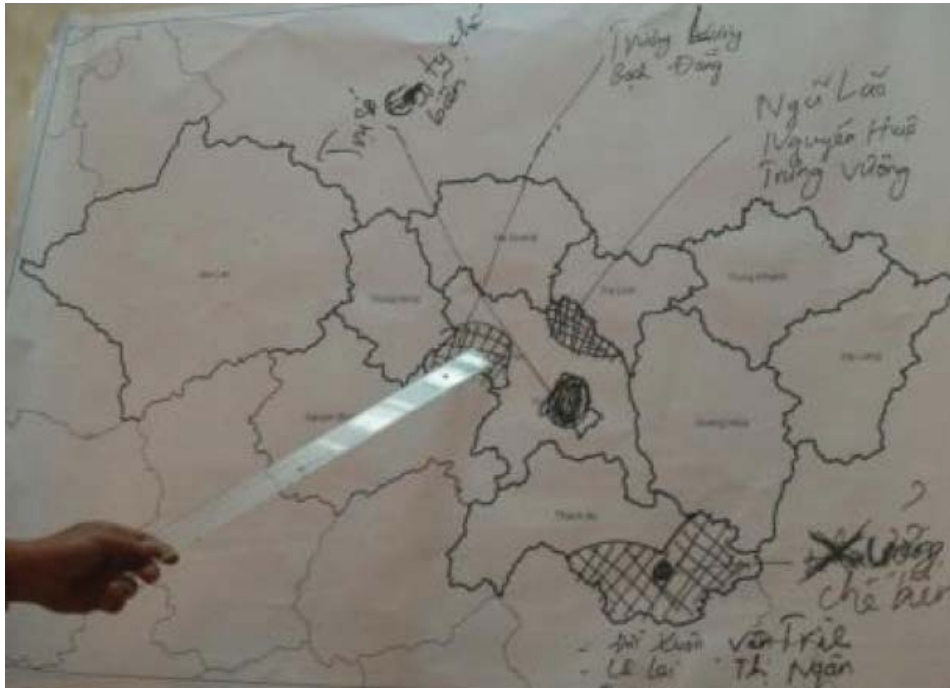
Source: Mapping Exercise for Sugar Value Chain, Cao Bang, Vietnam, (IFAD, M4P et al. 2007)

Figure 8: Example of geographical mapping of fresh produce supply in Zambia

Mostly Tomatoes from Mkuski

Mostly Onions from Chipata and Malawi

Mostly Tomatoes, Rape and Cabbage
with some Onion and Oranges
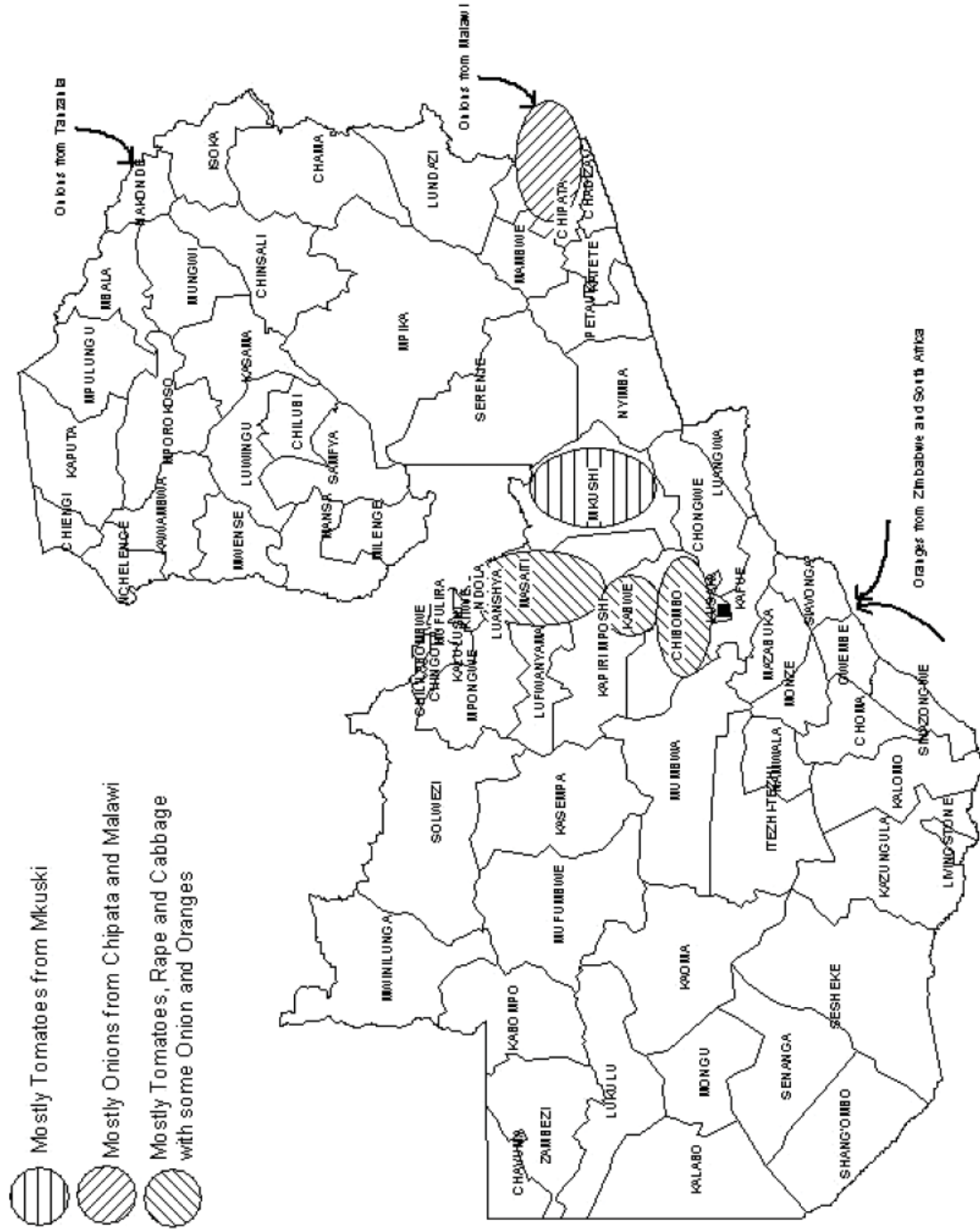
Source: (Hichaambwa and Tschirley 2006)

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Step 7   Mapping the value at different levels of the value chain.

A core element of value chain mapping is to map the monetary value throughout the chain. This is covered by the key question: How does the value change throughout the chain?

Value is something that can be measured in many ways, and this will be discussed in more detail in **Tool 6 – Analysing Costs and Margins**. The most straightforward depiction of a monetary flow would be to look at the value that is added at every step throughout the chain, providing an overview of the earnings at the different stages. Other economic parameters are, amongst others, revenue, cost structures, profit, and return on investment.

Box 11: Example of mapping value added throughout the chain.

In India, saris (women's dress) are made with handlooms. The following example is a map of the value chain in this sub-sector. The value is the price in rupees (Rs.) at which the sari is sold to the next actor in the chain.

| Input provision | Production | Trade | Retail | Consume |

| Value | Rs. 110.5 | | Rs. 248.90 | | Rs. 261.35 | | Rs. 275 |

| Value added | | Rs. 138.4 | | Rs. 12.45 | | Rs. 13.65 | |
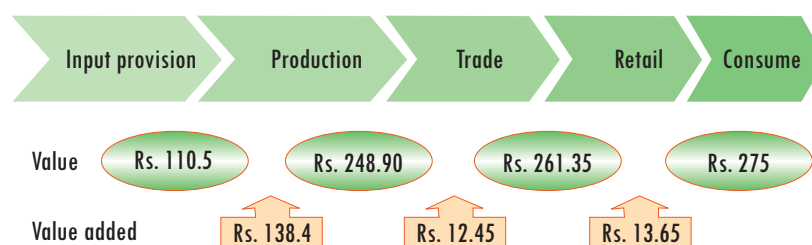
This example shows that producers (weavers) actually add the most value, both absolutely (Rs. 138.4) and relatively (125% value addition). However, this does not tell us about the profit margin of the producers. To assess that parameter, an analysis of costs needs to be made (see Tool 6 – Analysing Costs and Margins).

Source: (Padmanand and Patel 2004)

It is important to recognise that at the mapping stage of the value chain analysis very little accurate information may be known about costs, margins and profits at different process levels within the value chain. It is most likely at this stage of the analysis that only price information is known at each process level.

Step 8   Mapping relationships and linkages between value chain actors

Mapping linkages between value chain actors starts with mapping the actors in the value chain, as described in Step 2 of this tool. A next step is to analyse what kind of relationship actors have to each other. This is prompted by the following key question: What types of relationships and linkages exist?

Relationships can exist between different process steps (e.g. between producers and traders) and within the same process step (e.g. farmer to farmer). Relationships or linkages between similar actors can be mapped according to three broad categories:

1. **Spot market relations**: These are relationships that are created 'on the spot'. Actors make a transaction (including negotiations on price, volume and other requirements) with the duration and scope of that specific transaction. This is typical for transactions made at a fresh vegetable marketplace: buyer and seller meet, come to an agreement (or not) and break up the relationship. These can also be described as 'arm's length relationships'.

2. **Persistent network relations:** When actors have a preference for transacting with each other time and time again, we can speak of a persistent network relation. This comes with a higher level of trust and some level of interdependence. This relationship can be formalised by contracts, but this is not a necessity.

3. **Horizontal integration:** This goes beyond the definition of a 'relationship', since both actors share the same (legal) ownership. One and the same organisation (this can be an enterprise, or a cooperative) deals with different processes throughout the value chain. The ownership structure can be partial or full.

In order to map these types of relationships, different lines and arrows are used. The following example clarifies this.

Box 12: Example of mapping relationships and linkages.

The following example is based on the sedge handicraft sub-sector in Vietnam. Most linkages are persistent. This example is representative for sectors in which high quality requirements and differentiation (design of handicrafts) are crucial.

→ Persistent relationship

- - → Spot market relationship
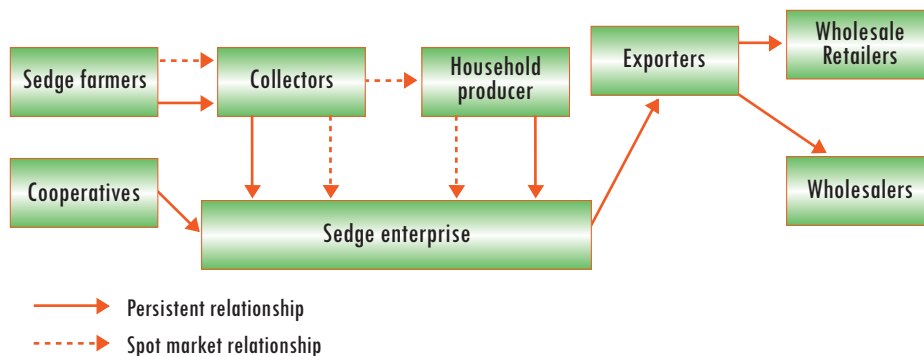
Source: (SNV 2005)

Step 9   Mapping services that feed into the value chain

A potential risk with value chain analysis is that the world surrounding the value chain is not taken into account. Crucial information might be found in the rules and regulations that are governing (parts of) the value chain or in services that are feeding into the chain. Mapping these services will give an overview of the potential for interventions outside the value chain itself. This is covered by the key question: What types of services are feeding into the chain?

Box 13: Example of mapping business services.

One of the major constraints of the sedge value chain in this example is the lack of services, especially in the first steps in the value chain.
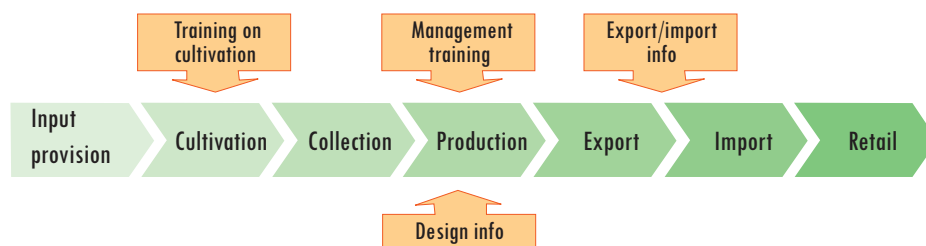
The sources and payment procedures of these services are different: embedded, fee based or for free (subsidised). A separate map can be drawn to make this visible.

Source: (SNV 2005)

Step 10   Mapping constraints and potential solutions

Constraints exist at almost all process levels of any value chain. For example, these could be constraints to greater efficiency, constraints to upgrading or constraints to greater involvement of the poor. Initial identification of these constraints should be made at all process levels and in addition, identification of potential solutions can be made.

Table 7: An example of mapping constraints and possible solutions.

	Input	Corn production	Procurement	Processing
Input		Seed Land Fertilisers Agronomic practices	Corn pips	
Activities	Supply of inputs	Corn planting Crop husbandry Harvesting Semi-processing Pip preparation	Packing Transporting	Drying Milling
Actors	Input suppliers (e.g. fertilisers) Extension officers (crop husbandry techniques) Agricultural research stations Farmer Unions Material supply agents	Farmers planting, managing the crop, harvesting and semi-processing	Commune collectors, District collectors, Province collectors	District trading companies, Small milling households
Difficulties		Untimely fertilisation Thorn worm epidemics Lack of production techniques Too high expenses for good quality seed Lack of capital	Lack of corn for procurement High transportation cost Difficult transportation High tax	Spoilt corn Lack of drying technology
Feasible solutions		Selling fertiliser on credit earlier Training agricultural promotion staff at village level Supply quality seed on credit Lending	Suitable tax policies	Investment in drying technology

Step 11   Making a value chain map matrix

Once mapping of the various dimensions of the value chain is complete, a value chain map matrix can be constructed which summarises the key information from the maps in one table. The matrix can be used as the basis for designing questionnaires, determining which actor groups to interview and which geographical locations to concentrate field work in. The matrix can also serve as an easy to interpret sector summary from a value chain perspective. Examples of a value chain matrix are given in Figure 9 and Table 8.

Figure 9: Initial matrix prepared after value chain mapping exercise

Source: (IFAD, M4P et al. 2007)

Table 8: Information transferred to final matrix

	Inputs	Production	Collection	Pre-processing	Factory processing
Inputs		Seed, fertiliser, plant protection drug Technique, soil, labour source Capital	Fresh leaves and buds	Fresh leaves and buds	Fresh leaves and buds Dried leaves and buds
Activities		Producing fresh leaves and buds	Collecting fresh leaves and buds Selling to factory	Drying Preservation	Buying fresh leaves and buds Pre-processing buds Selling finished products
Outputs	Seed, fertiliser, plant protection drugs Technique, soil, labour source Capital	Fresh leaves and buds	Fresh leaves and buds	Dried leaves and buds	
Actors	Seed company Fertiliser agency Plant protection agent Extension centre Bank	Farmer	Collectors	Local level small scale (household)	
Location and participation of the poor	Not much	Planting → Management → Protection → Harvesting	Not much	Some involvement	Limited (some workers)
Challenges		Plant protection Difficulties in getting good quality varieties Lack of technical knowledge	Difficult to transport	Preservation difficult Lack of funds for effective kilns	
Possible solutions		Periodical spraying Changing planting mechanism Setting up convention Technical training (plant production)	Upgrading roads	Investment in kilns	
Location		Thach An, Hoa An	Thach An, Hoa An	Thach An, Hoa An, Cao Bang town	Cao Bang town

Source: (IFAD, M4P et al. 2007)

5. What Should be Known after Analysis is Complete

This tool has given an overview of the different dimensions that can be mapped and offered suggestions on how to map them.

Developing initial value chain maps and a map matrix provides a firm basis for undertaking the full value chain analysis described in the following tools. In particular, after the mapping exercise is complete, practitioners should be able to determine which value chain actors should be interviewed, what information should be gathered, what significant information gaps exist, and what the geographic locations for field work are.

The following chapters provide tools to help analyse the dimensions that you wish to map.

VALUE CHAIN ANALYSIS TOOLS – QUALITATIVE TOOLS

PART 4 – VALUE CHAIN ANALYSIS TOOLS – QUANTITATIVE TOOLS

PART 1 CONCEPTS

PART 2 – VALUE CHAIN ANALYSIS TOOLS – GENERAL TOOLS

3

PART 3 - VALUE CHAIN ANALYSIS TOOLS

QUALITATIVE TOOLS

Tool 3 - Governance: Coordination, Regulation, and Control

Contents

Tool 3 - Governance: Coordination, Regulation, and Control

1. Introduction

The analysis of governance aims to investigate the rules operating in a value chain, and the system of coordination, regulation and control in which value is generated along a chain.

Governance refers to both the "official" rules that address output, and the commercial imperatives of competition that influence how production is structured. Governance implies that interactions between actors in the value chain are frequently organised in a system that allows competitive firms to meet specific requirements in terms of products, processes, and logistics in serving their markets. As such, it recognises that power is not evenly distributed, and access to market opportunities for the poor requires understanding of how production systems are organised to meet these competitive requirements.

Because "governance" looks and sounds like "government", the term is often interpreted narrowly to include only the legal and regulatory requirements that influence business operation and market access in a value chain. In actual fact, the instruments of governance range from contracts between value chain participants to government regulatory frameworks to unwritten "norms" that determine who can participate in a market.

Requirements may be "official" or "unofficial" and may originate within or outside of the value chain. These may be as simple as the requirement imposed by wholesalers that agricultural products be correctly harvested to prevent damage and degradation. Conversely, they may be as complex as a foreign government's enforcement of international standards regarding permissible levels of pesticide residues on imported products. Another example is the procedures imposed by a multinational firm as a condition of participation by a subcontractor in its global supply chain. There is a host of possible influences of governance in between these extreme examples, and value chain analysts should work to clearly understand what factors influence the organisation of production and the position of poor farmers and other producers in these arrangements.

Regardless of the level at which rules originate, poor value chain participants can find opportunities for upgrading and participation in higher-value markets where they have the resources to learn about requirements of participation in markets. Value chain actors may have limited access to services and other forms of support required for meeting value chain standards; insufficient support can hamper their possibility to actively participate in higher-value segments of the chain. Access to information about commercial requirements, standards and compliance-related services that may be delivered through government, semi-public initiatives, or through the private systems of value chain coordination, are key concerns in analysing upgrading opportunities for poor producers.

The analysis of value chain governance and services is best approached by separating three dimensions: Coordination Structures, Rules and Regulations, and Control Mechanisms (Transmission of Information and Services).

Governance is one dimension of social capital, as illustrated in the Figure 10 below.

Figure 10:   Dimensions of social capital related to value chains

Macro

Institutions of the state,
rule of law

Governance

Structural ← → Cognitive

Local institutions,
Relationships,
Linkages

Trust, Local norms, and
Value

Micro
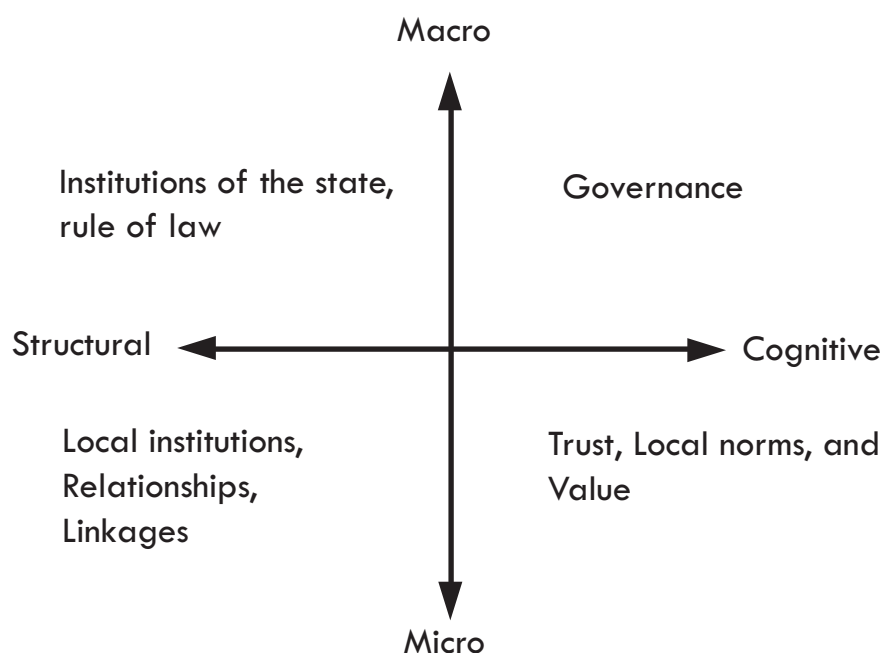
Source: (Grootaert and Bastelaer 2002)

2. Objectives

The main objectives of governance analysis are to:

- Understand how the value chain is coordinated, including key firms (actors) and mechanisms (i.e. contracts, agreements, services), and why this coordination structure has arisen and evolved
- Map the formal and informal rules, regulations, and standards that influence the value chain, how compliance to the rule is monitored, and what sanctions and incentives are used to ensure compliance
- Assess the impact of the rules on different sets of actors, particularly on disadvantaged groups
- Assess how different groups of value chain participants receive (or lack access to) adequate forms of support that can help them achieve the required standards

3. Key Questions

- What system of coordination is in place to meet commercial objectives related to quality, quantity, and consistency and/or to ensure compliance with standards? Which are the "lead" or "coordinating" firms in this system? Is coordination mostly based on formalised arrangements (contracts, for example), or is coordination informal?
- What are the rules and standards, both official and commercial, that actors involved in the value chain must comply with in order to participate? Where do they originate? How are they enforced?
- What are the effects of each rule on the participation (economic activities) of the poor, particularly relating to the actors that enforce these rules and the systems in place to coordinate production?

- How is information about applicable rules, standards and services to support 'compliance' transmitted through the value chain, particularly through the lead firm or its coordination system?
- Does the inability of poor producers to comply with these rules, either due to lack of information or capacity, limit participation in higher-value activities, or prevent upgrading of the value chain as a whole?

4. Steps

It is difficult to capture all of the governance and services issues in a fixed-format questionnaire. Most of the data needed for analysing governance is of qualitative and un-quantifiable nature. For this reason, it is recommended to use open-format and intensive interviews with value chain participants and key informants; this is particularly true when approaching an unfamiliar value chain.

Step 1   Map actors

Generate a list of all the actors (within and outside the value chain) that are potentially able to influence the governance structure. Use the mapping tool to identify all the relevant actors within the value chain. Identify other external organisations and institutions through interviews with key actors in the chain. To build a more complete list, both desk research and qualitative interviews with key actors in the chain are advised. Actors from lower levels of the chain may not have knowledge of wider rules, so interviews should primarily be held with major players, particularly with final links that interact directly with international markets.

Once the list is complete, it can be ungrouped for each level of the value chain based on different categories including wealth (poor, average, better off); business type and scale (micro, small, medium, large); ethnicity; and gender. Particularly when pro-poor analysis is involved, separating actors according to wealth and scale is very important. The categories can prove useful to analyse the impact of the governance structure on different groups, assess the level of information asymmetries along the chain etc. List all actors in a table and arrange them on a chart.

Step 2   Determine the demand and supply conditions of the value chain

Demand and supply conditions, which may vary over years and seasons, and also vary greatly between markets, influence the governance of the chain and the power of different actors. It is important to map out the demand and supply conditions throughout the year to get a good overview of how governance evolves over time.

For example, in Svay Rieng province in Cambodia vegetable collectors are employed elsewhere, and therefore not available, in the off-season (Ypma 2005). This makes it more difficult for remote off-season farmers to market their product. In cassava production systems in Vietnam the dominance of actors is determined by the season (ADB 2005). In the peak harvest season, with oversupply of fresh roots and only one market channel active, the main starch processors set and enforce regulations and pricing of starch content. However in off-seasons, with both fresh root and dried chip market channels active, it is the collectors who determine which channels will be supplied.

Figure 11: Example of bargaining power, chances for contracting systems and chain governance for perishable goods

Are you dealing with a highly perishable goog?

No

Yes

Is there an over or an under supply in the (local) market?

Over

Under

Can the suppliers meet the demand volume individually?

Yes → High bargaining power and opportunity for contracting

No

Are the suppliers organised to collectively meet demand?

Yes → Good opportunity for group marketing and contracting

No → Low bargaining power/ chance for contracting

Can the good be locally transformed (drying, canning juicing etc)?

No

Yes

Do the suppliers have a contractual relationship with the buyer?

No → Low bargaining power/ chance for contracting

Yes → Relatively stable and safe position in the chain

Can the transformed good be locally stored?

Yes

No → Low bargaining power/ chance for contracting

Is the transformed good easily transportable?

Yes

No

Good bargaining power providing market conditions for this transformed product can be met

Source: (SNV 2008)

Step 3 Determine the dominant coordination arrangement(s) in the value chain

As a system of production, every value chain has a system of coordination which includes formal and informal arrangements between participants. Coordination structures are constantly evolving to allow firms to fulfil the competitive requirements of intermediate and final markets, to ensure compliance with official or unofficial rules and standards, and to make better use of capital investments. These coordination structures may range from very loosely-coordinated, market-based trading structures, to intensely coordinated, vertically integrated, production. These are illustrated in the two graphics below.

Figure 12: Global value chain classification.

The different types of global value chains are ranked according to the degree of power asymmetry and explicit coordination.
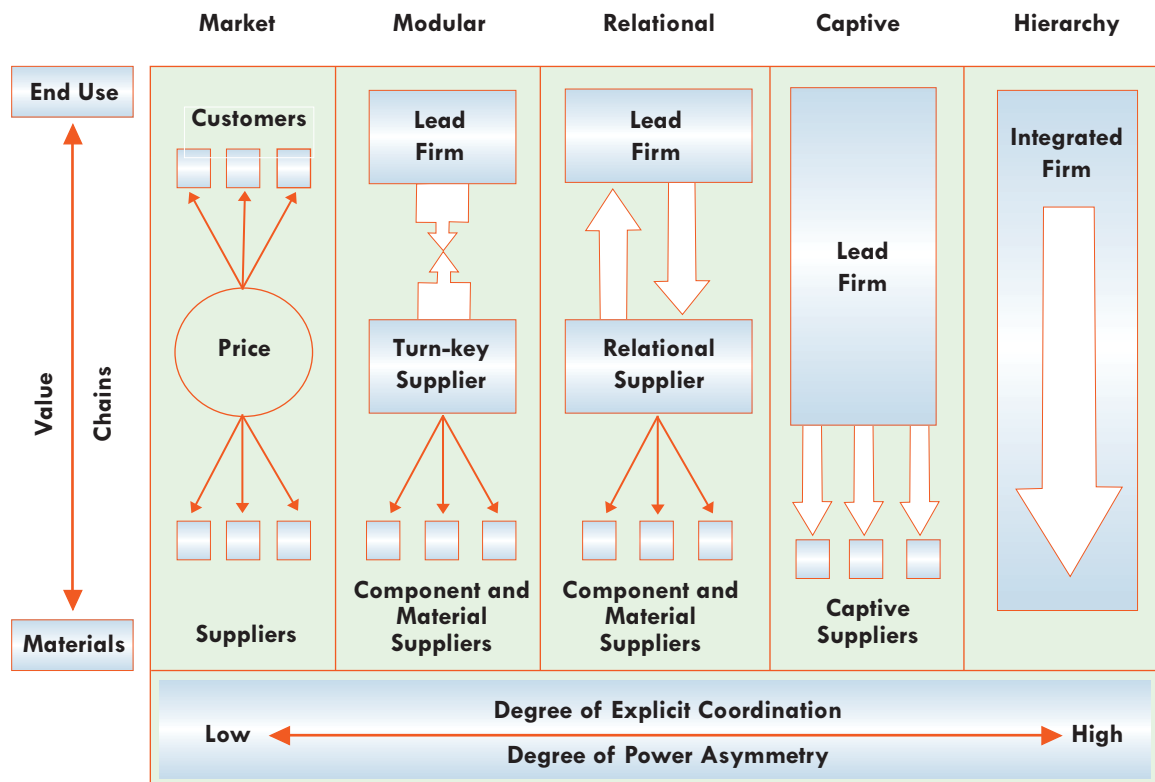
Source: (Gereffi, Humphrey et al. 2003)

Figure 13: Value chain classification applied to pro-poor markets.

The different types of value chains are classified according to the level of integration and coordination in the respective markets.
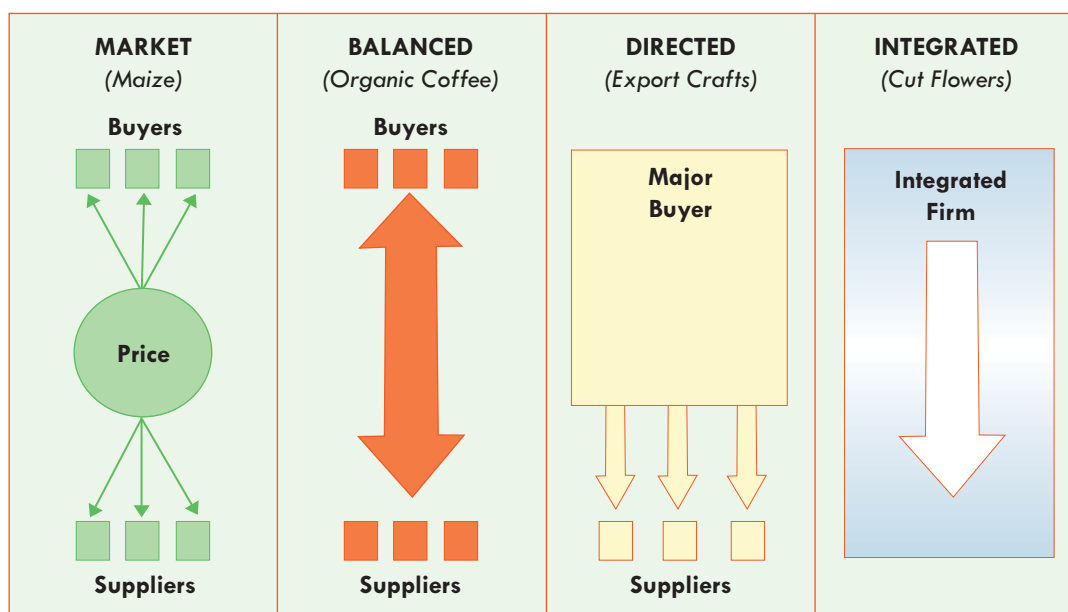
Source: (SNV 2008)

The companies most directly accountable for the configuration of production systems, and for enforcement of rules throughout the value chain as a condition of selling their products in intermediate or final markets, are referred to as "lead firms". In general, more restrictive or complex rules determining access to customers generate more sophisticated systems of vertical coordination by lead firms, even within a single industry. More stringent rules and requirements stimulate lead firms to exert more direct control over production and transportation of goods, since they are ultimately accountable to governments and consumers for the compliance of their goods with official or unofficial requirements. Their choices (and the choices of their agents) about which producers can participate in their supply systems have enormous, direct impact on the participation of the poor in value chains.

There may be more than one system of coordination operating in a single value chain in any given area, for example, where independent and contracted producers exist side-by-side; see Example 2: Three Coordination Systems in the Zambia Cotton Value Chain.

Step 4   Analyse how target populations participate in the value chain

The conditions under which producers participate in a value chain can be understood and mapped using a number of dimensions, though two are particularly useful:

1.   Functions undertaken in the value chain: Inquire as to the range of activities that poor participants undertake in a given value chain

2. Formal Coordination: This includes formality of contracts under which participants operate in the coordination system, including contracted input provision, marketing, certification, contract farming or outgrowing, or final product sales to buyers. It also may include producer-driven formalisation of collective activities (associations, groups, or other vehicles of collective action) to reduce costs, increase revenues or reduce individual risks.

Understanding target populations' functional range and formality of participation can be useful in understanding opportunities for upgrading.

The accompanying figure shows the possible positions of small producers within a chain, with the functions undertaken placed along the vertical axis and the type and level of contractualisation and coordination with other chain actors or among themselves on the horizontal axis.

Box 14: Example of possible positions of smallholders in a value chain

(1)   Entering the chain (→1)
(2)   Improving on existing production activities (1→1)
(3)   Adding value by taking on more functions (1→2)
(4)   Increasing contractualisation (1→3)
(5)   Coordinating a chain segment (1→4)
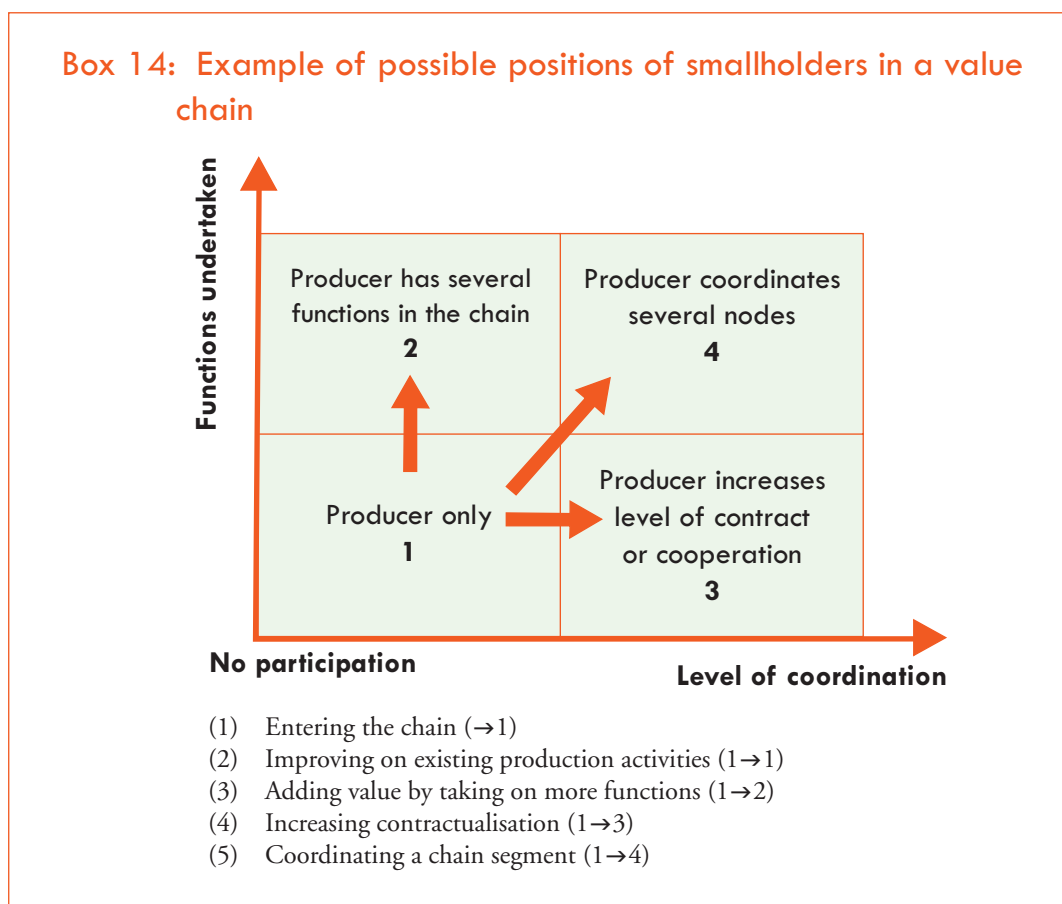
Step 5   Identify rules and regulations

There are generally rules, regulations, and standards that value chain actors must abide by in order to participate in the chain. Rules and regulations can be either formal (with official legislative backing) or informal (determined by commercial norms). Voluntary standards that provide products with specific designations, such as organic or fair trade exist somewhere in-between. At the same time, rules can be set by actors within and outside the value chain. In the past, rules were largely concerned with meeting basic cost parameters and guaranteeing supply; they usually involved agreement between buyers and suppliers

within the chain. At present, developing country agricultural producers face significant barriers to accessing developed markets due to well-developed product standards. These standards motivate development of new production systems and organisational forms.

Conversely, the dominant rules in local markets, particularly where official standards are weak or poorly enforced, tend to be commercial standards related to product quality, grading, and business practices. In these very loosely coordinated systems, wholesalers or traders may serve as de facto lead firms, enforcing rules upon producers through differential pricing and providing limited information or assistance with compliance. Monopolistic local trading structures may also disadvantage producers. Rules may not be communicated or may vary between localities within a national market. Poor producers also may not understand rules related to product quality or other commercial requirements and therefore may engage in antagonistic relations with buyers, which can aggravate other value chain dysfunctions.

In general, the standards faced by producers participating in export markets are vastly more complex than those governing local and national markets. While official and commercial standards usually apply in both cases, the need to comply with multiple and overlapping international standards related to production conditions constitute an important barrier to entry for poor value chain actors who wish to participate in export-oriented value chains. Nonetheless, better understanding of, and compliance with, local commercial rules is generally a pre-condition for value chain upgrading. It might also be considered a stepping-stone to export strategies, since producers are unlikely to be able to comply with complicated standards if they are unable to understand, accept, and comply with the basic requirements of local markets.

Box 15: Example of power imbalance - The shrimp export industry in Bangladesh

In 1997, the fourth leading export item in Bangladesh was frozen shrimp and fish, with a 7.3% share of the total export market. The major importers were the European Union (EU; 34–50% of Bangladesh's exports), the United States (23–38%), and Japan (15–26%), depending on the year. At that time, the value per kg of Bangladesh's frozen shrimp was lower than average for the Asian region. Bangladesh had a reputation for producing seafood that did not always meet minimum international standards as specified by the Codex Alimentarius Commission. With a low percentage of the world market, a lower-valued product, and a negative reputation in quality, Bangladesh was a price-taker rather than a price-setter.

THE EU BAN

On July 30, 1997, the EU banned imports of fishery products from Bangladesh, as a result of inspections of Bangladesh's seafood processing plants. Inspections found serious deficiencies in the infrastructure and hygiene in processing establishments and insufficient guarantees of quality control by Bangladeshi government inspectors. The ban was estimated to cost the Bangladesh shrimp-processing sector nearly USD 15 million in lost revenues from August to December 1997. The impact on both the industry and the economy of Bangladesh was substantial. The only way Bangladesh could strengthen its export position in the shrimp market was to improve the safety and quality of its exports. Over the last decade, with a major effort in the late 1990s,

safety improvements have been made by the industry and government, with the technical assistance of bilateral and multilateral agencies. While the short-term loss in foreign currency from the EU ban was high for a developing country, the ban did increase the commitment by industry and government to raise product quality to meet international standards. Both exporters and government made major investments in plant infrastructure and personnel training in order to achieve international technical and sanitary standards. This included new employee acquisition and training, sanitation audits, plant repair and modification, new equipment, new laboratories and other costs.

INVESTING IN SAFETY

Some upgrades were in progress at the time of the EU ban. By 1997, the Bangladesh shrimp processing industry had invested USD 17.6 million in plant upgrades, the government had invested USD 382,000 in laboratory and personnel upgrades, and outside partners had invested USD 72,000 in training programs in Bangladesh. Unfortunately, these improvements were not enough to prevent the ban. The total fixed investment cost of USD 18 million was only slightly higher than the nearly USD 15 million in lost revenue from the ban over a period of five months. These improvements would have almost been paid for, had they been implemented in time to make the ban unnecessary. Research has also determined that the annual recurring costs to maintain HACCP (Hazard Analysis and Critical Control Point) programs and meet international standards would be USD 2.2 million for industry and USD 225,000 for government. Subsequent inspections by the EU determined that some plant improvements met EU standards. Subject to certain provisions, the EU ban was lifted for six approved establishments for products prepared and processed after December 31, 1997. By July 1998, a total of 11 plants had been approved for export to the EU. Collective efforts by the industry, the Bangladesh Department of Fisheries, and the Bangladesh Frozen Food Exporters Association have continued to strengthen the export-processing sector. By 2002, of the 65 plants licensed for export by the government, 48 plants had EU approval.

Source: (Cato and Subasinge 2003)

Step 5 is mainly concerned with generating a clear understanding of the rules that influence actors in the value chain; identifying the actors that set the rules; understanding the reasons behind the rules; assessing how the rules affect different categories of actors within the value chain; understanding how much different actors know about the rules; and assessing the rate of change of the rules.

Table 9: Types of rules and standards affecting value chains

Type	Example	Enforcement and Sanction
Official "legal" standards	Prohibition of pesticide residues on imported vegetable products	Ban of non-compliant products from destination market
Voluntary Standards	Production requirements for organic certification and labelling	Ineligibility for certification or value-added labelling
Commercial Requirements or Norms ("Rules of Trade")	Tangible product requirement such as volume, size, colour, composition, or freshness, which may be codified or not	Spot rejection of product by buyer at delivery or collection, or reduced price acquired by seller (downgrading)

Identifying rules and regulation should begin by interviewing key actors in the chain (e.g. lead or coordinating firms, major processors, exporters), as they should be more aware of these issues. In locally-focused value chains, wholesalers or other key intermediaries may be the most important sources of information on de facto standards and rules, as informal commercial norms are more common in these situations.

After the initial interviews, other actors can be interviewed following backward linkages in the chain. Initial information could be gathered using semi-structured interviews. During the first round of semi-structured interviews with key actors, a questionnaire could be developed based on the following guidelines. Different sections can be chosen depending on the desired focus of the research:

- Ask the informant to list all the rules and regulations (formal and informal) that they must follow in order to operate in their market segment, and the consequences of failing to comply. Ask the informant to clearly explain how the rules are translated in detailed sets of instructions related to cost, quality, processes, delivery times etc. Also, take note of additional sources of information you might later consult if you need to know more about the requirements of each regulation (e.g. websites, statutes, legal documents).

- Ask the informant to list all the rules and regulations that they require their suppliers to follow. Ask them to list all the actors (or categories of actors) with whom they directly stipulate arrangements (contracts, informal agreements) according to each rule. Ask them to explain how the rules are communicated in the form of instructions on, for example quality specifications, costs, delivery time, inputs, equipment and processes to be used for production.

- For each rule or regulation (both upstream and downstream), ask the informant to explain the main advantages and disadvantages of compliance. Examples of advantages might be: expanded market access; possibility to implement a reliable quality management system; efficient production plans. Disadvantages might include: high costs and decreased profit margins; demanding requirements in terms of processes, technology, scale; difficulties in finding local suppliers or skilled workers that can match the requirements.

- For each rule or regulation, ask the informant to explain why it is necessary, and how it helps maximise the efficiency and the level of coordination within the value chain.

- For each rule or regulation, ask the informant to explain how the rules have been set, who set them, and when the rule was set. Also, try to understand if there have been major changes in the rules over time, and how the changes have affected business.

- For poor participants in the value chain, pay particular attention to whether they understand the rules, particularly when formalised. For example, if there is a written contract, can the poor understand the terms?

Following interviews, there should be enough information to generate a matrix of key regulations, voluntary standards, and commercial rules that impact each value chain segment, and the enforcement and sanctions associated with each rule for value chain participants.

A matrix can be used to summarise the findings, and also offers a tool for structuring some sections of the questionnaire, which can supplement the qualitative analysis during the next rounds of interviews.

Table 10:   Example of matrix for actors and regulations.

A matrix such as this provides an overview of the governance of the value chain; the green boxes indicate that the compliance with the rule is required by the relevant authority or actor.

	Rule 1	Rule 2	Rule 3	Rule 4	Rule 5	Rule 6	…….
European Union	■						
Government			■				
Industry Association		■					
Exporters		■					
Assemblers				■	■		
Buying agents						■	
Pre-processors					■	■	
Local traders						■	
Producers							
………..							

Figure 14: A graphic example of the different levels in the value chain that individual rules might apply to
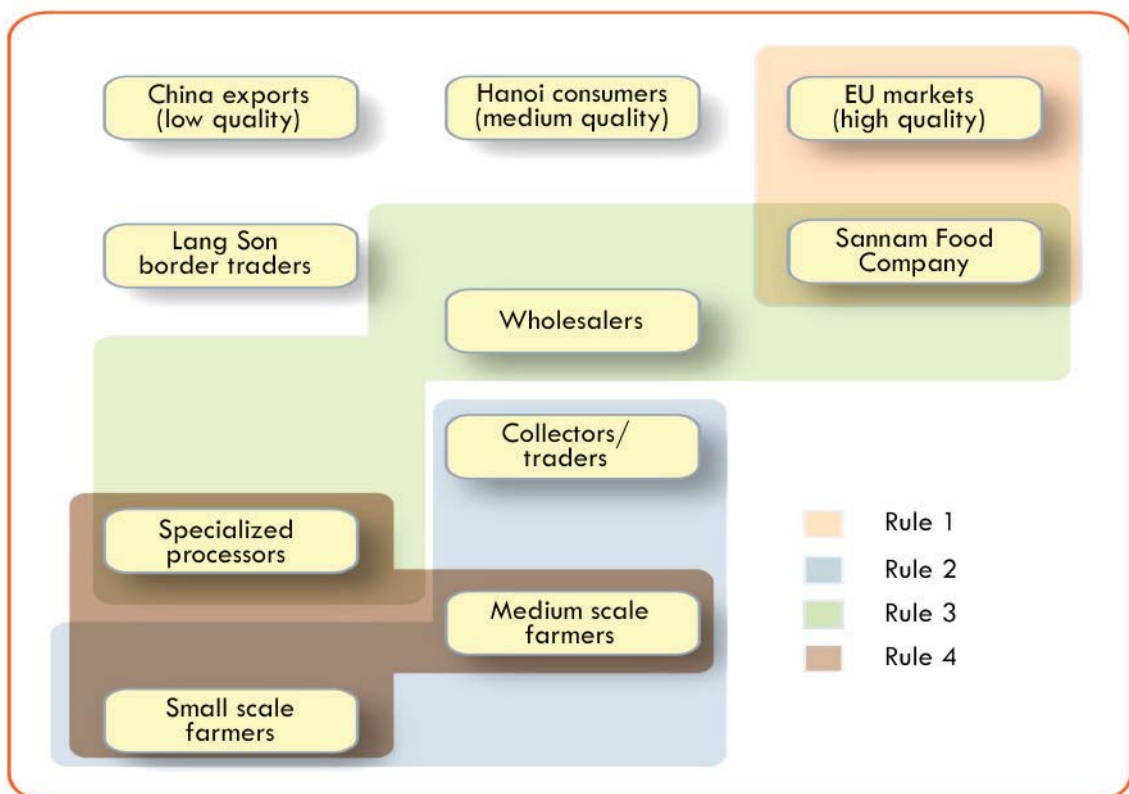
Source: Adapted from information in (ITTPC and SNV 2006)

Important information can emerge from the comparison of tables, maps and indicators grouped for different categories of actors (e.g. poor farmers, small-scale processors).

For example, try to compare the rules map that emerges from each group of actors, as these will give you an idea of how different groups perceive the overall structure of the value chain. It is likely that strong information asymmetries will emerge from the comparison.

Step 6   Analyse the impact of rules on value chain participants (including enforcement, rewards, and sanctions).

Step 6 is mainly concerned with the following issues: identification of who monitors compliance to the rules; identification of the system of sanctions available to punish defectors, and the system of incentives used to promote the application of the rules; and assessment of the effectiveness of the sanction / incentives system.

Enforcement includes the methods and tools used to check compliance with the rules, and the system of sanctions used to promote observance of the rules. Without effective enforcement, rules may be set - but not kept. The first aspect of enforcement is monitoring at different stages of the chain and the second aspect is the sanctioning system; it can include both sanctions (aimed at punishing defectors) and incentives or rewards (to encourage observance of the rules). Though government regulatory capacity may be important to enforcement, it is not exclusively, or even principally, a government function. Depending on the coordination structure, lead firms may have significant enforcement power, for example, to exclude non-performing producers from chains by revoking contracts or reducing prices.

It helps to produce a list of the actors involved in the enforcement system. Two separate sets of matrices can be generated, one of monitoring actors / monitoring tools, another of sanctioning actors / sanctioning tools. In the case of enforcement, it is particularly important to collect data regarding the frequency of inspections received by each actor from the different monitoring agents. Also, it is important to record the frequency with which each actor has been subject to specific forms of sanctions. It can also be important to compare maps and tables across different categories of actors (poor / non-poor).

Step 7   Analyse target sector knowledge and awareness of rules, norms and standards, and identify key gaps.

While producers and other poorer value chain participants may be subject to numerous sets of rules and standards, they may not understand the rules or be empowered to respond.

On the other hand, rules, quality standards, and norms may not be written down or may vary within and across market areas. These may also change in response to market offerings.

It is important to assess the level of transparency in monitoring and enforcing the rules. For example: are quality requirements clearly set in contracts, and translated in an explicit set of parameters that cannot be subject to discretional interpretations? Are independent parties involved in the monitoring process, or is it totally managed by powerful actors? Discretional quality controls coupled with power asymmetries can result in a monitoring system that disadvantages the poor. Furthermore, discretional rules can result in corruption.

Take Note

In the Farmer Marketing School (FMS) approach used by the CIDA funded Cambodia Agricultural Market Information Project (CAMIP), value chain actors (producers and traders) formalise the local grading standards by discussing the objectively verifiable criteria of quality and subsequently the parameters per grade for each criterion. The objective is to come to a commonly agreed upon standard for grading.

Table 11: Example of farmer marketing school grading table (yard long bean in Kampot, Cambodia)

Criterion	Grade 1	Grade 2	Grade 3
Length	> 45 cm	> 30 cm < 45 cm	< 30 cm
Colour	Dark green	Dark green	Any colour
Blemishes	No blemishes	< 5 spots/bean	> 5 spots/bean

Step 8   Analyse how information and services are provided internally through the value chain and externally.

Services define the ways in which actors within and outside the chain provide assistance to other value chain participants, to help them meeting the requirements of rules and regulations. Services can be provided by actors within the chain, as in the case of leading buyers (or their buying agents) that directly help their suppliers achieve quality standards. Alternatively, services can be provided by actors outside the chain.

The main focus of service analysis is to understand by whom (and through which means) value chain participants are supported in achieving competency as suppliers within the coordination system and compliance with rules and standards that are in place. This analysis also can help assess whether the level of support is adequate to the requirements of value chain upgrading.

The main questions to be addressed are the following: who provides assistance to value chain participants; which forms of assistance are available for different categories of value chain actors; what is the degree of satisfaction of different categories of actors with the services and assistance provided; and which linkages or services should be improved?

It is important to assess the level of services and support the poor receive from other actors within the value chain (for example, lead or coordinating firms, contract farmers, key wholesalers or other buyers) and from external organisations.

Particular attention should be given to understanding the ways in which actors within or outside the value chain are providing assistance to less advantaged participants in understanding and complying with commercial and regulatory requirements.

Table 12: External actors assisting firms to meet value chain rules

	Change agents	Sources of data
External to the chain	■ Consulting firms ■ Learning networks ■ Government agents	■ Interviews with consultants; ■ CEO or production control in firms; ■ Business Associations CEO or production control in firms; ■ Interviews with government officers (local and national) responsible for industrial policy
Internal to the chain	■ Rule-setting firm ■ Buying agent of rule setting firm ■ First-tier suppliers, or other leading suppliers to rule-setting firm	■ Supply chain management or purchasing function in purchasing firms: CEO or production control in supplying firms Interviews with agent and CEO of recipient firms; supply chain management operations

Source: (Kaplinsky and Morris 2001)

5. What should be known after Analysis is complete

After having followed all the steps, the key questions outlined below should be able to be answered:

■ What are the value chain's coordination structures?
■ What is the role of lead firms in coordination?
■ Where do targeted populations fit into the value chain in its various coordination structures?
■ What are the formal and informal rules that regulate the actions of value chain participants?
■ How are rules monitored and enforced? Which are the sanctions and incentives used to make the rules effective?
■ Do disadvantaged value chain actors have access to information about the formal and informal rules that shape their participation in the chains?
■ What services are delivered to producers through the coordination structure?
■ Are there effective systems to support participants in meeting the rules and requirements of the value chain?

Useful Examples

Example 2: Three value chain coordination systems in the Zambian cotton value chain
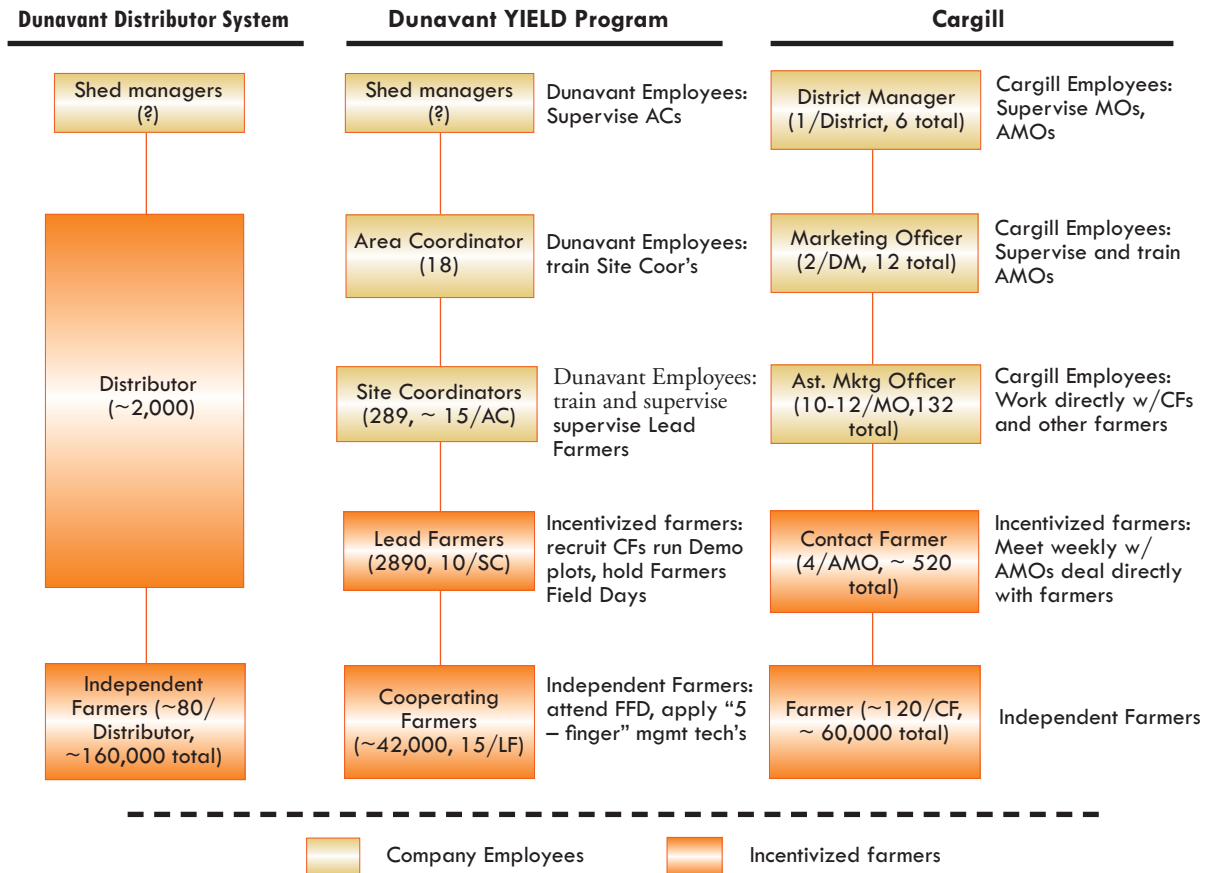
Source: (ABD 2005)

Box 16: Coordination structures in the cotton value chain in Zambia - the Distributor Model

Dunavant employs four Operations Managers, based in each of the Provinces in which Dunavant operates. They manage the production, loan systems and credit recoveries in their respective areas. They interact with the Distributors (village-based agents who work on a commission basis) through their field staff and are responsible for all production activities within their region.

The Operations Managers are assisted by eight Area Managers to oversee the activities of the Shed Area Managers and distributors in their area. The Area Managers ensure that company protocol is followed and activities are undertaken correctly. Their role is to manage and monitor the Distributor system, oversee field activities and to report back to the company through the Operations Managers.

Dunavant employs 65 Shed Area Managers, and (in 2004/2005) contracted some 2,400 Distributors. Their respective role and responsibilities are:

Shed Area Managers
- Manage and monitor the distributors, including distributor record keeping;
- Coordinate and facilitate between the company and the distributors;
- Receive inputs from the company and disburse these to the distributors;
- Assist with technical support and advice to the distributors;
- Disseminate information from the company to the distributors;
- Monitor product deliveries; and
- Oversee loan recovery.

Distributors
- Collect and pay the company a fee of ZMK 1,500 per bag of cotton planting seed, which should be collected from all farmers to whom inputs are being distributed;
- Submit stock reports in line with Dunavant requirements;
- Keep detailed accounts for inspection;
- Obtain credit from the company for inputs;
- Store inputs prior to disbursement, usually in small self-built sheds or homes;
- Mobilise the farmers for planting based on history, membership and loan recovery performance;
- Distribute the loan in the form of inputs; seed, chemicals, sprayers and for some designated trial farmers, fertiliser;
- Report any problems that may occurs that s/he cannot advise upon;
- Coordinate harvesting schedules;
- Coordinate the delivery of the produce to village grading and storage sheds;
- If the Distributor also acts as a Buyer (for which he has to be numerically literate), he is also responsible for:
  - Weighing the produce
  - Grading the produce;
  - Recording produce weight and grade against the smallholder farmers name and ID number from his/her national registration card; and formatting
  - Coordinating trans-shipment with Dunavant to regional storage depots.

Whereas initially Distributors were also responsible for providing extension services, training and technical support to the farmers, this is now the responsibility of the extension staff employed under the Dunavant Yield Programme.

Source: (ABD 2005)

Tool 4 - Relationships, Linkages and Trust

3

Contents

Tool 4 - Relationships, Linkages and Trust

1. Introduction

Trust and linkages are inextricably intertwined within a value chain. Organisations without linkages have little reason to "trust" each other, even if they do not "distrust" the other party. Conversely, trust might not be important if enforcement mechanisms exist to ensure compliance with a given set of rules governing their relationship (for example, contracts and other legal regulations). However, in the absence of an effective mechanism of enforcement, linkages without trust are invariably weak.

> ### Terminology
>
> for the purpose of this tool
> 1. Relationship is defined as a social connection between two parties
> 2. Linkages are defined as a business relationship between two parties of the value chain/network
> 3. Trust is social capital formed between two parties enabling a more efficient linkage through the reduction of transaction costs.

Whereas relationships, defined as a social connection between two parties may play a role in certain value chains, e.g. a family business with different individual family members or family groups each having specific tasks or specialisations within the value chain (usually with a high level of trust), linkages are the more common norm in most value chains (with varying degrees of trust between actors). From here onwards this tool will therefore focus on linkages and trust.

Analysis of linkages involves not only identifying which organisations and actors are linked with one another, but also identifying the reasons for those linkages and whether the linkages are beneficial or not. Actors in the value chain link with one another because they purportedly obtain benefit from those linkages. An identification of the benefits (or lack of them) goes a long way to identifying the constraints in increasing linkages and trust amongst value chain participants.

Linkages within a value chain are mostly business linkages, and could be formal but are often informal. The informal linkage refers to the domain of social capital (see also Figure 10 in Tool 3), in which trust can play a central role. Many studies have shown that in a dynamic traditional community the degree of social capital in business activities is high with numerous linkages based on trust.

The linkages in value chain can be classified into vertical linkages and horizontal linkages. The vertical linkages are the relationship between actors along the chain. Examples of interactions of farmers with other actors in the chain can take diverse forms:

- Sales contract directly with state agro-processing enterprises
- Production contract with foreign companies

- Sale to private merchants by oral engagement
- Sale through service co-operatives
- Handicraft and industrial villages cluster

Horizontal linkages on the other hand are linkages between actors at the same level of the value chain, e.g. farmers working together with other farmers, or companies in the same sector liaising with each other on a regular basis. For example, in the cotton industry in Zambia horizontal linkages exist between the different ginning companies operating in the country, while each of these companies have their vertically integrated production and supply value chains.

Strengthening the linkages between the different actors in the marketing system will lay the groundwork for improvements to other constraints; establishment of a contract regime, improvements in post-harvest and transportation systems, improvements in quality, and the effective use of market information.

2. Objectives

1. To identify linkages geographically and socially
2. To describe the linkages between different actors in the value chain and their linkages with other actors ancillary to the value chain
3. To describe the linkages between actors by poor and non-poor actors
4. To assess the impact of the linkages on the poor actors in the value chain

3. Key Questions

Dimensions of analysis:

1. Do linkages exist?
2. How important are linkages?
3. How many different actors are involved?
4. What is the frequency of contact?
5. What is the level of formality?
6. What are the reasons for having or not having linkages?
7. What are the relative benefits/costs of linkage? What is the level of trust?
8. How long have these linkages existed?
9. How has the formality of the linkages changed or evolved?
10. What is the rate of expansion of linkages over time?

4. Steps

Step 1 Map respondents and create categories

When interviewing, separate out into different categories of respondents for both horizontal and vertical linkages in order to analyse later the differences in linkages between the different categories

Possible classification of respondents:
Wealth   –   poor, average, better-off

Skills	–	unskilled, low-skilled, high-skilled
Gender	–	male, female
Ethnicity	–	different ethnic types
Business type	–	micro, small, medium, large
Period	–	day labour, temporary labour, permanent labour
Status	–	family, hired
Origin	–	temporary migrant, permanent migrant, locally hired

Step 2   Identify dimensions

Identify the horizontal linkages between producers and traders varying from individual to group, association and/or cooperatives. The dimensions of analysis of horizontal linkages could include the following:

- The objective of the group
- The size and scale of the group
- Benefits for individuals to participate in the group, both short- and long-term
- Relationship to the selected value chain
- Formal and informal governance of the group (trust and by-laws)
- Effectiveness of the group on meeting their objectives
- Potential opportunities for the group in the value chain

Identify relevant dimensions of vertical linkages to investigate. Dimensions of analysis could include the following:

- Existence of linkages (Yes/No)
- Number of different actors (number of different people in each organisation grouping)
- Frequency of contact (number of times per year met)
- Level of formality (informal/ verbal agreement / written contract)
- Reason for linkages / Reason for no linkages
- Relative benefits/costs of linkage (benefits>costs / benefits=costs / benefits < costs)
- Level of trust (distrust / no trust / little trust / some trust / full trust)

Step 3   Survey actors

Conduct survey interviews with relevant value chain actors to identify their linkages with other actors in the chain. For example, interview farmers, traders, processors. First a list of relevant value chain actors is created. Secondly a set of questions on trust are developed and used in a survey instrument; see example in Table 13.

Step 4   Analyse the results of the survey

The results of the survey can then be analysed in table format or graphically, for example using "Radar Charts" in Excel. Qualitative indicators can be transformed into quantitative indicators by assigning numerical levels – e.g. Levels of Trust (distrust, no trust, little trust, some trust, full trust = -1, 0, 1, 2, 3). Averages can be calculated to aggregate across individual respondents. An example is shown in Figure 15.

3

Table 13: Extract from a survey questionnaire on value chain linkages in the Bangladesh shrimp industry

Business Linkages with Other Organizations

Linkage Organization	Linkage		How Many Different Individuals/Groups/Organizations Did Your Business Meet With During Year													Average Frequency of Meeting (times per year)				
	Yes	No	0	1	2	3	4	5	6-10	11-20	21-50	51-100	101-200	200-500	>500	≤1	2-3	4-6	7-12	>12
Farmer																				
Farmer Group																				
Farmer Cooperative/Association																				
....																				

Linkage Organization	If Linkage = YES, then Typical Nature of Linkage (From Informal to Formal Written Contract)			If Linkage = YES, then How Much Do You Trust These Individuals/Groups/Organizations?				
	Informal	Verbal Arrangement	Formal Written Contract	Distrust	No Trust	A Little Trust	Some Trust	Full Trust
Farmer								
Farmer Group								
Farmer Cooperative/Association								
....								

Source: (Agrico, ANZDEC et al. 2004)

Figure 15: Linkages with different organisations by farm family respondents.

In the diagram the percentage of farmers with linkages to each organization/institution is shown, differentiated between poor and better-off households. The diagram shows that poorer farmers have fewer linkages than better-off households

Linkages with Organizations by Farmers
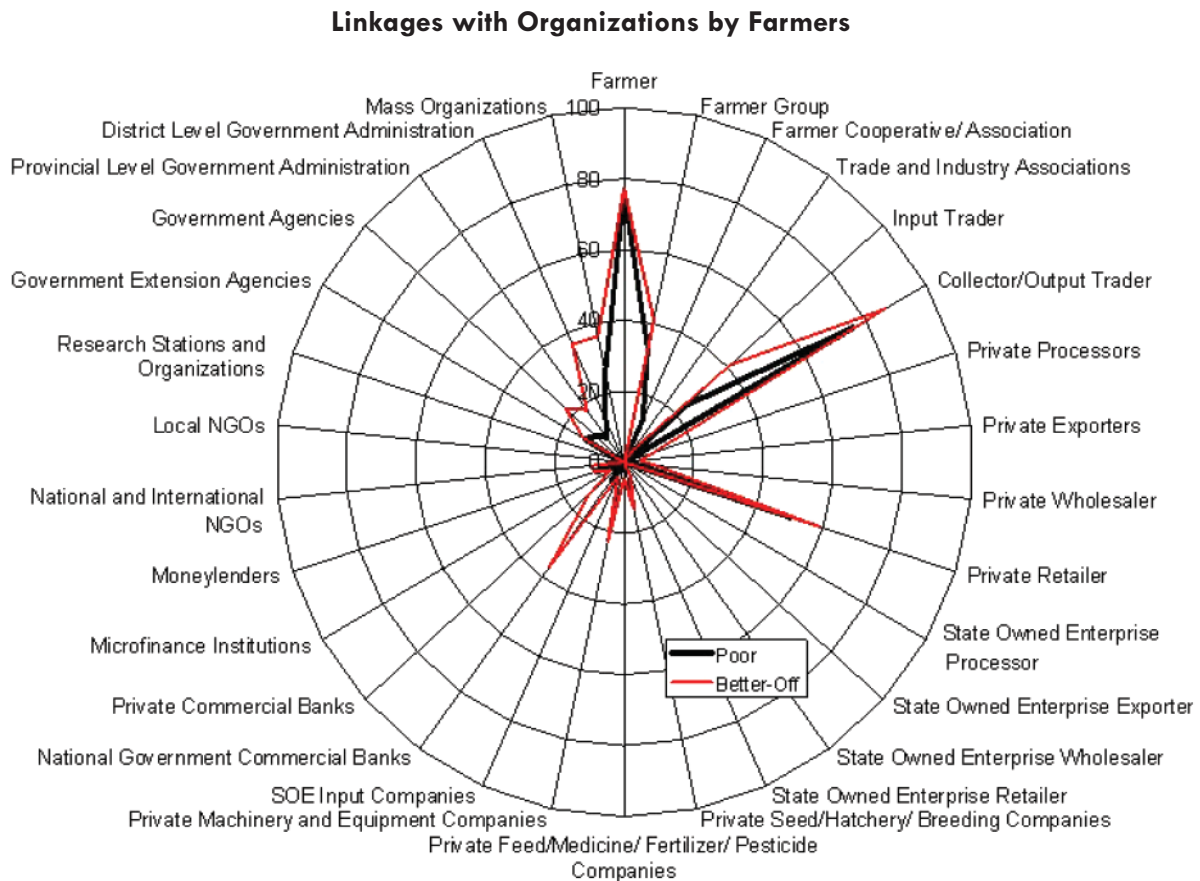
Source: (UNDP and NERI 2005)

Step 5   Identification of power distribution

The issue of power is complex and still highly debated in the value chain literature. For the practical purposes of this toolbook, power will defined as directly related to the level of concentration and access to key assets in the hands of a limited number of actors. Key assets can be both physical resources (e.g. capital, land, credit) and intangible resources (market information, knowledge, personal relationships, reputation). Actors who have exclusive access to key assets and resources are more powerful and have the capacity to influence others in the chain.

There are a number of indicators which can be taken into consideration in order to measure the power of actors operating in the chain; these are presented in Table 14 below. Most of the indicators are indexes of concentration (share) and can be combined together in order to understand the overall control exerted on the key resources by specific actors in the chain.

Table 14: Identifying the key governors in the chain.

Different actors in a value chain have different levels of power or influence. The below indicators can be used to identify which actors are key governors.

Indicators	Strengths and weaknesses	Source of data
Share of chain sales	Not a strong indicator as may only be a reseller of bought-in materials and may lack influence	Balance sheets
Share of chain value added	A better indicator for measuring size since it reflects the share of the chain's activities	Firm-level interviews
Share of chain profits	May be a good reflection of chain power, but may also arise from monopoly control over scarce raw materials (e.g. platinum) and may have little influence over downstream processing	Balance sheets, but it is likely that this data will only be available for publicly owned companies
Rate of profit	A poor indicator since minor players in the chain may be relatively profitable but have little influence	Balance sheets, but it is likely that this data will only be available for publicly owned companies
Share of chain buying power	A good indicator of power, particularly if there are asymmetries; i.e. its dependence on its suppliers is less than their dependence on the lead firm	Firm-level interviews
Control over a key technology (e.g. drive- train in autos) and holder of distinctive competence	A good indicator in producer-driven chains (autos, for example), since this defines the distinctive competence of a chain (BMW's image as a quality, refined car) while the smaller firms 'fill in the gaps' in the chain	Firm-level interviews
Holder of chain "market identity" (e.g. brand name)	May be critical in markets where brand image is very important	Firm-level interviews; studies of market share of brands in final markets

Source: (Kaplinsky and Morris 2001)

Indicators have to be selected according to the focus of the analysis and the availability of data. The number of market partners available to each party and the stability of the exchange relationship (captured in the analysis of contracts) can represent, for instance, easy indicators to understand the vulnerability and the dependence of one actor from the other. As is often the case, small producers may only have access to a limited number of stable channels through which to sell their production; therefore their ability to bargain the price can be limited.

Once all the relevant indicators have been chosen, it is possible to calculate a concentration index for each of them. The concentration index can give an idea of how a particular indicator is allocated among the top five or ten actors in the chain. If the second indicator from the table above (the share of the value added in the chain) is used as an example, the following steps can be followed to calculate a concentration index:

1. Rank all the actors in decreasing order according to the indicator. Start from the one that presents the highest share of value added to the chain, to the one that has the lowest share. Put all the actors in a spreadsheet.
2. Define the cutting point for calculating the concentration level: for example, among the top five actors or among the top 5%. This is a sensitive step, as choosing one cutting point instead of another can drastically change the results. It is therefore advised to choose more then one cutting point and compare the results in the subsequent analysis.

3. Divide the total value added by the top actors (as defined in step 2) by the total value added produced by the entire chain. By using this simple methodology, it is possible to understand how key resources or assets are concentrated among actors.
4. Repeat steps 1-3 for all the indicators useful for the analysis and check how often the same actors are among the top actors. For example, the same five actors in a chain can turn to be not only the ones to have the highest percentage of value added and profit, but also the ones who control key technologies and information in the chain.

Step 6   Analyse trust

Table 15 lists some key features that characterise exchange relationships based on low or high levels of trust.

Table 15: Differences between chains characterised by low and high levels of trust

	Low Trust Chain	High Trust Chain
Length of trading relationship	*Short term*	*Long term*
Ordering procedure	Open bidding for orders Prices negotiated and agreed before order commissioned	Bidding may not take place Price settled after the contract is awarded
Contractual relationship	Supplier only starts production on receipt of written order	Supplier more flexible about instruction Would start production without written order
Inspection	Inspection on delivery	Little or no inspection
Degree of dependence	Supplier has many customers Customer has multiple procurement sources	Few customers for supplier Single or dual sourcing by customer
Technical assistance	Expertise rarely pooled Assistance given only when paid for	Extensive unilateral or bilateral technology transfer over time
Communication	Infrequent and through formal channels	Frequent and often informal
Price determination	Adversarial, with hiding of information	Non-adversarial
Credit extended	Punitive or no-credit extended	Easy access, longer payback period, easy terms
Outsourcing payment terms	Long delays in paying agents and informal economy producers	Payment on receipt of finished goods

Source: (Kaplinsky and Morris 2001)

The analysis of trust can be based on key questions derived from the above table, such as:

1. How long has the trading relationship lasted?
2. When and how are prices set?
3. Are there control and inspection procedures?
4. Is there a contract or an oral arrangement?
5. Is there a high degree of dependency and high level of information sharing?

An index of trust can be easily built by scoring and weighting all these characteristics.

An index of trust can be easily built by scoring and weighting all these characteristics. To save time it sometimes can be useful to directly ask the respondent about their level of trust with regard to a list of other actors in the value chain. The level of trust should be ranked according to a scale (for example: (-1) distrust; (0) no trust; (1) little trust; (2) some trust; (3) complete trust). The data on trust from various value chain actors can then be inserted in a matrix as shown in Table 16.

Table 16: Example of matrix of trust levels between actors

	Farmers	**Traders**	**Processors**	**Moneylenders**
Farmers	3	2	1	-1
Traders	3	0	2	0
Processors	1	2	2	2
Moneylenders	2	0	0	2

From Table 16 it is possible to see the level of trust actors have for others in the chain, and to check if trust is reciprocal. If it is true that informal arrangements are the results of trust, it has also to be considered that informality makes it more difficult to understand the terms of the arrangement. Whether or not trust is reciprocal can be particularly important to understanding the position of the poor, as it gives a rough idea of the extent to which an agreement is based on trust or simply the result of dependency (no other alternative partners available). In the example above, farmers have some trust in traders while traders have complete trust in farmers; the exchange is therefore almost reciprocated.

5. What Should be Known after Analysis is Complete

After having followed all the steps, the key questions outlined below should be able to be answered:

- Do linkages exist?
- How important are linkages?
- How many different actors are involved?
- What is the frequency of contact?
- What is the level of formality?
- What are the reasons for linkages, reasons for no linkages?
- What are the relative benefits/costs of linkage?
- What is the level of trust?
- How long have these linkages existed?
- How has the formality of the linkages changed or evolved?
- What is the rate of expansion of linkages over time?

Tool 5 - Analysing Options for Demand-Driven Upgrading: Knowledge, Skills, Technology and Support Services

Contents

Tool 5 - Analysing Options for Demand-Driven Upgrading: Knowledge, Skills, Technology and Support Services

1. Introduction

With this tool the gap between the quality demanded by the market (as expressed in formal or informal standards and grades), perception of quality by different actors along the chain and the current quality provided to the market by different segments of producers will be analysed. Following the analysis of the gaps, opportunities for upgrading knowledge and skills as well as technology will be identified and potential providers of services to make the necessary upgrading available and possible will be mapped.

Important pro-poor aspects in the analysis of upgrading opportunities will be:

- Who are the local innovators in the community that can serve as showcase to others within the community?
- What are the mechanisms present within the community to share, maintain and collectively develop skills and knowledge? Is the social capital present and are people willing to share it?
- Can the poor do it? Do they have the required knowledge and skills to understand the technology and to implement or operate it?
- Can the poor afford it? Is the investment requirement for the upgrading within reach of the poor?
- Can the poor copy it? When the technology is introduced to a select audience is it easy to copy? For example, do local construction workers have the capacity to build it or are seeds available?
- Can the poor access it? Are the necessary services in place and accessible to the poor?
- Is there enough level of organisation/collective action to disseminate experiences and guarantee quick absorption of upgrading?

Take Note

The term 'skills and technology' includes all types of skills and technology ranging from so called traditional (indigenous / local) skills and technology (often self-developed by the users based on experiences) to high-tech skills and technology (developed through extensive R&D) without making a judgement on its value. In a pro-poor skills and technology analysis special attention should be paid to the existing levels of traditional technology and its effectiveness and previously tried upgrading interventions and its impact (both acceptation and failure).

2. Objectives

The objectives of this tool are:

1. To analyse the efficiency & effectiveness of technology in use within the value chain
2. To categorise current and required technology in the value chain
3. To analyse the appropriateness of technology (affordability, suitability, accessibility, replicability and exchangeability) matched with skills of technology at different levels of the value chain
4. To analyse upgrading options within the value chain that provide the required quality of output
5. To analyse the impact of external investments in knowledge and technology (innovation and R&D)
6. To understand what the causes of the existing gaps / constraints are through the analysis of:
   - Existing and applied skills, knowledge and technologies; and
   - Past attempts to improve skills, knowledge and technologies and its impact
7. To identify the needs and opportunities for upgrading of skills, knowledge and technologies
8. To analyse the possibilities to make upgrading opportunities available through embedded services, external services and/or collective action and learning

3. Key Questions

Key questions to answer in the analysis will be:

- What are the standards and grades existing in the market (both formal and informal)?
- Which technologies are in use and which grades are currently produced by different groups of producers at different stages along the value chain (poor versus non-poor, ethnic division)? What is the efficiency and effectiveness of the technologies in use? Where are problems located?
- What are the current levels of understanding, skills, and knowledge about quality standards and grades along the chain actors? Is there a unified definition of quality?
- Who determines orientation and investment in knowledge and technology in the value chain?
- Who organises, provides and pays for quality control?
- Does the current level of skills, knowledge and technology produce the required output?
- What indigenous and other knowledge is being used in the value chain?
- What upgrading interventions have been tried in the past and what has been their impact?
- What are the upgrading options already available in the market?
- Where are good examples of upgrading inside or outside the geographic analysis area?
- Who are the change leaders and do they have the willingness to share?
- What are the costs/margins of technology (refer also to Tool 6 – Analysing Costs and Margins)?
- Is investment in upgrading worthwhile? Does it bring enough added value to the poor?
- Are there social mechanisms to make investments in services or technology affordable?

■ Who can provide and produce the upgrading solutions? For example, advisory services, R&D, extension, local producers of technologies.

An important pro-poor aspect in the upgrading of technology and knowledge will be the impact on the poor in terms of:

■ Producers: Will the recommended upgraded technology and knowledge be in reach of poor producers? Will they be asked to take unnecessary high risks?
■ Labourers: Will the upgraded technology be labour saving (and thus less poor will have access) or will the upgraded technology be labour intensive, meaning more poor can be absorbed?
■ Consumers: Will the upgrading of technology and knowledge in the value chain lead to an increased access for the poor to products at a more affordable price? Will production inputs needed for the upgrading (often seeds and breeds) be available to the poor so they can also benefit from the technology upgrading?

4. Steps

Step 1   Analyse (mapping and diagnosis) the variation/ differences in knowledge, skills and technology in the separate processes in the value chain

In this first step the different uses and users of the current technologies in the value chain will be mapped. For each process in the value chain the levels of knowledge and technology being used is mapped for the different users, focusing especially on poor and non-poor users.

For each process that is identified in the mapping exercise, a matrix should be made that shows the position of the process in terms of poor and non-poor users. Table 17 gives an example of the type of matrix that could be constructed.

Table 17: Example of knowledge and technology matrix - cassava production and processing

Production			Processing		
	Knowledge	*Technology*		*Knowledge*	*Technology*
Poor	Indigenous knowledge on upland growing conditions	Local varieties	Poor	Indigenous knowledge on chip making and drying	Open air drying and home storage in bags
Non-poor	Upgraded knowledge from extension training	Hybrid varieties from China	Non-poor	Knowledge from formal studies	High tech starch processing

Source: (ADB 2005)

To determine the types of knowledge, technologies and skills used by actors at different levels of the value chain, it is important to both observe the types of technology, and to ask questions that are designed to gather useful information about knowledge levels and the appropriateness of technology being used. Table 18 gives examples of questions that could

be asked to value chain actors, and the types of information that could be determined from asking those questions. The questionnaire will have to be adapted to the local context and/or research question. The (non-) homogeneous application of knowledge, skills and technology should be taken into account especially when dealing with smallholder producers and systems of collective action.

Table 18: Examples of questions that can be asked to the different actors in the value chain

Question	Details to look for
What is the technology you are using to produce your output?	Get a clear description of the technology used. Primary production: - Varieties in use - Inputs - Tools / machinery - Post harvest treatment / storage Processing: - Home based drying - Small scale factory - Large enterprises Transport: - Foot / horseback - Motorbikes / bicycles - Cars / trucks Packaging / labelling: - Bulk (more than 10 kg) - Bags - Packs - Other
Where did you learn about this technology?	Is the knowledge on the technology passed - From generation to generation - From other people in the neighbourhood - By extension (or other) services - Through the media (radio / TV) - Through formal education (yourself or family members)
When did you start using this technology?	Date that the technology was first introduced and the modifications that have taken place
Who paid for the initial cost of the technology?	- Paid by the user - Introduced with outside subsidy (for instance an extension model) - Introduced as part of a business deal (free training with a seed purchase)
What investments (capital, labour, land) have you made in the technology and knowledge?	Capital Investments: - Initial amounts - Maintenance / modifications - Cost to operate the technology Labour - Amount of time needed to operate the technology Land - Amount of space required for the technology
For what purpose can the technology be used?	Can the technology be used for other purposes? **Examples:** Cassava can be used to feed the own animals or sell to the starch factory. A longan drying oven can also be used in other seasons to dry mushrooms.

Step 2   Determine and describe standards along the chain (both in terms of market demand and supply)

In this step the different commercial standards (qualities and grades), as mentioned and used by actors along the chain, will be identified and described. The example provided in Table 19 can be adapted for number of grades, as well as key features, according to the official description of standards (official standards as described in laws and regulations, or in commercial standards as an accepted standard among chain actors); see Box 17 to Box 20.

Table 19: Product standards table with specified visible key features and grades

Key Features	Grade A	Grade B	Grade C	Grade ......
Shape				
Colour				
Smell / Taste				
Freshness				
% Impurities				

Take Note

If there are no formal, clear standards with specified grades these need to be developed with relevant actors. Key features should be as specific as possible so they can be understood by all and are not open to multiple interpretations.

3

Box 17: Norm table developed for dried longan in North Vietnam

Key Features Visual	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Shape	Round and regular shape	Quite round shape	Round-flat, irregular shape	Half-flat, very irregular shape	Flat shape
Colour	Bright yellow colour	Yellow-orange colour	Orange-caramel colour	Caramel colour	Caramel to black colour
Dryness	Very dry	Very dry	Not very dry, "elastic" texture	"Elastic", sticky texture	"Elastic" texture
Smell & taste	Sweet smell and taste	Sweet smell and taste	Quite sweet smell and taste	Little sweet, caramel and coal smell and taste	"Burnt" and coal smell and taste
Level of impurities	No impurities < 10%	Very few impurities 10 - 20%	Some impurities 20 – 30%	Impurities 30 – 40%	A lot of impurities >40%

Source: (ITTPC and SNV 2006)

Box 18: Official grading tables for certain Indian cashew types

Grade Designation	Trade Name	Colour Characteristics	Count 454 gms size description	Maximum Moisture %	Broken Max %	NLSG NLG Max %
SWP	Small white pieces	White/pale ivory or light ash	Broken kernels smaller than those described on LWP but not passing through 6 mesh 20 SWG sieve/2.80mm I.S Sieve	5	Nil	5 (BB &SSP Together)
BB	Baby Bits	Do	Plemules & broken kernels smaller than those described as SWP but not passing through a 10 mesh 24 SWG Sieve/1.70 mm I.S.Sieve	5	Nil	1% (Cashew Powder)
SPS	Scorched Pieces Second	Kernels may be over scorched, immature, shriveled (Pirival), speckled (Karaniram), discoloured and light blue	Kernels broken Into pieces but Not passing through a 4 mesh 16 SWG sieve/4.75 mm I.S. Sieve.	5	Nil	7.5 (DP & DSP together)
DP	Dessert Pieces	Kernels may be deep scorched, deep brown, deep blue, speckled, discoloured & black spotted.	Kernels broken into piecesbut not passing through a 4 mesh 16 SWG sieve/4.75 mm I.S.Sieve	5	Nil	7.5 (DSP)

Remarks: *Kernels shall be completely free from infestation, insert damage, mould, rancidity, adhering testa and objectionable extraneous matter.*

NLSG denotes: Next Lower Size Grade,   NLG denotes :Next Lower Grade

Source: http://www.cashewcorporation.com/spec.htm

Box 19: Quality criteria for green leaf vegetables along a value chain in North Vietnam

Quality criteria in Vietnam vegetable chains
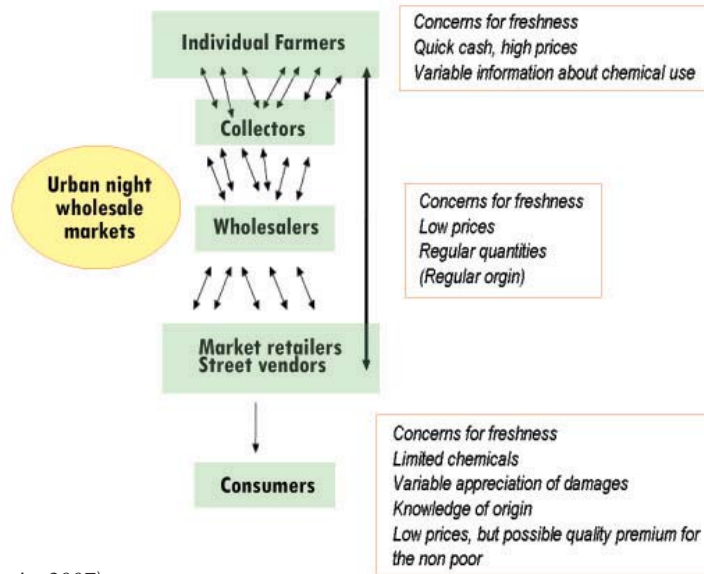
Source: (Moustier 2007)

Box 20: Quality criteria along a pig value chain in North Vietnam

3

Quality criteria in pig commodity chains
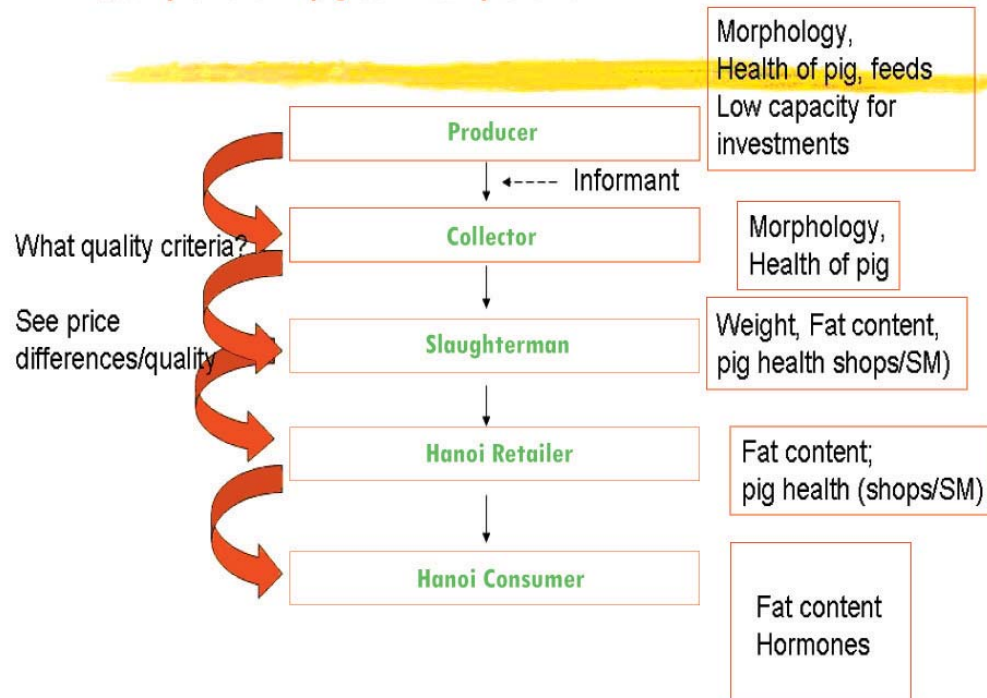
Source: (Le Goulven, Boutonnet et al. 1999; Binh 2002; Figuié 2004)

Step 3   Identify distinct market chains based on applied knowledge, skills and technology and product grade levels achieved.

In this step the analysis continues by analysing the different results and outputs from different technologies and knowledge levels.

In many value chains there are distinct market channels, often with regard to value and end-consumers using the products. By analysing these different channels and the technology and knowledge used in these channels it is possible to get a clear picture of the activities the poor are involved in, and an assessment can be made what their best options are if they would like to upgrade technology.

> ### Take Note
>
> During the analysis, it is helpful to support investigations with photo materials, especially to show different technologies that are being used.

For each market channel that is identified in the mapping exercise, a matrix should be made that shows the position of the process in terms of poor and non-poor users, the type of technology used and the type of output. Table 20 gives an example of the type of matrix that could be constructed.

Table 20: Matrix for market channel analysis of poultry

	Market Channel	Technology Used	Type of Output
Poor	Local market / Self consumption	Home yard growing	Eggs Live chickens
Medium	District / Provincial markets	Open shed farming for 50-150 animals	Eggs Live chickens
Non-poor	Supermarkets	Industrial chicken production and processing	Eggs Pre-processed frozen chicken

It is important to analyse which technology is used in each market channel but also to analyse from the consumer towards the producers to understand customer demand and to translate that into the correct use of technology. In Box 21 on Longan processing an example is given of how technology was developed to be able to go from low quality processing to medium quality processing for a different market channel in which different margins can be earned.

> ### Box 21: An example of technology development – Longan drying technology development
>
> In Son La province, North-West Vietnam, farmers are growing Longan (a tropical fresh fruit). Most of the fruit is processed into dried Longan. This is partly due to the fact that there is an oversupply of fresh fruit in the season combined with infrastructure constraints to transport the fresh fruit directly to the end consumers.
>
> Present technology was deemed to produce an inappropriate quality of output in the eyes of end consumers. An analysis of technology in use demonstrated that there were a number of weaknesses that caused the poor quality. These were related to temperature control, hygiene and energy inefficiency.
>
> The department of agriculture had introduced new technology which was not adopted by small scale processors in the value chain because of high cost for the technology, complexity of the technology and the high running cost (energy input) of the technology.
>
> Development of new technology, suitable to the investment levels of local processors and technologically appropriate, was facilitated by an outside development organisation. An analysis was done with potential investors (processors) to determine the financial limitations. Based on this information a new design was constructed and tested with a local training institute for demonstration and dissemination purposes.
>
> *Source: (ITTPC and SNV 2006)*

3

Step 4 Identify opportunities for upgrading knowledge, skills and technology for improving market chains.

In the fourth step of the analysis the possible upgrading solutions - and why they are not being applied - will be analysed. In other words, what are the limitations of these options, especially for the poor, to be put into practice?

Terminology: Upgrading

Process upgrading. Process upgrading refers to the efficiency of production. Can costs be reduced? Can speed of delivery be increased? For example, can a farmer reduce the use of fertilisers while maintaining the same production levels? Or can a transporter use stronger boxes to reduce losses?

Product upgrading. Product upgrading refers to the introduction of new products or improving old products. For instance can a processor use a better drying oven to produce higher quality dried longan? Or can a tea processor introduce small tea bags instead of 1 kg loose tea boxes?

Functional upgrading. Functional upgrading refers to the basic question of which activities the actor in the chain should concentrate on. Should a farmer be both producer, processor and transporter or can concentration on one or two steps add more value? Can outsourcing of other activities improve added value? For example, can a group of small farmers bring their pigs together to the market in one small truck or should they all travel individually with the pigs on the back of their motorbikes?

In the search for upgrading possibilities it is important to look at the effect of the upgrade on the whole value chain. For example, the introduction of a new variety for the producer can mean that the processor also has to change technology or that different requirements have to be placed on transport.

In order to improve the performance of the whole value chain it is important to determine the most effective level in the value chain to upgrade. If upgrading should take place at more than one place in the value chain it is important to look where this will have the best impact for the poor.

Construct a matrix as shown in Table 21. For each level of the value chain identify potential product, process and functional upgrading possibilities. It may not be possible to identify all three types of upgrading strategy for each level of the chain. If no possibility can be identified, leave that cell blank.

The choice for upgrading possibilities can also be influenced by external factors such as availability of labour (permanent of seasonal). In the analysis these elements should be well looked at.

Table 21: Example – upgrading possibilities matrix for Longan

	Producer	**Processor**	**Trader**	**Wholesaler**	**Retailer**
Product		Better drying oven			Display shelving
Process	Increased fertilizer use		Use crates for transportation	Maintain low humidity in storage sheds	
Functional	Small scale drying facilities	Integrate processing and trading	Integrate trading and wholesaling		

Box 22: An example of factors influencing upgrading possibilities in the cassava value chain

The production of dry chip rather than fresh cassava can be considered a form of upgrading. Dry chips have four major advantages: (i) creates more employment and adds value for cassava producers; (ii) farmers can keep dry chip as savings and speculate for higher prices; (iii) dry chip can be used as animal feed, giving more choices to farmers against market risk; (iv) the dry chip is lighter, which reduces transportation cost. The production of dry chips does not require a big capital investment (a basic dry-chip processing technology costs about 400,000-500,000 VND). This is an affordable investment also for poor farmers.

The opportunities that are there depend largely on the characteristics of cassava buyers. North and Central Vietnam are characterised by a scarcely diversified cassava processing sector, with buyers engaged in starch processing enterprises. This type of processing requires the utilisation of fresh cassava roots, and thus the potential for utilisation of dry chips is limited.

In contrast dry chips are favoured by buyers engaged in animal feed processing. In the South of Vietnam where important animal feed processing factories operate, market opportunities for dry chips are therefore much higher.

However, farmers are willing to participate in dry chip production only if the volume of cassava output is high enough to have a surplus beyond their own needs, as dry chips are produced for the purpose of animal feed, and cannot be eaten. Furthermore, the production of dry chips is associated with a high labour requirement. For these reasons the poorest or small holding farmers, which have limited land and cassava output and overall cash shortage, prefer to sell fresh cassava roots.

Source: (ADB 2005)

3

Step 5   Analyse which options are within reach of the poor (in terms of knowledge level, investment, use)

In this step of the analysis the focus changes to which of the upgrading options are within reach of the poor. There are many aspects to consider when deciding if an upgrading option is within reach of the poor.

Table 22: Example of different technology options available relative to investment levels

	Tomato on raised beds	**Covere beds with simple irrigation**	**Green-house**
Short description	Open cultivation system on raised beds for water management	Beds covered with simple plastic tunnels and continuous water availability	Permanent green-house system with water and climate control
Advantages	Easy to construct Cheap	Better climate control inside the tunnel Easier to keep insects out Lower maintenance	Good climate control possible for all year production Good hygiene Low maintenance
Disadvantages Costs	High maintenance (labour) Not easy to keep insects out Only labour days	Relatively high investment costs Medium cash cost	High investment costs High cash cost

Some of the important aspects to consider in this step of the analysis are summarised in Table 23.

Table 23: Important issues to consider when selecting the best potential upgrading options for the poor.

Issue	Details to look for
Capacity to react to changes in demand (fashion)	Consumer demand is often changing. The success of a value chain is mostly determined by the capacity to react as quickly as possible to these changes. Upgraded technology should ideally have the capacity to deal with this without making a lot of extra changes or investments.
Bottleneck analysis to determine at what level to invest	In order to improve the performance of the whole value chain it is important to analyse the most efficient and effective level in the chain to upgrade. Especially if more than one place in the value chain is being upgraded, it is important to look where this will have best impact on the poor.
Prioritise options	Based on the bottleneck analysis a prioritisation should be made for which level in the chain the first interventions should take place to upgrade the whole chain and to have a direct impact on the poor.
Incentives that stimulate investments in knowledge technology / lack of incentives and barriers that limit the poor from upgrading	In poverty situations there is often a lack of technology and knowledge development and thus also in subsequent upgrading of the value chain. It is important to analyse what the incentives or lack of incentives for investment are. - Why do people invest in new technology? Or - Why do people not invest in new technology? - Why do people gather new knowledge? Or - Why do people not look for new knowledge? Are there factors that hinder the poor from investing in technology of knowledge?
Role of local institutes / organisations in R&D and innovation	An often seen, limitation to technology upgrading is the "distance of the researchers to the local situation." Technologies developed in location A do not suit to the circumstances in location B. In the analysis it is necessary to look at: - What local institutions / organisations are there which are involved in R&D and innovation? - What have been their past contributions to technology development? - Can they play a role in the current value chain upgrading?
Policy environment for pro-poor technology development	What are the policies for technology development and value chain upgrading in place? (R&D, dissemination, credit & investment). Do these policies favour pro-poor technology development? Are people aware of these policies?
Information flows	Trickle down of R&D information & bottom up flows of indigenous knowledge
Dissemination	Low-tech feasible technology can disseminate itself based on reputation - expensive promotion campaigns are often not necessary.

Take Note

Innovations in knowledge and technology often come from external service providers (public or private). In many agricultural value chains the lack of these service providers causes a large bottleneck to the possibility of upgrading the chain. If present, these service providers (e.g. extension, vocational training, knowledge providers) need to be carefully analysed as their presence alone is not enough. It is also necessary to analyse whether the poor have equal access to these service providers to improve their knowledge and technology and if the services offered are suitable to the capacity level of the poor.

Step 6   Analyse which services should be provided to assist the upgrading and who are the potential service providers

The following table provides an overview of services that might be needed to upgrade skills, knowledge or technology. In describing the services make sure to be as specific as possible about these services.

Take Note

Describe the type of the service first, without thinking about who can or should provide the service. This will come in the next phase of the analysis, working towards intervention strategies.

3

Table 24: Overview of potential services for upgrading

Skills	Knowledge	Technology
Technical skills upgrading training	Market information	Research & Development
Demonstrations	Group management	Improved technology practitioners
Exchange visits	Technical knowledge / specialisation	Visits to proven / failed technology improvements
Unified skills application	Standards and control	Contacts / networks to sellers
Entrepreneurial skills improvement	Chain actor networks	Access to investment financing

To identify who could be potential providers of the services, the following lead questions can be used:

- Who are current leaders, owners, manufacturers for the upgraded solutions?
- Who have provided services in the past and what was their impact?
- Who has an interest in the delivery or availability of the service?

- Who will provide the service?
- Who will pay the service?
- Who will check quality control of service provision as well as the impact?

Box 23: Possibilities for upgrading Thieu Thanh Ha Litchi value chains by combining local and scientific knowledge

Situation and Constraints:
- Lack of capital investment for production
- Limited scope of intensive production techniques and lax husbandry of litchi production
- Immature harvesting of fruit at harvest for quick cash flow reduces income
- Unstable and reducing market price for litchi
- Difficulties in drying, preservation and processing technologies
- Lack of market, technological and scientific information
- Small scale of production, processing and marketing leading to higher transaction costs

Opportunities for Upgrading:
- Develop extension mechanisms to expand Good Agricultural Practice (GAP) procedures for production and processing
- Support for new technology development in preservation equipment, long season varieties and extended ripening times
- Establishment of internal quality management systems and Protected Geographical Indicators
- Improve market information, identify stable market outlets
- Strengthening Producer Associations

Source: (Anh and Minh 2007)

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5. What Should be Known after Analysis is Complete

After having followed all the steps related to skills, knowledge and technology, the position of actors involved in the chain with regard to upgrading should be clear, and a set of upgrading strategies with positive impacts on the poor can be designed. The role of embedded or external service providers in this process is often very important and should not be overlooked.

4

PART 4 - VALUE CHAIN ANALYSIS TOOLS

QUANTITATIVE TOOLS

Tool 6 – Analysing Costs and Margins

Contents

Tool 6 – Analysing Costs and Margins

1. Introduction

Before deciding to enter a new market or business a person must first determine which business is the most profitable for them. This is particularly important for poor people who have limited resources and so cannot afford to choose the wrong market or sector.

Revenues, costs and margins of value chains should therefore be compared (both different marketing channels and different product chains), but also the potential for scaling up and the required investments should be investigated.

After the value chain has been mapped the next step is to study certain aspects of a value chain in depth. There is a wide choice of aspects that can be further elaborated upon. One of these is costs and margins. The **cost** is the money that an actor in the value chain contributes, while the **margin** is the money that an actor in the value chain receives, minus the costs.

Analysis of costs and margins enables the researcher to determine how "pro-poor" a value chain really is. **Actual costs and margins** should be considered when a researcher aims to find out whether a value chain is a good source of income for the poor and whether a value chain is accessible for the poor. **Historic costs and margins**, on the other hand, enable a researcher to find out what the financial trends have been in the value chain and whether the chain has potential to grow in the future.

> ### Take Note
>
> There are two types of growth. The first is economic growth. This type of growth potentially results in higher absolute incomes for all actors in a value chain. The second type is called pro-poor growth. This type of growth generates **relatively greater improvements in income and wealth for the poor**. Hence in a pro-poor value chain intervention, growth benefits the poor relatively more than it does other actors in the value chain.

2. Objectives

Knowledge of costs and margins of actors in a value chain enables a researcher to understand:

1. **Costs of entry:** identify how operating and investment costs are currently distributed over the actors in the value chain in order to conclude whether it is possible for the poor to enter the chain: if operating costs or investment costs for starting up a business are high it may be a problem for the poor to join the value chain

2. **Distribution of costs and margins:** identify how revenues and margins are currently distributed over the actors in the value chain in order to conclude whether actors and particularly the poor can increase margins in a value chain. In other words, is it possible to upgrade the position of the poor in the chain by making the chain more efficient (decrease costs) and effective (increase value)?

3. **Change in costs and margins:** see how costs and margins in a chain are changing over time in order to predict future growth or decline of the chain. As some costs increase or decrease (e.g. petrol costs), so will margins decrease or increase. Therefore, a sector that might seem to be profitable now is not necessarily profitable next year

4. **Value chain comparison:** compare profits of one chain with profits in another chain to see if it would be worthwhile to change chains

5. **Performance benchmarking:** compare the practice in the selected value chain to an industry standard or a best practice in order to improve the effectiveness and efficiency of the selected chain. In other words, try to find out why a value chain in area A is less profitable than the same chain in area B and draw lessons from it. If there is time the success factors of value chains in other sectors could also be studied. This process is called benchmarking

Take Note

The main goal of studying costs and margins is to increase the margin per product unit. However, this does not always reduce poverty: if a poor farmer increases their profit margin per unit, but sells fewer products, then the absolute income may decrease. Therefore, researchers should always combine cost and margin analysis with analysis of total revenues or income per actor. More information on income is presented in Tool 7 - Analysing Income Distribution.

3. Key Questions

The key questions that need to be answered by the researcher in order to achieve this section's objectives are:

1. What are each actor's costs (both fixed and variable costs) and what are the required investments for entering a value chain?

2. What are each actor's revenues in the value chain? In other words, what are each actor's sales volumes and selling prices?

3. What are each actor's net profit, margins and break-even point?

4. How are investments, costs, revenues, profits and margins changing over time?

5. How are investments, costs, revenues, profits and margins divided between the actors in the value chain?

6. Are the costs and margins of this value chain lower or higher compared to other product value chains? In other words, what are the opportunity costs of employing production resources for this particular value chain?

7. Are the costs and margins of this value chain lower or higher compared to similar value chains in other places?

8. What are underlying causes of the division of costs and margins in a value chain?

4. Steps

Step 1   Opportunity costs or financial costs?

Cost and margin analysis of a value chain is only useful if producers (farmers or whomever) are treated as micro-entrepreneurs (i.e. small commercial actors seeking the most profitable use of their limited resources in the marketplace) rather than as subsistence actors.

In order to use this type of analysis effectively, it must be recognised that there are important differences between the way economics and accounting treat costs that should guide both analysis and decision-making in pro-poor value chain development.

Economists tend to look at **opportunity costs**, which are the costs of employing production resources (labour, capital, land) in a particular way, rather than pursuing alternative business options. Opportunity costs are useful in evaluating what alternative uses of resources could generate the most income and wealth for producers.

Accountants tend to consider **financial costs**, the monetary expenditures that an actor in the chain incurs in carrying out an activity, and which are usually found in any accounts (formal) or records (informal) being kept by the actor. Financial costs usually do not consider the alternative uses for resources.

Many farmers, if asked why they shifted from one crop to another in a given season, will report that they thought that they could make more money. They are thinking about the relative attractiveness of different options. They may or may not consider all of the costs involved. For example, the additional labour required for a new crop or the possibility of renting out land instead of growing on it. Good value chain analysis should try to reveal the real opportunity costs faced by farmers because these affect choices that producers will make about what to produce for a given season.

In order for value chain practitioners to reveal the real costs of participation in a value chain, cost calculations throughout the chain value chain should take into account opportunity costs for farmer and family labour, the use of land, and capital.

This means assigning a realistic estimated (imputed) value to the value chain participant's (and their family's) time, land, and capital that is dedicated to the activity. If these values are not assigned, analysis will unintentionally treat each of these as free resources, distorting the true picture of cost, profitability, and sustainability for value chain upgrading. This is particularly important when small producers hope to move towards more commercially-oriented participation in value chains. Guidelines for incorporating these values into cost calculations appear in the box below.

4

Terminology: Opportunity Cost

Opportunity cost for labour. The opportunity cost for labour is a measure of employing scarce labour resources in a chosen activity. For family labour this is generally equal to the cost incurred if a person is employed to do an activity normally carried out by a family member.

Alternatively, it is the income the family member would lose by not hiring himself out to carry out an activity on someone else's farm and instead doing the same activity on his own farm.

It is important to realise that there can be a seasonal variability in the opportunity cost of labour. In a rice production area the opportunity cost for a family member for weeding could be zero (or close to zero) if there is no alternative weeding activity for the farmer to be employed in because of a low labour demand on other farms. Conversely, at times of transplanting and harvesting, when there is a high labour demand and therefore the option of being employed in these activities on other farms, there can be a significant opportunity cost associated with labour.

Opportunity cost of land. The commonly used opportunity cost of land is the return on leasing the land to another producer (or for another use) instead of the farmer producing a crop on it themselves.

Opportunity cost of capital. The opportunity cost of capital is the interest rate that one would receive from a bank or microfinance institution (MFI) when one has an account with such an institution, or the interest that one would receive for lending to an individual.

Box 24: Opportunity cost of choosing different cropping systems

A good example is provided by Laotian farmers in Viengkham district, Luang Prabang province. Farmers in this area were used to monoculture and were cultivating rice only once a year. As the demand for other crops was growing farmers became interested in crop diversification and growing a second product. The farmers could choose between maize, soybeans or sesame. To make the right decision farmers had to consider how much money they would lose (the opportunity costs) by choosing one crop, for example maize, over the other two crops, in this case sesame or soybeans. To help the farmers a simple cost/benefit analysis was carried out. The conclusion was that on average farmers would get the highest returns on soybeans (2.7 million Kip per ha) followed closely by sesame (2.6 million Kip per ha). For maize, the return was only 0.5 million Kip per ha.

One has to be careful though, not to jump to the conclusion that soybeans or sesame would therefore be the best choice for the farmers. For example, it should be noted that in the above analysis labour, mostly family labour, was not included, and it depends on the labour resources available to the farmer whether or not soybeans or sesame are really an option for him or her. Also to be considered is the deployment of other resources such as land use and capital. Is the land suitable for the production of soybeans or sesame (e.g. soil type, availability of water)? Does the farmer have the capital required to invest in the production of these crops? Only if such questions are also answered a recommendation on what would be the best alternative for the farmer can be formulated.

Source: (MPDLC 2005)

Warning

When various alternatives are compared, as in the above example of soybean vs. maize, and one of these shows the highest returns (i.e. soybean), it does not necessarily mean that soybean is the better alternative for a smallholder farmer. Soybean is less drought resistant than maize, so depending on rainfall patterns the farmer could be taking a higher, and possibly even unacceptable, risk by choosing to grow soybean rather than maize. All of the risks associated with each option should be clearly analysed before choosing new activities.

Step 2   Calculating costs and required investments

The second step is to identify what the costs of an actor's activities are. Often only the Operating Costs (Variable and Fixed) and Investment Costs are considered. However, other cost types such as transaction and regulatory costs, as shown in Table 25, should also be considered. Opportunity costs should be included among the appropriate fixed and variable costs; for example, when calculating labour, land, and capital costs.

Not all costs are easily categorised into fixed, variable or other costs, and there is not always a right or wrong category for costs. Assumptions should be made based on the real needs of value chain development, not based on abstract theories. Regardless of which choice is made, try to be consistent throughout the analysis.

Table 25: Examples of costs in a value chain

Operational Costs		Transaction Costs	Regulatory Costs		Investment Costs
Variable Costs	*Fixed Costs*		*Formal*	*Informal*	
• Costs of inventory sold • Wages related to production • Other direct production expenses including losses	• Salaries of non productive staff • Office supplies • Insurance • Legal and accounting fees • Travel • Utilities • Rent • Repairs and maintenance • Depreciation • Marketing expenses • Finance expenses (interest and bank charges)	• legal costs to have contracts checked by a lawyer • information costs for traders: costs incurred to obtain information on which commodities are available, where, and in which volumes, and from whom (trustworthiness) — telephone costs, time spent on driving around in rural areas on the motorcycle, etc • lack of grading standards resulting in increased risk of paying to high a price for the actual quality purchased	• business licensing • levies • grading (external to the value chain, e.g. legally imposed certification)	• grading (internal to value chain)	• Principal • Interest

4

Warning Accuracy of Data

It may not always be possible to obtain accurate figures on costs, for example production costs from farmers, because they may not keep accurate records.

Data may sometimes have to be calculated in an indirect way, e.g. by asking a trader how much time (hours/day, number of days) and funds (distances covered per day, means of transport) they spend collecting information and establishing contacts ('information costs') without actually performing any transactions.

In both cases it will be necessary to interview a large sample of a group of actors to obtain approximations of such costs. Even then, it may still be necessary to cross-check information collected this way with other sources of information, e.g. industry sources.

Care should be taken to gather further information where required. For example, a farmer may indicate that they spend 30 days on harvesting the crop, while further questioning would reveal that the actual time spent on harvesting on these days is from 06.00 to approximately 10.00 hours, or half days only. The actual number of labour days for harvesting is therefore only 15 days.

It is also important to realise that certain cost types may vary significantly throughout the year. This means that information collected at a certain point in time may not reflect the actual costs. For example, the costs for collecting the crop usually increase once the rains have started because shorter routes become impassable meaning that travel time to both collect and transport crops increase.

Operating costs can be divided in two cost types: variable costs and fixed costs:

A. **Variable costs**, or costs of goods sold, are costs that change in direct relationship to the level of production in a given production or sales cycle. Variable costs are the costs that are relevant to economic decision-making in the short run. Examples of variable costs in agriculture include fuel, fertiliser, seed, chemicals, animal feed, veterinary medicines, and water. More complex examples include the cost of extension staff employed by a company in accordance with the number of outgrowers that are contracted for in a given season, or the hiring of occasional labour for harvesting or planting.

In the case of cattle raising variable costs include, amongst others, food and vaccinations. If a farmer has ten cows and decides to raise two more cows he needs proportionally more food and vaccinations for the two new cows.

Take Note

Instead of simply adding the totals for each of the variable or fixed costs, it can be worthwhile to assign relevant cost types to different activities performed by the same actor. For example, the costs for per diems and fuel for extension officers employed by a company contracting smallholder farmers under an outgrower arrangement could be separated over (i) the recruitment and contracting of farmers; (ii) training activities in accordance with the production cycle (e.g. nursery management, land preparation and transplanting, field management, pest and disease control, harvesting, and post-harvest handling); and (iii) marketing of the produce. Another example is given below.

Delivery and processing of the milk produced by the cows could take place in two stages; for example, through one of a series of milk collection centres, from where the milk is transported to the central dairy plant for further processing. Various costs (variable and/ or fixed in this example) should be assigned to each of the milk collection centres or to the dairy plant to better understand how each of these cost centres is performing. When relating the actual expenditures with the amount and quality of milk leaving each of the milk collection centres it is possible to identify which of the milk collection centres are under-performing. It may then be possible to identify remedy the bottlenecks.

Table 26: A virtual example of costs for milk collection centres and dairy plant.

The costs are presented as percentages of the total cost for each expense.

	Vehicle O&M	Telephone & Postage	Utilities	Rental	Payroll	Office	Bank Charges	Equipment
Milk collection centre A	3%	5%	4%		10%	15%		15%
Milk collection centre B	2%	5%	3%		5%	10%		15%
Milk collection centre C	2%	5%	3%		5%	10%		15%
Dairy plant	93%	85%	90%	100%	80%	65%	100%	55%

Most variable costs are easy to calculate as they change with the same proportion as the output. However, there are some exceptions, for example transportation costs. These do not always change in proportion with the volume traded. A 25 ton truck can, for example, transport 25 tons of bamboo, but also 10 tons and, over short distances, even 40 tons. Transportation costs per ton of bamboo therefore vary depending on the total amount of bamboo that is transported. If real costs are not known a researcher needs to make assumptions on the average costs. The following example explains how to calculate transport costs.

Box 25: Example of calculating transport costs

Assume that there are 40 m3 of space available in a truck and that it costs USD 500 to hire the truck. A container of 0.2 m3 holds 8 kg of tomatoes and a container of 0.4 m3 holds 10 kg of green peppers.

Then the transport cost for tomatoes per container and per kg is ...

USD 500 ÷ (40 m3 ÷ 0.2 m3) = USD 2.50 per container

and

USD 2.50 ÷ 8 kg = USD 0.3125 per kg

While the transport cost for green peppers per container and per kg is ...

USD 500 ÷ (40 m3 ÷ 0.4 m3) = USD 5.00 per container

and

USD 5.00 ÷ 10 kg = USD 0.50 per kg

Source: (NESDB 2004)

Another cost that is often ignored is the cost of losses. Particularly if products are perishable, such as many fresh products, a certain amount of the traded products will usually be lost. The example in Box 26 below shows how losses should be calculated.

Box 26: Calculating costs on losses

Assume 10 % of the product is lost. This means that 1 kg of tomatoes purchased by the trader from the farmer results in 900 g (0.9 kg) available for sale to consumers. The trader buys tomatoes from the farmer at USD 5 per kg and marketing costs are USD 2 per kg. The selling price of tomatoes is USD 8 per kg.

The costs are
1 kg purchased at USD 5 per kg = USD 5.00
1 kg packed and transported at USD 2 per kg = USD 2.00
_____
Total Costs = USD 7.00

Sales Revenue USD 8 x 0.9 kg = USD 7.20
Thus the margin to the trader = USD 0.20

Below is an example of the more usual, and wrong, method of calculation.

1 kg purchased at USD 5 per kg = USD 5.00
1 kg packed and transported at USD 2 per kg = USD 2.00
10 percent losses or USD 5 x 0.1 = USD 0.50
_____
Total Costs = USD 7.50

Sales Revenue or USD 8 x 1 kg = 8.00
Thus the margin to the trader = USD 0.50

The second calculation is clearly wrong because here the trader is seen to be obtaining revenue from produce which has already been "lost".

Source: (NESDB 2004)

B. Fixed costs on the other hand are costs that are independent from the size of production.

In case of the cattle example, fixed costs are items such as investments in stables and land. Even though the farmer decides to raise two more cattle, there is usually no immediate need to buy additional land or build a new stable. Other fixed costs examples are depreciation (replacement) costs, capital costs (interest on long-term loans) and in more advanced businesses promotion costs, stationeries and office personnel (not related to the primary production process).

Take Note

As fixed costs do not change with the size of production there is a risk that certain costs are not acknowledged or reported by actors in a value chain. Also, certain costs apply to more than one product. For example, a cattle raiser may also raise pigs that are kept in the same stable. The costs for the stable should therefore be split between the cattle and the pigs. If not, the costs taken into account by the researchers may be too high, or too low.

Investment costs are explored through analysing a value chain actor's required capital for starting up his business. In formal accounting, investment costs are considered a type of fixed cost, but in pro-poor value chain development, they should be analysed as a key potential obstacle to entering and participating in a value chain.

In other words, what assets does an actor need to possess (through buying or renting) to be able to run his business? Finding this out is important in judging whether a value chain is accessible for the poor. For example, a food value chain may require high quality standardised products that cannot be produced manually. This means that expensive machines are required for entering this market, so even though a farmer produces the right raw material the market is not accessible. A complete picture of investment costs is also relevant for calculating depreciation costs.

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Take Note

Depreciation means the wearing out of capital goods, such as machines and equipment, which need to be replaced after a while. To be able to pay for replacements companies should save money. The costs of these are called depreciation costs. However, as depreciation costs are not expenses they decrease income but not cash money. Quite understandably poor farmers and micro enterprises usually do not calculate depreciation costs. They need all their income to survive.

Once all the different cost types have been calculated it is possible to present the figures in a table, which may have the format as presented in Table 27.

Table 27: An example of presenting cost compilation across actors in the value chain.

Cost Type	Actor 1	Actor 2	Actor 3	Actor 4
Operating Costs - Variable				
Operating Costs - Fixed				
Investment Costs				
Transaction Costs				
Regulatory Costs - Formal				
Regulatory Costs - Informal				
Total Costs				

Step 3   Calculating revenues per actor

After the costs per actor have been calculated, the revenues need to be identified. Revenues are calculated by multiplying the volume sold (Q) with the selling price (P) and, subsequently, by adding additional sources of income, such as revenues of selling the production waste of a product. Revenues = (Q * P) + other sources of income.

An example of this last source of income is in the bamboo sector, where leftovers are used for producing paper pulp or fuel.

Prices differ per marketing channel or per market segment and sometimes per grade or per quantity sold. Prices can also change over the season. Prices can even vary during one single day, like in many fresh vegetables markets. Therefore, surveys should include questions related to what the prices in different markets, for different products and during the different seasons, are. For calculating average prices, these should be weighted. An example of how to do this is provided in Box 27 below.

Box 27: An example of calculating the weighted average selling price.

Assume an example involving a consignment of 100 kg of tomatoes as follows ...
50 kg sold at USD 2.00 = USD 100
20 kg sold at USD 1.40 = USD 28
20 kg sold at USD 1.00 = USD 20
5 kg sold at USD 0.40   = USD 2
(5 kg which cannot be sold)
_____
Total Revenue   = USD 150

The average selling price per kg is
USD 2.00 + USD 1.40 + USD 1.00 + USD 0.40 + USD 0.00 = USD 0.96
while the weighted average selling price is
USD 150 ÷ 100 kg = USD 1.50

Source: (NESDB 2004)

The price a producer receives for his crop may vary according to the volume he has for sale. For example, a trader looking to buy 1 ton of a commodity would be willing to pay a better price if he can purchase it all from a single farmer. He will pay less if he has to purchase 100 kg of the same quality from ten different farmers as he will incur more costs in collecting, i.e. the trader has a higher transaction cost; see Table 25.

When studying a market over a longer period of time, for example over a ten year period, it is necessary to incorporate inflation and deflation rates. To do this, a base year, against which all prices are adapted, needs to be chosen. If this is too complicated a researcher should at least mention that there had been inflation or deflation in order to make a reader aware of the situation.

During interviews many different cost and price units might be used. For example, handicrafts producers sometimes refer to their production volume in pieces, sometimes in tons and sometimes in containers. This can particularly be confusing when the study is conducted by more than one person. It is important to either agree upon which unit of measurement is used, or to determine how many units fit into one container or ton.

Step 4   Calculating financial ratios

Now that the investments, variable, fixed and/or other relevant costs, and revenues are known the financial position of the value chain actors can be analysed. Several ratios can be looked at, such as:

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A. Net Income

Net income, or profit, is calculated by deducting total costs (both variable and fixed costs) from revenues.

Net income = revenues - variable costs - fixed costs

For example, in the hypothetical case of a shoe manufacturer who sells 10,000 pairs of shoes (Q) per month for 100,000 VND (P) per pair the revenues would be: 10,000 (P)* 100,000 (Q) = 1,000,000,000 VND. As the total costs for material, labour, rent, depreciation on the machines and tax are 800,000,000 VND per month his net income would be 200,000,000 VND per month.

B. Net Margin - Currency

Net margin: a margin on a product is the net income per product. This is calculated by dividing the net income of the manufacturer by the total number of products sold (Q).

Margin = Net income / Q

In the case of the shoes manufacturer the margin per product would be:

200,000,000 VND net income / 10,000 shoes= 20,000 VND per pair of shoes.

This is a simplified example and in reality there may be other costs. An example of a rice farmer's costs, revenues and margins is presented under Useful Examples - Example 3.

C. Net Profit Margin - Percentage

Net profit margin per unit is usually expressed as a percentage. In this case, net profit margin = unit profit/unit price.

For the shoe manufacturer:

20,000 VND / 100,000 VND = 0.20 or 20% net profit margin.

D. Break Even Point

The break-even point shows how much an actor has to sell before they start making profit. In other words, this is the point at which their revenues are starting to exceed their costs.

Break-even point = Fixed costs / (P-Variable Costs) = the number of units

For example, assume:

- Total fixed costs of the shoe manufacturer = 500,000,000 VND per month
- 1 pair of shoes is sold for 100,000 VND (P)
- Variable costs per pair of shoes = 60,000 VND

To calculate the break-even point:

500,000,000 /(100,000-60,000) = 12,500 units (pairs of shoes)

E: Return on Investment

Calculating the return on investment (ROI) for each actor in the value chain shows how attractive the activity is relative to other potential uses of capital.

ROI= Net Income/ Total Cost

For example, the shoe manufacturer's net income is 200,000,000 VND per month, and his total costs, including material, labour, rent, depreciation on the machines and tax are 800,000,000 VND per month. ROI would, then, be 200,000,000 VND /800,000,000 VND, or 25% for that period.

Basic ROI calculations can be correctly performed only if, as in example A, realistic depreciation of fixed assets is calculated, and if producers' own labour costs are counted among variable costs of production. If an enterprise's total capital costs are attributed to a single year's production, more capital intensive activities will look much less profitable, while if "imputed" labour costs are omitted from the calculation of variable costs, ROI from labour intensive activities will appear to be much higher.

Step 5   Changes over time

All the above aspects should be considered over time. What may look like a valuable value chain today may be invaluable next year. In other words, a researcher should study the trends of a value chain and consider the implications of these trends for the future. For example, to date Vietnamese traders who trade on a small scale have small margins on the products they sell. Over the past few years the cost for petrol has increased significantly and margins of small-scale traders have been decreasing. This means that small-scale traders need to either increase the scale of their business or find another source of income.

Another example can be taken from the commodity product market. Usually, when a country develops and people earn higher incomes, the demand for and hence revenues from commodity products, such as rice and maize, increase rapidly. As a consequence many farmers start growing these products and existing farmers intensify their production. The demand however only grows up to the point that people have sufficient food because people can only eat a certain amount of rice and maize. After that point, when supply exceeds demand, prices and hence revenues go down, and farmers may need to diversify their production.

Step 6   Relative financial position of actors in the value chain

In this step the division of investments, costs, revenues, net income (or profit) and margins among the actors in a value chain are considered. The aim of this step is make conclusions about the financial position of an actor compared with other actors in the chain.

There are several ways to present the financial position of actors in a value chain, for instance in a table or through a diagram.

In Table 28 and Table 29 an example of how to calculate the value added margins and profits along a chain is given. Table 28 gives the formulas used to do the calculation and Table 29 provides a worked example. The calculations appear difficult, but are easily implemented in an Excel Worksheet.

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Table 28:   Calculation of marketing margins – formulas for calculating ratios

Value Chain Actor	Costs			Revenues	Profits			Margins	
	Unit Total Cost	Added Unit Cost*	% Added Cost	Unit Price	Unit Profit	% Total Profits		Unit Margin	Unit Margin
Farmers	A	-	A/F	G	G-A	(G-A)/(K-F)		G	G
Assemblers	G	B	B/F	H	H-B-G	(H-B-G)/(K-F)		H-G	H-G
Processors	H+C	C	C/F	I	I-C-H	(I-C-H)/(K-F)		I-H	I-H
Traders	I+D	D	D/F	J	J-D-I	(J-D-I)/(K-F)		J-I	J-I
Retailers	J+E	E	E/F	K	K-E-J	(K-E-J)/(K-F)		K-J	K-J
Total		F=A+B+C+D+E	100		K-F	100		K	K

*Added unit costs refer to the added costs at each stage of production net of the procurement cost from the previous stage.

Table 29: Calculation of marketing margins - example of presenting a calculation of value chain margins

Chain Actor	Costs				Profits		Margins	
	Unit Total Cost	*Added Unit Cost*	*% Added Cost*	*Unit Price*	*Unit Profit*	*% Total Profits*	*Unit Margin*	*% Retail Price*
Farmer	20,000	20,000	29%	25,000	5,000	9%	25,000	20%
Assembler	32,100	7,100	10%	37,500	5,400	10%	12,500	10%
Trader	39,185	1,685	2%	50,000	10,815	19%	12,500	10%
Processor/ Retailer	89,873	39,873	58%	125,000	35,127	62%	75,000	60%
Total		**68,658**	**100%**		**56,342**	**100%**	**125,000**	**100%**

Source: (NESDB 2004)

The diagrammatic presentation of the value chain margins is shown in Figure 16 below.

Figure 16: Value chain margins for the actors in each level of the value chain as a percentage of the overall value added
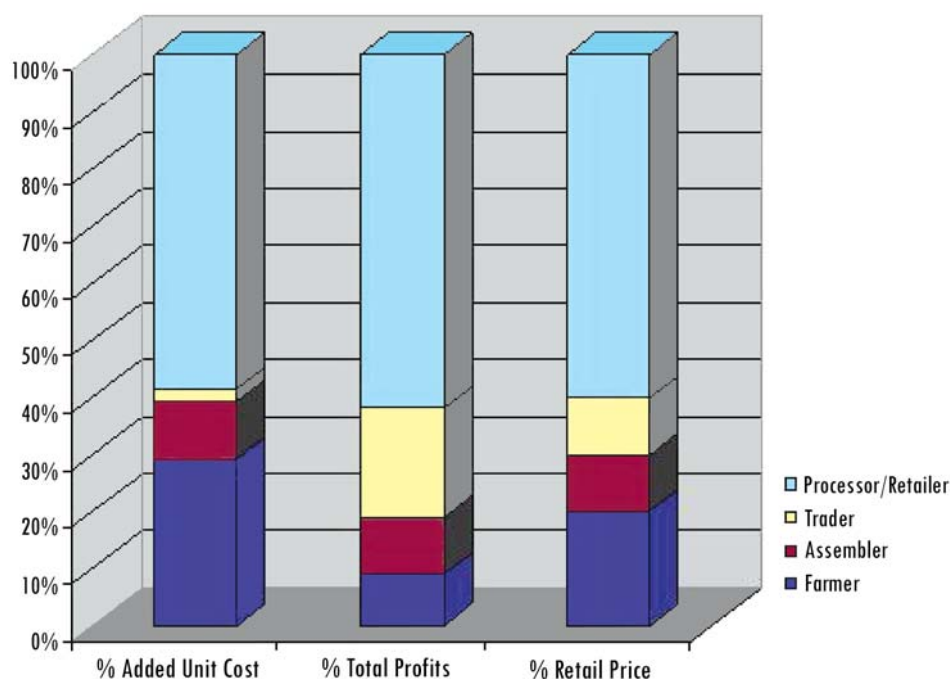
Source: (NESDB 2004)

A visual way to show the division of costs and margins is to include the cost and margin data in the value chain map; see Box 28. A similar map can be also drawn up for presenting the investments per actor.

Box 28: Revenues, costs and profit per unit in the value chain of 1 litre fish sauce (quality 2)

Input Supply	Production		Trade	Retail	Consumption

	Input Supply	Production	Trade		Retail	Consumption
Sale Price		5.025 VND	5,728 VND	10,000-12,000 VND	11,000 VND	12,000-14,000 VND
Cost		4,250 VND				
Profit		775 VND				
% Profit		18%				
% Added Costs		40%				

Fisherman	Semi processor	Processor	Trader	Retailer
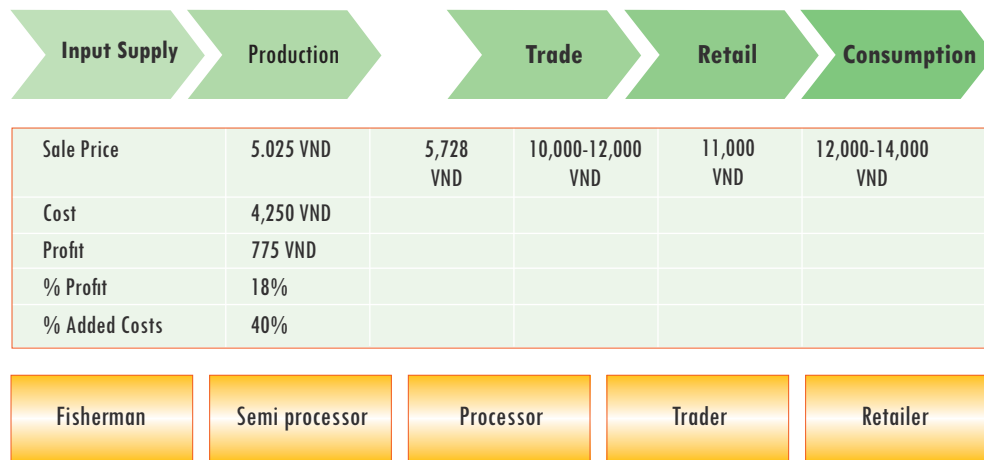
Source: (Boomsma 2006)

After data have been presented a researcher can start the analysis. In Figure 16, for example, it may be evident that the farmer incurs high costs and has little profits, while the trader has little costs and relatively high profits. This suggests that costs and margins are shared unequally in the value chain and could be an intervention point for a project. One such intervention might be scaling up the business of an actor in a chain in order to make the business more attractive for the actor. A good example comes from the bamboo sector in Vietnam. Currently most bamboo growers sell whole bamboo culms to paper, chopsticks and bamboo flooring enterprises. These enterprises cut the bamboo culms and subsequently only use part of the culms for processing. Leftovers are usually used as waste or in some cases as fuel. If farmers were to cut the trees themselves and sell only the relevant parts to each buyer, they could receive higher profit margins.

Take Note: Carefully consider TOTAL costs and revenues

Presenting the total costs, revenues and profits per actor per year (instead of simply presenting cost per unit) shows the scale of an actor's business. This is important because if only the profit per unit is considered an actor might appear to have an unfair share as they make only a small profit per unit. However, looking at the actor's total profit per year may demonstrate that the actor actually earns a reasonable income. This is often the case with commodity products, such as corn. Commodities often have low profit margins per unit, but because they are sold in large quantities the total profit per year can still be financially attractive.

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Step 7   Benchmarking

Comparing similar value chains in different regions will provide information on the potential for efficiency gains. For instance, rice farmers in Northern Vietnam spend 1 million VND on inputs per ha, while their counterparts in the central highlands only spend 500,000 VND per ha. This could mean that prices for inputs are different (which would provide an opportunity for market entrants) or that farmers in Northern Vietnam use too many inputs. A situation like this provides an opportunity for the farmers to learn from each other's production techniques, although it is important to ensure that all units are the same before making comparisons.

Step 8   Going beyond the quantitative data

The final step in the costs and margins section is to go beyond the quantitative data and explore why certain actors in the chain have higher margins and lower costs than others. Is this the result of one actor investing more in a value chain than another actor? Is it the result of an unequal power distribution between actors (see Tool 3 - Governance: Coordination, Regulation and Control)? Does one actor have better access to market information because he or she has better linkages to the market than another actor?

5. What Should be Known after Analysis is Complete

Having followed all of the steps related to costs and margins the financial situation of actors involved in the value chain should be clear and strengths and weaknesses related to costs and margins of an actor and / or a value chain can be summarised. After that the constraints and needs of a value chain can be identified and interventions can be designed.

Useful Examples

Example 3: Cotton crop budgets for smallholder farmers in Zambia

The rain-fed smallholder cotton sector in Zambia had several years of stagnant yields of 600 kg/ha or below which was often attributed to a lack of fertilisers. A private sector company aimed to increase cotton yields of their contracted smallholder outgrowers through rolling out an extension programme focussing on the five key basic principles of cotton crop husbandry: early land preparation, early planting, thinning and gap filling to obtain an optimum plant stand, timely weeding, and an integrated pest management (IPM) approach to pest and disease control.

Without the use of fertilisers, and with the same amount of labour input, yields were greatly improved. As shown in the table below, non-collaborating farmers (NCF) achieved yields of 537 kg/ha on average, while collaborating farmers (CF) under the programme achieved yields of 902 kg/ha on average. Lead farmers (LF), who were more actively and directly supported by extension staff employed by the private sector company as intermediaries to reach the large numbers of collaborating farmers, achieved yields of 1,281 kg/ha. On closely monitored farmer-managed demonstration plots average yields of 1,892 kg/ha were achieved, showing the further potential for increased yields.

With 50,000 farmers benefiting from the programme in the first two years, and assuming an average yield increase of 400 kg/ha at USD 0.35/kg, the total benefits accruing to the farmers amounts to USD 7,000,000 per annum, against an investment in the programme of under USD 2,000,000.

Table 30: Cotton crop budgets for smallholder farmers in Zambia

Inputs/Activity	Manual labour				Animal draught power			
	Family labour (man days)		Family (man days) / Hired (ZMK)		Own ox-span Family/Hired labour		Hired ox-span Family/Hired labour	
Seed 15 kg (treated)		36,000		36,000		36,000		36,000
Spear (aphicide) - 100 ml		15,000		15,000		15,000		15,000
Ha pack of chemicals (standard)		115,000		115,000		115,000		115,000
Jacto knapsack sprayer (240,000/6 years)		40,000		40,000		40,000		40,000
Credit Cost		Inclusive		Inclusive		Inclusive		Inclusive
Subtotal	0	206,000	0	206,000	0	206,000	0	206,000
Land preparation	24		1	100,000	1	Ploughing	1	100,000
Planting	12		1	50,000	1	50,000	1	50,000
Gap filling	4		1	15,000	1	15,000	1	15,000
Thinning	4		1	15,000	1	15,000	1	15,000
Weeding 1	24		1	100,000	1	100,000	1	100,000
Weeding 2	16		1	50,000	1	Cultivator	1	80,000
Weeding 3 (4th weeding if necessary only)	16		1	50,000	1	Cultivator	1	80,000
Scouting	2		2		2		2	
Pesticide applications	3		3		3		3	
Harvesting - 1st picking (approx. 450 kg)	15		2	90,000	2	90,000	2	90,000
Harvesting - 2nd picking (approx. 90 kg)	3		1	18,000	1	18,000	1	18,000
Subtotal	123	0	15	488,000	15	288,000	15	548,000
Total man days/cost	123	206,000	15	694,000	15	494,000	15	754,000
NCF Yield 537 kg/ha @ ZMK 1,120		601,440		601,440		601,440		601,440
Profit		395,440		-92,560		107,440		-152,560
Return on Family Labour (ZMK/day)		3,215		-6,170		7,160		-10,170
CF Yield 902 kg/ha @ ZMK 1,120		1,010,240		1,010,240		1,010,240		1,010,240
Additional man days/cost harvesting (+ 365 kg)	12		2	72,000	2	72,000	2	72,000
Total man days/cost	135	206,000	17	766,000	17	566,000	17	826,000
Profit		804,240		244,240		444,240		184,240
Return on family labour (ZMK/day)		5,957		14,367		26,132		10,838
LF Yield 1,281 kg/ha @ ZMK 1,120		1,434,720		1,434,720		1,434,720		1,434,720
Additional man days/cost harvesting (+ 744 kg)	25		4	150,000	4	150,000	4	150,000
Total man days/cost	148	206,000	19	844,000	19	644,000	19	904,000
Profit		1,228,720		590,720		790,720		530,720
Return on family labour (ZMK/day)		8,302		31,091		41,617		27,933
Demo Yield 1,892 kg/ha @ ZMK 1,120		2,119,040		2,119,040		2,119,040		2,119,040
Additional man days/cost harvesting (+1,355 kg)	45		6	270,000	6	270,000	6	270,000
Total man days/cost	168	206,000	21	964,000	21	764,000	21	1,024,000
Profit		1,913,040		1,155,040		1,355,040		1,095,040
Return on family labour (ZMK/day)		11,387		55,002		64,526		52,145

Source: (van Gent 2007)

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Example 4: Costs, revenues and margins for rice farming

Similar to the cotton story, rice production and yields can be improved with the application of improved practices. An analysis of rice yields and practices in the Mekong Delta of Vietnam shows that farmers can increase yields and reduce costs significantly. With only a modest increase in yield (100 VND/kg) and a slightly improved quality (resulting in an increased farm gate price), the main improvements come from a reduction in costs by more optimal use of seed, fertilizer and pesticides. Farmer profits go from 0.74% up to 18.89% with just some slight changes in farming practices.

Table 31: Costs, revenues and margins for rice farming

Input		Units	Summer-Autumn Crop - IR64, Can Tho Province, 2001					
			Farmer Practice			*Improved Practice*		
			Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
Seed		Kg	200	2,000	400,000	100	2,000	200,000
Fertiliser	Urea	Kg	150	2,200	330,000	100	2,200	220,000
	DAP	Kg	100	3,000	300,000	100	3,000	300,000
	Phosphorous	Kg	50	2,300	115,000	50	2,300	115,000
Insecticide		VND	1	350,000	350,000	1	200,000	200,000
Fuel	Diesel	Litre	60	5,500	330,000	60	5,500	330,000
	Lubricant	Litre	3	10,000	30,000	3	10,000	30,000
Irrigation		VND	1	50,000	50,000	1	50,000	50,000
Soil Work		VND	1	320,000	320,000	1	320,000	320,000
Threshing		VND	1	320,000	320,000	1	320,000	320,000
Other Facilities		VND	1	160,000	160,000	1	160,000	160,000
Labour	Cleaning Field	Person	10	20,000	200,000	10	20,000	200,000
	Sowing	Person	5	20,000	100,000	5	20,000	100,000
	Weeding	Person	30	20,000	600,000	25	20,000	500,000
	Fertilizing	Person	6	20,000	120,000	5	20,000	100,000
	Spraying Insecticide	Person	6	20,000	120,000	4	20,000	80,000
	Pumping Water	Person	13	20,000	260,000	13	20,000	260,000
Harvesting	Cutting	Person	18	20,000	360,000	18	20,000	360,000
	Transporting	Person	8	20,000	160,000	9	20,000	180,000
	Drying	Person	8	20,000	160,000	8	20,000	160,000
Other Labour		Person	12	20,000	240,000	12	20,000	240,000
Credit	1% @ 4 months	VND	4	50,250	201,000	4	29,250	117,000
Total Cost	Materials	VND			2,705,000			2,245,000
	Labour	VND			2,320,000			2,180,000
	Total	VND			5,226,000			4,542,000
Yield		Kg	3900	1,350	5,265,000	4000	1,400	5,600,000
Cost		VND/kg			1,340			1,136
Gross Margin		VND/ha			39,000			1,058,000
Percent Profit					0.74%			18.89%

Tool 7 - Analysing Income Distribution

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Contents

Tool 7 - Analysing Income Distribution

1. Introduction

Analysing incomes within the value chain is central to understanding how the participation of the poor can be increased. Understanding how income is distributed along the value chain provides the necessary start to determine opportunities for income generation. Income analysis is different from the analysis in Tool 6 - Analysing Costs and Margins. While costs and margins analysis focuses on the profitability of an activity and the individual actor, analysis of income looks at all of the actors of the value chain.

Analysing distribution of income is not only an analysis within a particular value chain but also recognises that individual actors participate in a number of different value chains at the same time. For example, a farmer may be involved in several agricultural crops and several handicraft activities as a means of income diversification. A trader might be involved in trading multiple agricultural products at the same time or at different times of the year depending on the season. Therefore, livelihood strategies made by various actors are influenced by the sum of their income sources and any analysis must take this into account.

2. Objectives

1. To analyse the impact of value chain participation on the distribution of incomes within and between various levels of the value chain at the level of the individual actor.

2. To analyse the impact of different value chain governance systems on income distribution and on final product price.

3. To analyse the distribution of income at a whole of enterprise level and to analyse how that impacts on value chain participation and decision making.

4. To describe the impact of income distribution on the poor and other disadvantaged groups and the potential for poverty alleviation from different value chains.

3. Key Questions

- Are there differences in incomes within and between different levels of the value chain?

- What is the impact of various governance systems on income distribution between and within various levels of the value chain?

- What are the impacts of the distributional outcomes of the value chain on the poor and other disadvantaged groups, both currently and in the future?

- What are the changes in incomes that result from the development of various types of value chains?

- What is the variability of incomes and risks to livelihoods within and between various levels of the value chain?

- What is the contribution of the particular value chain to the whole of enterprise income and how does this influence decision making?

Terminology

Income is defined as the earnings accruing to an economic unit during a given period of time. Income comprises the money received from the sale of goods plus the value of self-consumed output minus the costs of production.

The costs of production comprise the costs of inputs, depreciation on capital equipment, interest payments and taxes.

Unlike profits (sales minus costs), where costs of production include the opportunity cost of own labour, income does not deduct the cost of own labour (since this accrues to the enterprise as "income" from labour). However, the cost of hired labour is deducted as this is a cost to the enterprise.

Cash income can be distinguished from non-cash income where a barter system occurs. For example, hired labour is sometimes paid for in a combination of cash as well as benefits (food, healthcare, pensions).

4. Steps

Step 1   Define categories

To analyse incomes within value chains it is important to first categorise actors. The mapping of the value chain as discussed in Value Chain Toolbook - Part Two (Tool 2) generally provides a map of actors within categories and this can be used as a basis to add income specific information. Categorisation should include a distinction between poor and non-poor actors as a starting point for analysis of incomes.

An example is given below for the value chain for rice in Cambodia. The value chain is divided into the size of operations at each level of the value chain (low, medium and high technology and volumes), as well as the mode of operations (contract milling, medium and large mills). In this example, each level of the value chain is separated into different categories for poor, medium wealth and better-off actors (distinguished by different colour coding). Thus, low and medium level technology farmers are more likely to comprise poor households, while the high technology and contract farming households are more likely to comprise medium wealth households.

Take Note

Poverty levels are a relative measure and it is difficult (and perhaps unwise) to be comparing poverty (as defined by income) between value chain levels. For example, a poor farming household earning USD 1 per day cannot be compared against a poor factory worker in the city earning USD 4 per day. Both are poor relative to other actors within their particular level of the value chain but there is clearly a difference between USD 1 and USD 4.

Figure 17: Rice value chain - categorisation of actors
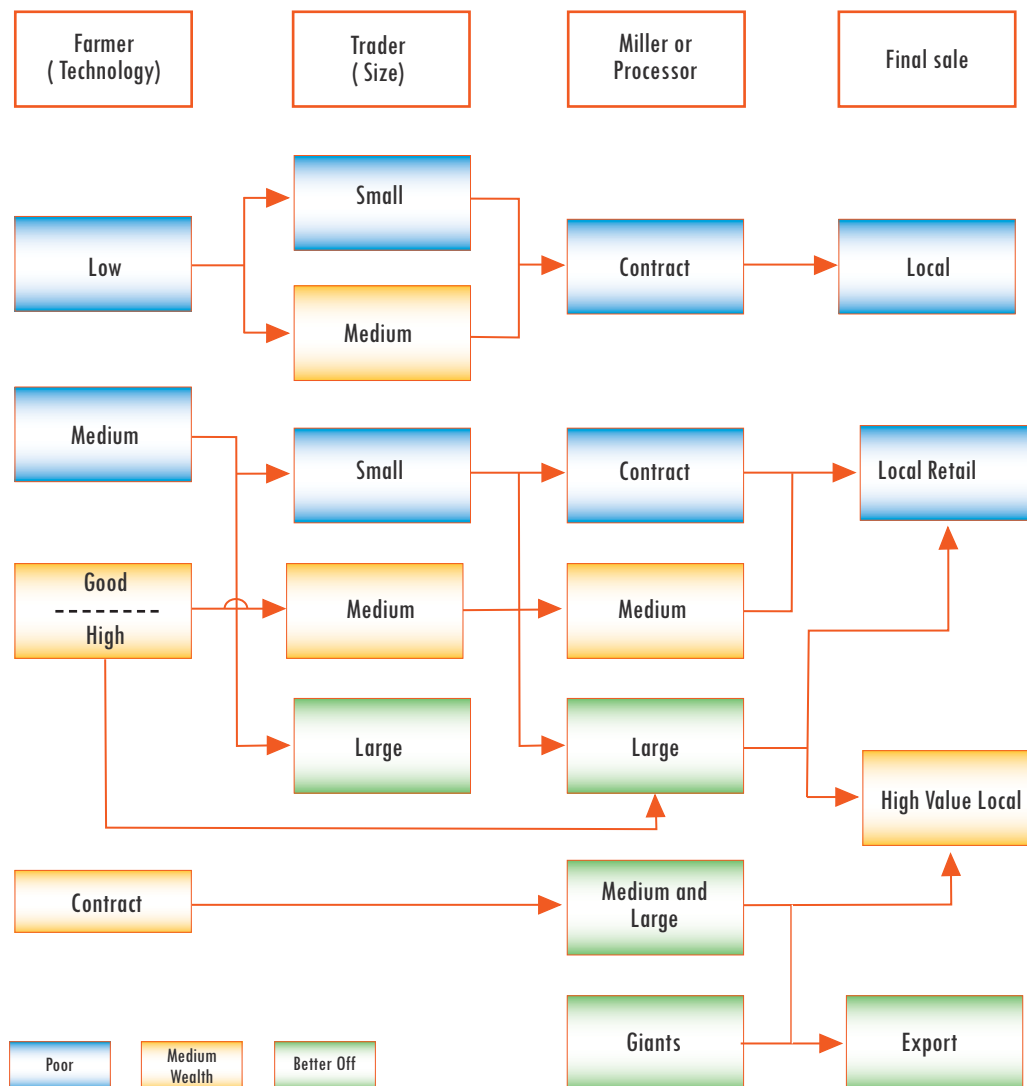
Other measures of income (such as purchasing power) may be a better reflection of differences between different levels of the value chain. Use can also be made of official poverty lines, which are often different between urban and rural areas or between mountainous rural areas and flat land agricultural areas.

Step 2   Calculating incomes per unit of output

After the actors at each level of the value chain have been categorised and mapped the calculation of income per unit of output can be carried out at each level of the chain and for each actor. Income per unit at each level is determined using the tools outlined in Value Chain Toolbook - Part Two (Tool 6). Recall from above that income is different from profit in that the cost of own labour is not deducted from the calculation.

Step 3 Calculating the net income at each level of a value chain

Comparing the distribution of net income across each level of a value chain means that the benefits accruing to actors at various levels of the chain can be compared. This is in addition to the analysis of the margins and the profits accruing at each level of the chain. The analysis of income gives a more accurate picture of the true distribution of benefits at each level of the value chain, as it reflects the often vastly different volumes handled by actors at each level of the chain.

To determine income distribution the net income per unit at each level is multiplied by the sales volume at each level. Net income per unit is calculated as total revenue minus total costs (where total costs include hired labour costs but do not include own labour costs). In the example in Table 32 below, the net income and sales volume are used to calculate income earned by each actor at each process level in the value chain[1].

Table 32: Example of income distribution along the value chain for silk in Thailand

	Cocoon - Farmer	Yarn - Farmer	Total Farmer	Trader	Weaver	Small Retailer
Total Cost (Baht)	67	725	704	715	437	744
Total Revenue (Baht)	70	834	834	750	660	812
Net Income per unit (Baht)	3	109	130	35	223	68
Sales Volume	137 kg	18 kg	18 kg	18 kg	100 pieces	100 pieces
Total Income - Baht (USD)	**378 (9.45)**	**1962 (49.05)**	**2340 (58.50)**	**630 (15.78)**	**22266 (556.65)**	**6822 (170.55)**

The average net income level accruing to actors at each level of the chain should be benchmarked (compared with) the official poverty line and a subsistence level of expenditure to determine if the income level generated by the activity at that level of the value chain is sufficient to maintain or improve livelihoods. Using the benchmark level of poverty, and the profit margin and income information, a calculation can be made to determine how much of a particular activity would need to be undertaken in order to generate an income higher than the poverty line. Examples could include: how many hectares of rice cropped or how many tons of fruit traded.

Benchmarking incomes relative to the poverty line is a first way to consider the involvement of the poor in the value chain. A study of supermarket and street vendors (Moustier, Anh et al. 2006) compared street vendors' incomes with the 2005 poverty threshold in Hanoi, (500,000 VND/month) and found that 18% of street vendors are poor, while no poor households were found in the formal markets, nor in the shops or supermarkets.

Comparing income with subsistence level expenses is another way to appraise the role of the participation in the value chain in livelihood strategies. For example, the incomes of

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[1] The analysis indicates an immediate opportunity for intervention in the value chain; providing opportunities for farm households to also undertake weaving activities. The weaving step is where the majority of the value added occurs, so any intervention which promotes upgrading will enable poor farming households to increase their income.

peri-urban vegetable commercial farmers in different African cities have been compared with the income necessary for subsistence (Moustier and Danso 2006). In Brazzaville and Bangui, at the time of surveys, market gardening yielded enough income to provide for the basic food requirements of the family, plus housing, clothing and schooling expenses; see Table 33. In this case, even if the total number of farms is small as compared with total urban population, their functioning demonstrates that urban agriculture is one of the sources of stable income that should be protected and considered a portfolio of cash-earning activities that require limited starting capital.

Table 33: Estimates of family commercial farmers' incomes compared with subsistence income

City (year) (source)	Number	Estimation of average monthly income USD	Estimation of minimum subsistence food expenditures USD
Brazzaville (1989)	1000 producers	150	100
(Moustier, 1996)	1700 retailers	120	
Bangui (1991)	300 producers	280	60
(David, 1992)	300 wholesalers	290	

Source: (Moustier and Danso 2006)

In the example in Figure 18 below, net incomes from the production of rice in the Red River Delta of Vietnam was calculated according to land area, and compared against the official poverty line. The example shows that 0.57 ha of paddy would be needed to increase the net income of the household from rice production to take that household up to the poverty line. Given the allocation of land per household usually is around 0.144 ha (360m2 per person and up to four people per household), the analysis implies that unless yields can be dramatically improved poverty alleviation cannot be achieved by rice production alone. Therefore, alternative income generating activities and value chains need to be considered.

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Figure 18: Comparison of net incomes from rice production with the official poverty line – minimum area of rice land required to support a four person household in the Red River Delta of Vietnam. The official poverty line is shown by the red horizontal line. The graph demonstrates that 0.57 ha of paddy is required for the harvest to generate enough income to equal the official poverty line.
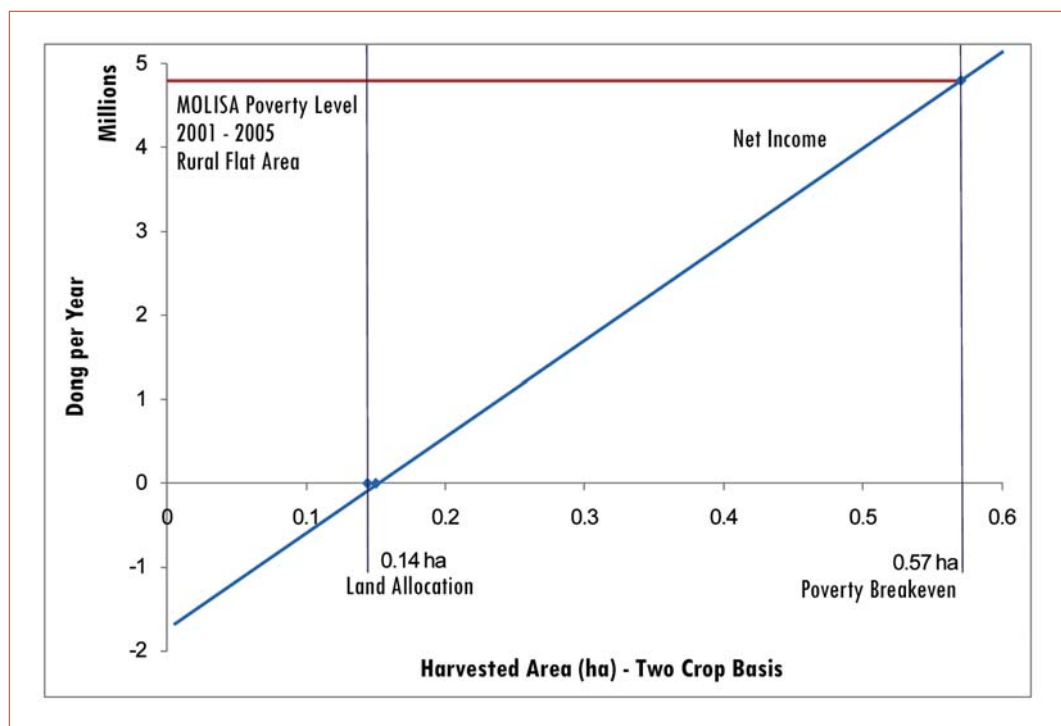
Source: Adapted from (CIEM 2004)

Step 4   Calculate the wage income distribution

Since the calculation of incomes is profit + own wage income, it is useful to look at the combined components of wage incomes (own wages and hired wages) to see how wages are distributed over the value chain. Looking only at income accruing to the enterprise itself does not capture the contribution of each level of the value chain to the whole sector.

In order to calculate the wage income distribution along the value chain, separate the wage components in the partial budget calculations for margins and incomes. The value of costs (represented by wages multiplied by the value of sales at each level) will give the level of wage income at each level of the value chain. The comparison of wage incomes over different levels of the chain, combined with the categorisation completed in Step 1, gives a picture of the distribution of benefits to individuals within the framework of enterprises at each level of the value chain. Wage costs can be especially high for large-scale farms, as well as processing companies. An example calculation is provided in Table 34 below.

In this example total wage costs, as paid by farmers and processors, are a little more than farmers' and processors' profits. If all profits and wages are used as household incomes (which means that some of the profits are not used for investments) it can be concluded that the chain generates USD 325,000 in terms of incomes (USD 150,000 profit and USD 175,000 wage costs).

Table 34: A virtual example of calculation of total wage costs for a
farmer to process 50 tonnes of vegetables

Item	USD /kg	kg/actor	No. of actors	Total (USD)
Farmers' input costs	1			
Farmers' wage costs	0.5	500	100	25,000
Farmers' other costs (depreciation, taxes, interest rates)	0.5			
Farmers' total costs	2			
Farmers' Revenue	3			
Farmers' Profit	1	500	100	50,000
Processors' input costs	2			
Processors' wage costs	3	5000	10	150,000
Processor's other costs	3			
Processors' total costs	8			
Processors' Revenue	10			
Processors' profit	2	5000	10	100,000
Total farmers and processors' profits	3			150,000
Total farmers' and processors' wage costs	3.5			175,000

In the example in Table 35 below looking at profits along the chain would suggest that farmers earn USD 15.9 million and processors earn USD 0.99 million. When wages are taken into consideration it can be shown that the processing industry contributes USD 9.6 million to the Zambian economy in hired labour alone, while the farm level contributes USD 7.3 million.

Table 35: Distribution of incomes and profits in the Zambian cotton
value chain

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Wage Costs/Profits	USD /tonne	No. Actors	Total (USD)
Farmer			
Wage Costs	40.00	280,000	7,336,000
Profit	86.75	280,000	15,910,000
Processor			
Wage Costs	52.20	6	9,573,000
Profit	5.40	6	990,000
Total Wages			16,909,000
Total Profit			16,900,000

Source: (Purcell, Gent et al. 2008)

In the analysis of income distribution, care should be taken to differentiate between paid labour and unpaid family labour. Although unpaid family labour does not incur a cash cost, it does incur an opportunity cost, frequently calculated using the local paid labour rate. This is explained in more detail in Value Chain Toolbook - Part Two (Tool 6).

Step 5   Calculate income variability over time

Seasonality in income is important to model, as substantial variations can occur. Therefore, value chain investigations based on a single estimate of income (at a particular point in time) may result in biased estimates of income. Variability in income increases risk of production and affects actors' decisions to invest in particular activities. This is particularly important for farmers who grow staple crops (such as rice or maize).

Overall, cash is most constrained in the period just prior to harvest. After a large harvest, households often have sufficient cash for their needs before planting begins and inputs need to be purchased. There may be large differences between households in different locations. This is a function of market access as households in remote areas have to rely on their own resources to make ends meet during the lean months. There may also be significant differences between the cash constraint profiles of poor, average, and better-off households. Box 29 below gives an example of a simple survey instrument designed to determine seasonal levels of cash constraint.

Box 29:   Example of survey question to examine seasonal cash constraints

What are the seasonal cash constraints for the farmers?
Get the farmer to place a ☑ or a ☒ in the appropriate row for each month.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Surplus Cash	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Enough Cash	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Lack of Cash	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Source: (UNDP and NERI 2005)

By cross-referencing the data collected using the survey tool above with the categorisation of poverty levels, a graph can be produced focusing on cash constraints. This type of analysis can highlight the seasonality of cash constraint and surplus in certain value chains. This is not limited to agricultural crop cycles but can also be a result of changes in consumer demand, for example tourist seasons.

Figure 19:   Monthly cash constraint by wealth category
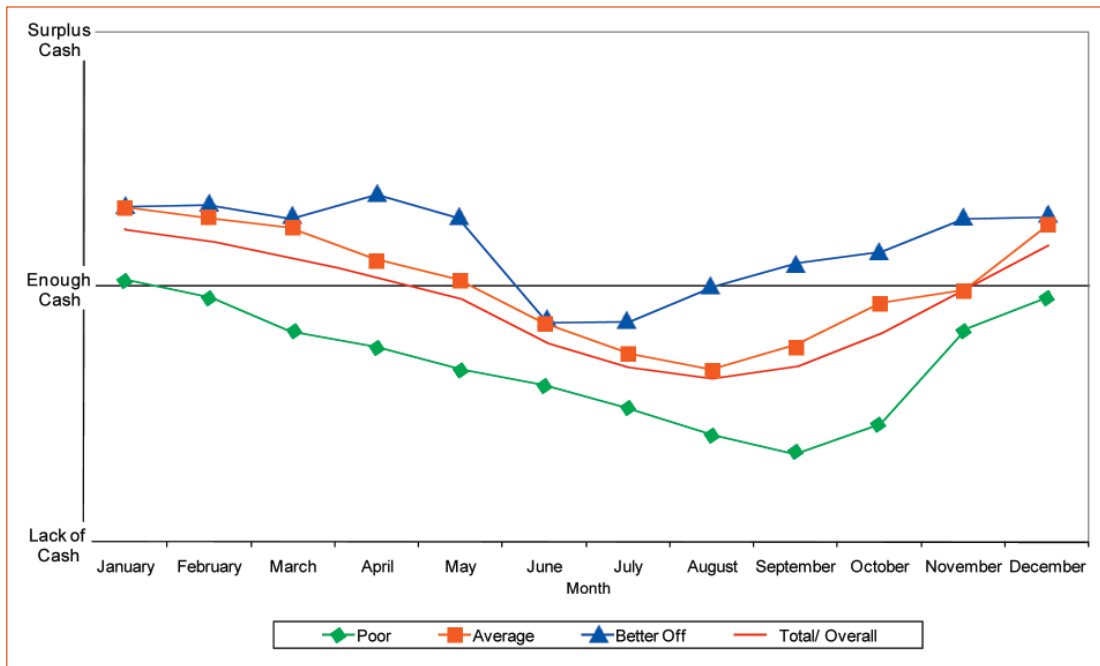
Source: (UNDP and NERI 2005)

Step 6   Appraising the place of income in livelihood strategies

It is important to consider the place of income generated by the value chain in total household incomes. Due to income diversification strategies, the income brought by one value chain may be only a small fraction of a household's total. The share of income represented by the value chain should be calculated in order to accurately model livelihoods and livelihood responses.

In the example previously of street vendors in Hanoi and peri-urban agriculture in Africa, the business represented more than 90% of cash income of the household, which means that an improvement of the income generated by the value chain will have significant impact on the family incomes. Therefore, the participants in the value chain will be particularly willing to invest their energy in the upgrading of the value chain, which may not be the case if the commodity had a more minor contribution to the household income.

In the example in Box 30 below, the contribution of different household activities to total household livelihood is calculated using a survey questionnaire. It is important to distinguish between activities that derive income (through cash sales) and those that are carried out for household consumption purposes.

Box 30:   Extract of survey questionnaire on calculating household income

Weighting Activities

Get the farmer to list all farm and non-farm activities and sources of income and livelihood. Put them into the categories below. Using 100 seeds, ask the farmer to partition and weight each activity between what the household consumes/uses and what is either sold for income or kept as capital accumulation. For example, livestock is typically kept for capital accumulation and draught power purposes (own use). After the farmer has finished weighting review the results with the farmer. Do pair-wise comparisons between the cells, asking the farmer to verify that the relative weightings are correct. Some common problem that arise:

- Farmers giving a "consumption" weighting to off-farm labour or salaries (people can't "eat" labour).

- Farmers weighting activities between income and consumption, but not between activities.

Farm and non-farm activities		Weighting	
		Income and capital accumulation	*Consumption / Own Use*
C.1	Rice	___%	___%
C.2	Root and Tuber Crops (cassava, potato etc)	___%	___%
C.3	Upland Crops (maize, other cereals, legumes etc)	___%	___%
C.4	Vegetables	___%	___%
C.5	Perennial Crops (rubber, coffee, pepper etc)	___%	___%
C.6	Annual Industrial Crops (Sugarcane, Cotton, etc)	___%	___%
C.7	Fruit Trees	___%	___%
C.8	Fishing and Aquaculture	___%	___%
C.9	Small livestock (poultry, pigs, goats, etc)	___%	___%
C.10	Large Livestock (Cattle, buffalo, etc)	___%	___%
C.11	Non-Timber Forest Products	___%	___%
C.12	Forest Products	___%	___%
C.13	Other Farm Activities	___%	___%
C.14	Handicrafts and Weaving	___%	___%
C.15	Off-Farm Work and Remittances	___%	___%
			Check Sum Total=100%

Valuing Activities

Identify the activity with the highest income weighting. Ask the farmer to estimate what the value of that activity was in terms of sales. Reconfirm the relative weightings of each activity for the Income column in terms of value. Calculate total Farm Income below.

Farm and non-farm activity		Income and capital accumulation Value (in Local Currency)	Weighting (From Above)
C.16		(A)	% (B)
C.17	TOTAL FARM INCOME (Cash and Consumption)	=A/B*100	100%

Once total Farm Income has been calculated, the percentages for each activity can be then re-calculated into monetary value for comparison between farmers.

Source: (UNDP and NERI 2005)

The results of the above survey can be averaged across categories of respondents and then re-calculated in % terms for comparison purposes[2] . In the example in Table 36 below, focusing on the cash returns alone results in the conclusion that off-farm work and remittances are the most important income sources. This is followed by small livestock production and upland crops whereas rice is clearly the most important activity after own consumption is factored in.

Table 36: Source of farm family incomes in Lao PDR - average percentage reported

Farm and Non-farm Activities	Overall			Total by Income Group		
	Income and Capital Accumulation	*Consumption /Own Use*	*Total*	*Poor*	*Average*	*Better-Off*
Rice	4.4	24.0	28.4	34.7	27.1	27.1
Root and Tuber Crops (cassava, potato etc)	0.2	0.6	0.8	1.1	0.8	0.8
Upland Crops (maize, other cereals, legumes etc)	5.7	3.1	8.8	12.7	8.1	8.1
Vegetables	5.5	2.5	7.9	8.2	8.6	8.6
Perennial Crops (rubber, coffee, pepper etc)	0.9	1.0	1.9	1.0	2.4	2.4
Annual Industrial Crops (Sugarcane, Cotton, etc)	0.1	0.3	0.4	0.7	0.3	0.3
Fruit Trees	2.4	1.3	3.7	2.6	3.8	3.8
Fishing and Aquaculture	0.8	0.3	1.1	0.0	1.8	1.8
Small livestock (poultry, pigs, goats, etc)	5.9	3.9	9.8	6.8	10.6	10.6
Large Livestock (Cattle, buffalo, etc)	3.5	2.3	5.7	2.5	6.5	6.5
Non-Timber Forest Products	2.7	0.9	3.6	5.4	3.2	3.2
Forest Products	1.5	0.6	2.1	3.2	1.7	1.7
Other Farm Activities	0.8	0.9	1.8	2.9	1.6	1.6
Handicrafts and Weaving	0.8	0.2	1.0	1.2	0.9	0.9
Off-Farm Work and Remittances	20.4	2.5	23.0	17.0	22.5	22.5
Total	**55.7**	**44.3**	**100.0**	**100.0**	**100.0**	**100.0**

Source: (UNDP and NERI 2005)

Traders are also likely to have multiple income sources. One trader may be involved in maize, cassava, and soybeans either simultaneously or on a seasonal basis. This means that decisions to participate in any particular value chain are contingent on factors which could be outside the single value chain. For example, a trader may decide to liquidate maize stocks at a loss rather than wait for an imminent price rise if he has to use the storage space and cash liquidity to engage in the upcoming soybean season.

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[2] It is important to recognize that just using percentages will not allow a comparison across different groups, as all income sources add up to 100%. The data need to be converted into USD values and then averaged within stratification groups. Once averages (means) have been calculated, these can then be converted back into percentages for comparison between groups.

Step 7   Comparing incomes across different value chains

The comparison of incomes generated by different value chains characterised by different governance structures or different upgrading strategies (the two being often related) enables recommendations regarding the promotion of governance and upgrading which generates the highest incomes and/or the most balanced ones across different actors. For instance an analysis of an aromatic-rice value chain in Vietnam shows that the association-driven chain, with the labelling of aromatic rice by a farmers' association and sales to supermarkets, generates more income to the farmers than the traditional chain (Binh, Huan et al. 2005).

A researcher may wish to compare incomes across different value chains, such as within a commodity but across different governance structures, or across commodities (value chains) within a particular area. It is important to recognise that comparing different value chains in different areas without considering the different agro-ecological systems (for production) or the different technologies available (low technology milling versus high technology milling) may result in incorrect conclusions.

For the first case, comparing across different governance structures, the following example shows profit margins for producers and processors across three different value chain governance systems for cotton in Zambia. The first governance system is called the Distributor System. This system follows a Principle-Agent model of organisation where the processor makes contracts with traders who are then responsible for the distribution of inputs and services and the collection of the crop. The second governance system is called the Contact Farmer System where the processor has a system of field agents and extension advisors who are employees of the company. The third governance system is a Side-Buyer System where the processor does not invest in providing inputs or services to farmers but relies on attracting farmers currently under the two other systems to renege on their contracts by offering a slightly higher price.

Figure 20: Comparison of profit margins across governance systems in cotton in Zambia

Source: (Purcell, Gent et al. 2008)
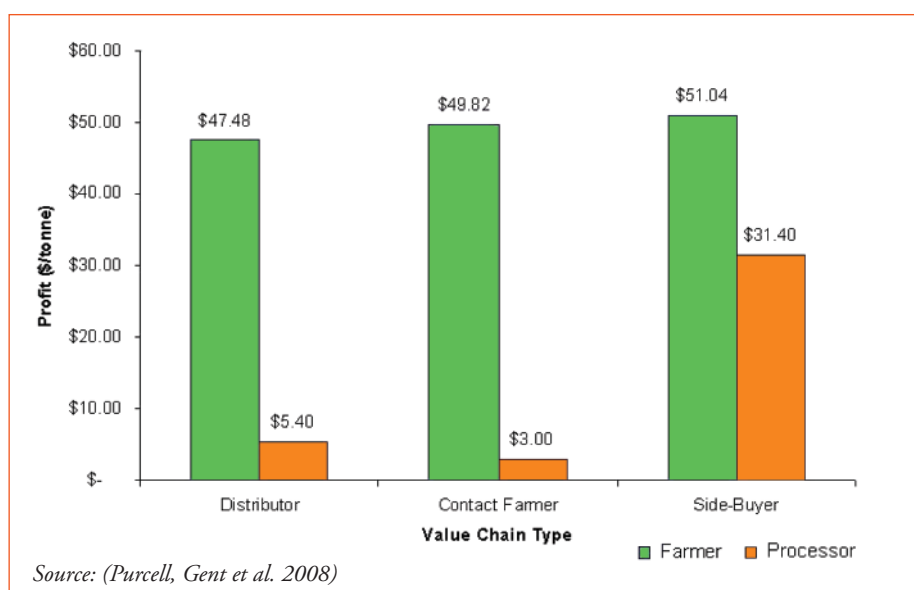
The analysis shows that farmers are better off in the side-buyer value chain as the profits are slightly higher than the other two systems. However, as the discussion in Value Chain Toolbook - Part Two (Tool 3) indicates, such a strategy may not be sustainable in the long run as it could force the other governance systems out of the market and farmers would lose the advantages of having their inputs and services provided by the lead firms. The analysis also shows that while the side-buyer processor has the greatest profit (since they do not have to spend any money on inputs or extension), the distributor model is more profitable than the Contact Farmer model since the Contact Farmer processor has to spend their own money on the logistics of providing inputs and services as well as collection of the harvest.

Comparing the incomes in the value chains before and after upgrading is also a good way to assess the economic impact of value chain upgrading. Yet it is often difficult and time-consuming to carry out "before" and "after" evaluation, and comparing "with" and "without" situation at the same period of time, for different actors, is generally more feasible.

Similarly, comparing incomes across value chains is a good indicator of alternative activities which households could undertake. In the example below, the value chains for five different sectors in Zambia are compared for employment and income. The results indicate that sugarcane and export horticulture value chains are the two chains with the highest income per capita; the domestic horticulture and cotton chains have the two lowest incomes per capita. This suggests that interventions to get greater numbers of people into the sugarcane and export horticulture chain would have the most benefit. However, a deeper analysis of the five chains suggest that barriers to entry for these two chains are significant (hence their greater returns) and that improvements in the cotton and domestic horticulture chain would yield more significant benefits, and impact on more households.

Table 37: Income distribution and employment across value chains in Zambia

Value Chain	Sector Earnings (USD million)	Wage Employment	Small Farmers	Earnings per Person (USD/day)
Cotton	81	2,300	280,000	1.30
Tobacco	63	92,000	23,000	2.49
Sugarcane	65	4,000	1,692	51.91
Export Horticulture	55	14,500	2,500	14.71
Domestic Horticulture	116	10,000	525,406	0.98

Source: (Purcell, Gent et al. 2008)

Figure 21: Income distribution and employment across value chains in Zambia

		Farmer			Processor			Total	
	Cotton	Burley Tobacco	Smallholder Sugar	Cotton	Burley Tobacco	Smallholder Sugar	Cotton	Burley Tobacco	Smallholder Sugar
Profit	$15,909,95	$2,002,945	$2,027,154	$990,360	$376,000	$589,599	$16,900,31	$2,378,945	$2,616,752
Hired Wage	$7,336,000	$112,752	$149,632	$9,573,480	$1,868,249	$1,422,711	$16,909,48	$1,981,001	$1,572,343
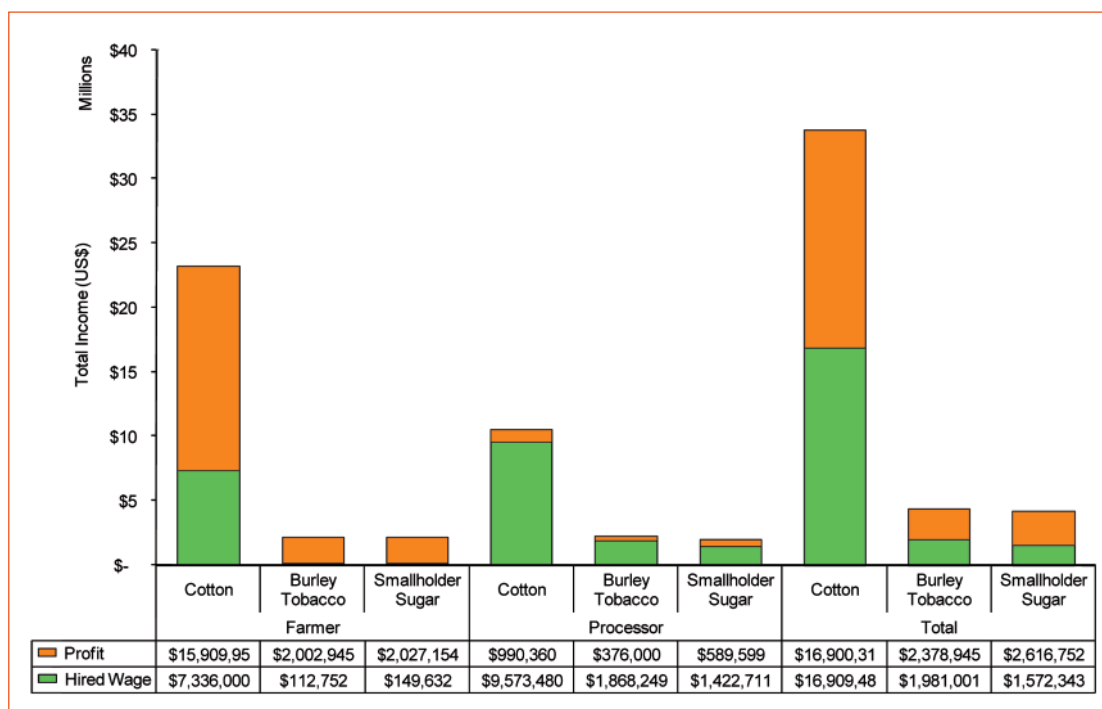
Source: (Purcell, Gent et al. 2008)

5. What Should be Known after Analysis is Complete

After having followed all the steps it should be possible to answer the key questions outlined below:

- Are there differences in incomes within and between different levels of the value chain?
- What is the impact of various governance systems on income distribution between and within various levels of the value chain?
- What are the impacts of the distributional outcomes of the value chain on the poor and other disadvantaged groups, both currently and into the future?
- What are the changes in incomes that result from the development of various types of value chains?
- What is the variability of incomes and risks to livelihoods within and between various levels of the value chain?

Useful Examples

Example 5: Differences between the distribution of unit profits and incomes.

Moustier et al (2006) assessed the distribution of costs and profits* between the different actors of the following off-season tomato chains in Northern Vietnam:

■   Among the different value chain actors, it is the collectors and wholesalers selling vegetables of Moc Chau who get the highest incomes. This is due to the large quantities traded as their profits per kg are smaller than other actors; e.g., 19-5 Cooperative and Van Tri Cooperative (for tomato, 105 ton/year for collectors, 132 ton/year for wholesaler, 6 ton/year for Bao Ha, 13 ton/year for 19-5, 12 ton/year for Van Tri). It is worth investigating the reasons behind these differences in quantities traded. It may be a function of the number of years in the business, or the fact that the cooperatives prefer the reliability of their suppliers in terms of product quality rather than the number of suppliers and their large scale.

■   Compared with the other actors, supermarkets get relatively low margins (less than 20% of final price, while the farmer's margin is more than 25%);

■   Selling to supermarkets does not bring more income to farmers than selling to safe vegetable shops, even though the retail price is 20% higher. The price difference is distributed into increased profits for the assembling and distribution cooperatives (Van Tri, Van Noi) and company (Bao Ha), and into the supermarket margin. Compared with safe vegetable shops, supermarkets represent more constraints for their suppliers, in particular as regards the possibility of returned products.

Note: in this calculation, we assume that the actors get the same profit per kg for all vegetables traded; therefore, the figures of total incomes should be taken for comparison rather than in absolute terms.

* Profits = Sales revenue – Cash costs – Depreciation (see Tool 6 - Analysing Costs and Margins).

Table 38: Estimation of incomes of various actors of the vegetable chains (USD)

	Tomato			All commodities	
	Profit/kg	*Qty/year*	*Income/year*	*Qty/year*	*Income/year*
Farmers Moc Chau inside coop	0,06	3340	203,18	9200	559,67
Collectors Moc Chau (local)	0,02	2100	42,94	13440	274,83
19-5 Cooperative	0,01	12600	129,23	500000	5128,21
Van Tri Cooperative	0,04	11900	530,16	612000	27265,38
Farmers Moc Chau outside coop	0,06	8400	474,38	15000	847,12
Collector Moc Chau (to Hanoi)	0,02	105000	2147,12	105000	2147,12
Wholesaler Hadong	0,02	132000	3206,92	148000	3595,64
Farmer Soc Son	0,14	2374	322,77	8700	1182,87
Collector Soc Son	0,04	20130	771,65	82500	3162,50
Company Bao Ha	0,03	5610	150,32	132000	3536,92
Safe vegetable shop	0,02	3400	78,24	40800	938,92

Source: (Moustier, Anh et al. 2006)

Example 6: Unit profits and incomes along the value chain for onions.

The analysis of distribution of incomes among actors in the onion value chain from Niger to Ivory Coast in 1995 shows that incomes are higher by far for urban wholesalers, and lower for producers and retailers, even though the retail stage has the highest profit per kg.

A significant part of wholesalers' incomes is actually distributed to other actors of the chain in the form of gifts, in kind and cash, to help them in difficult times.

Table 39: Distribution of incomes from onion production in Niger to retail sale in Abidjan in 1995

	Number of actors	Tons/Actor	Sales price (USD/kilo)	Costs/kilo (apart from	Profit/Kilo/ actors purchase price)	Total income/ actors/year (USD)
Producers		4	0.14	0.04	0.10	400
Assemblers	6950	1565	0.16	0.01	0.01	12520
Mobile wholesalers	15	703	0.30	0.13	0.01	8436
Urban wholesalers	30	1984	0.38	0.02	0.07	134912
Semi-wholesalers	175	113	0.53	0.02	0.13	14238
Retailers	11200	2	0.95	0.04	0.37	744

Source: (Moustier and Zebus 2002)

Tool 8 - Analysing Employment Distribution

Contents

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Tool 8 - Analysing Employment Distribution

1. Introduction

As with income distribution, analysing the distribution of employment within the value chain is central to understanding how to increase the participation of the poor. Understanding how employment is distributed along the chain provides the necessary start to determine opportunities for employment generation. The distribution of employment and access to employment by different wealth classes can be analysed to identify employment opportunities. See also the mapping suggestions in Value Chain Toolbook - Part Two (Tool 2) for visual representations of employment distributions.

Analysing distribution of employment is not only an analysis within a particular value chain but also recognises that individual actors participate in a number of different value chains at the same time. For example, a farmer may be involved in several agricultural crops and several handicraft activities as a means of income diversification. In the same way a trader might be involved in trading multiple agricultural products at the same time or at different times depending on the season. Therefore, livelihood strategies made by various actors are influenced by labour constraints and any analysis must take this into account.

The second part of this tool looks at whether there is room for improvement in the distribution of labour and how this can be done, taking into account seasonality in demand and availability of labour and also the competitiveness between labour intensive and labour saving upgrading strategies.

2. Objectives

1. To analyse the impact of the value chain on the distribution of employment within and between various levels of the value chain at the level of the individual actors.
2. To describe distribution of employment along the value chain and amongst the different wealth classes; and determine how the poor and other disadvantaged groups participate in the chain.
3. To describe the dynamics of employment within and along the value chain and the inclusion and exclusion of the poor and other disadvantaged groups.
4. To analyse the impact of different value chain governance systems on employment distribution.
5. To analyse the impact of different value chain upgrading strategies on employment distribution.

3. Key Questions

- What are the differences in employment within and between different levels of the value chain?
- What is the impact of the employment distribution of the value chain on the poor and other disadvantaged groups, both currently and in the future?
- What are the changes in employment that result from the development of various types of value chains?

- What is the variability of employment and risks to livelihoods within and between various levels of the value chain?
- What is the impact of various governance systems on employment distribution between and within various levels of the value chain?
- What is the impact of various value chain upgrading strategies on employment distribution between and within various levels of the value chain?

Pro-poor dimensions in the distribution of employment are:

- What are the opportunities / barriers for the poor to find employment in the value chain?
- Is it more interesting for the farmer to work on his own farm or switch to wage labour within or outside the chain?
- Which age groups do have the chance to access employment?

4. Steps

Step 1   Define the categories of actors

To analyse employment distribution within a value chain it is important to first categorise actors. The mapping of the value chain as discussed in Value Chain Toolbook - Part Two (Tool 2) provides a map of actors within categories and this can be used as a basis to add employment specific information.

There can be different types of farmers, collectors, wholesalers and retailers. As was the case with defining the categories for income levels along a value chain in Value Chain Toolbook - Part Two (Tool 7), the most important categorisation for pro-poor value chain analysis is based on income levels (a distinction between poor and non-poor actors).

For example, for flower retailers in Hanoi (Vietnam) there are at least three different broad categories; hawker, retailers in open air markets, and retailers in their own flower shops. These retailer categories are very much related to the different wealth levels, with hawkers being the poorest. Other examples of categories that could be used are presented in Box 31 below.

Box 31: Examples of other categories of actors

Categories	Dimensions
Skills	Unskilled, low-skilled, high-skilled
Gender	Male or female
Ethnicity	Different ethnic types
Business Type	Micro, small, medium, large
Period	Day labour, temporary labour, permanent labour
Status	Family, hired
Origin	Temporary migrant, permanent migrant, locally hired

Take Note

Within specific groups it may be important to look at age distribution. For example, in rural Vietnam it is becoming obvious that the average age of farmers is increasing because younger people find it easier and more attractive to find employment elsewhere. Even if employment opportunities exist this does not mean it is open to each age group, gender or social group.

Step 2   Determining employment at each level

By comparing the distribution of employment across each level of the value chain a comparison of opportunities for the poor at various levels of the chain can be made. This is complementary to the analysis of the incomes accruing at each level of the chain.

Employment at each level of the value chain can be determined in different ways:

1. **Wholesalers:** Conducting a survey of wholesalers is generally not too time-consuming. Be aware of seasonal variations; in the off season the number of wholesalers is much smaller than in the main season.

2. **Retailers:** Based on the total traded volume of a product in a value chain and the daily turnover of a retailer one can calculate how many retailers are involved. But if additional time is available count all retailers in a sample area (e.g. open air market retailers) and then apply the figures to calculate the retailers in a total area. For example, count the total number of open air markets in a city (e.g. 130) and then take a random sample of various open air markets (e.g. 15). Visit these open air markets, count the number of retailers in these markets or ask the market administrator (if present) how many booths he rents out. Calculate the average number of retailers per open air market and multiply by 130 to get a rough estimate.

3. **Transporters:** Estimate the total volume of sales, and the typical volume per transport unit (e.g. trucks, motorbike, carts, boats). Then estimate the number of people required per transport unit, the time required to transport, and the number of full time equivalent employees (FTEs) this generates.

4. **Processors:** Identify the number of processors in an area from official sources (e.g. registration certificates); identify the number of informal processors from key informant interviews.

5. **Collectors:** Conduct interviews with village leaders or commune heads. Estimate the number of collectors under each trader/wholesaler. Estimate the total volume of sales, and the typical volume per transport unit. Then estimate the number of people required per transport unit, the time required to transport, and the number of FTEs this generates.

6. **Farmers:** Estimate the number of farmers based on hectarage under each crop and yields (related to traded volumes). Cross check with district authorities for official figures. Obtain information on sales of key inputs sold by input providers at bottleneck points (e.g. seed). Be sure to distinguish between smallholders and commercial farmers.

4

7. **Hired labourers:** Estimate from partial budgets and scale up.

8. **Input suppliers:** Seed, fertiliser, nurseries, breeding station owner. Estimate volumes demanded in the market and volumes provided by the average input supplier. Estimate average employment per input supplier and estimate the total number of FTEs this generates.

9. **Service suppliers:** Extension, design, marketing etc. Estimate how much of the services provided by the suppliers feed into the specific chain (and not to other chains).

A fast way to get an idea of the number of actors in a value chain is to carry out interviews with wholesalers. Wholesalers are often located in just a few locations and there is usually a small number of wholesalers compared with the number of farmers, collectors or retailers. Through a combination of census counts (counting the total number of wholesalers in a certain location) and interviews with a number of wholesalers it is possible to get a good estimate of the total traded volume of a product in the value chain (e.g. tons of avocados, or number of roses). Conducting interviews with the other actors in the chain to estimate their typical turnover allows an estimation of how many actors are involved.

As many actors in agricultural value chain are only involved seasonally, it could be useful to convert the collected employment data into a standardised indicator. This allows comparisons among various value chains, for example using the number of FTEs as the main indicator for the employment created by a certain value chain. One just simply defines or agrees on how much labour days per year are considered 1 FTE, for example 240 days. If someone only works for 120 days, this is accounted as a half FTE. It is also important to consider both direct and indirect employment in administration and ancillary services. In another example, farmers can hire labour to work on lower valued crops while they concentrate their own labour on higher valued crops.

Take Note

For a quick insight in the employment generation by a value chain focus resources on the use of participatory analysis tools with wholesalers and transporters. They are often concentrated in just a few locations (saves time in visiting) and have a very good overview of traded volumes and the various upstream and downstream channels.

Due to employment diversification strategies, the employment in one value chain may be only a small fraction of the total employment of a household; especially for service activities all along the chain. The share of employment represented by the value chain should be calculated to accurately model livelihoods and livelihood responses. In the example in Table 40 below, the share of employment in different livelihood activities was calculated for farming households in Laos across different income levels.

Table 40: Average utilisation of labour by livelihood activities in Lao PDR

Farm and Non-farm Activities	Poor	Average	Better-Off
Rice	41.0%	36.3%	35.3%
Root and Tuber Crops (e.g. cassava, potato)	1.7%	0.8%	0.0%
Upland Crops (e.g. maize, other cereals, legumes)	11.2%	9.9%	6.7%
Vegetables	10.7%	9.9%	2.8%
Perennial Crops (e.g. rubber, coffee, pepper)	1.2%	2.6%	1.3%
Annual Industrial Crops (e.g. sugarcane, cotton)	1.0%	1.2%	0.2%
Fruit Trees	2.1%	2.1%	4.9%
Fishing and Aquaculture	0.4%	1.3%	2.2%
Small livestock (e.g. poultry, pigs, goats)	5.4%	10.2%	9.5%
Large Livestock (e.g. cattle, buffalo)	1.8%	3.9%	7.3%
Non-Timber Forest Products	5.0%	1.8%	0.9%
Forest Products	2.6%	2.1%	0.9%
Other Farm Activities	2.7%	0.5%	0.0%
Handicrafts and Weaving	3.0%	1.7%	0.9%
Off-Farm Work and Remittances	10.2%	15.8%	27.2%
Total	**100.0%**	**100.0%**	**100.0%**

Source: (UNDP and NERI 2005)

Step 3 Calculate the employment distribution at different levels of the value chain

Conduct field surveys to obtain an indication of the different dimensions of employment at each level of the chain according to the category. These surveys can be short and simple, just to get some idea of turnover volumes per actor (e.g. mean harvested number of roses per farmer per year; or average annual traded volume per collector per day/month/season/year), income levels, or the number of hired labourers.

Comparison of employment over different stages in the chain should be undertaken according to the various categories developed in Step 1. This gives a picture of the distribution of benefits to individuals within the framework of enterprises at each level of the value chain.

An example of this is given in Figure 22 below, which shows the different numbers of actors at each level of the shrimp value chain in Bangladesh. This can be extended to describe the different categories of actors (poor, non-poor, self-employed, wage earners).

4

Figure 22: Example of employment over different stages in the value chain

Hatcheries (1,384)	Wild Fry collectors (120,000)
Hatchery Agents (525)	Wild Fry buyers/Faria (2,804)
Traders/Faria Selling Hatchery Fry to farms (1,266)	Wild Fry Aratda (1,325)
	Traders/Faria Selling wild Fry to farms (1,047)

Shrimp Farms (166,485)

Small Depots (1,496) — Shrimp Traders Faria (5,293)

Large Depots (2,641)

Commission Agents (500)

Processing Plants (3,147)
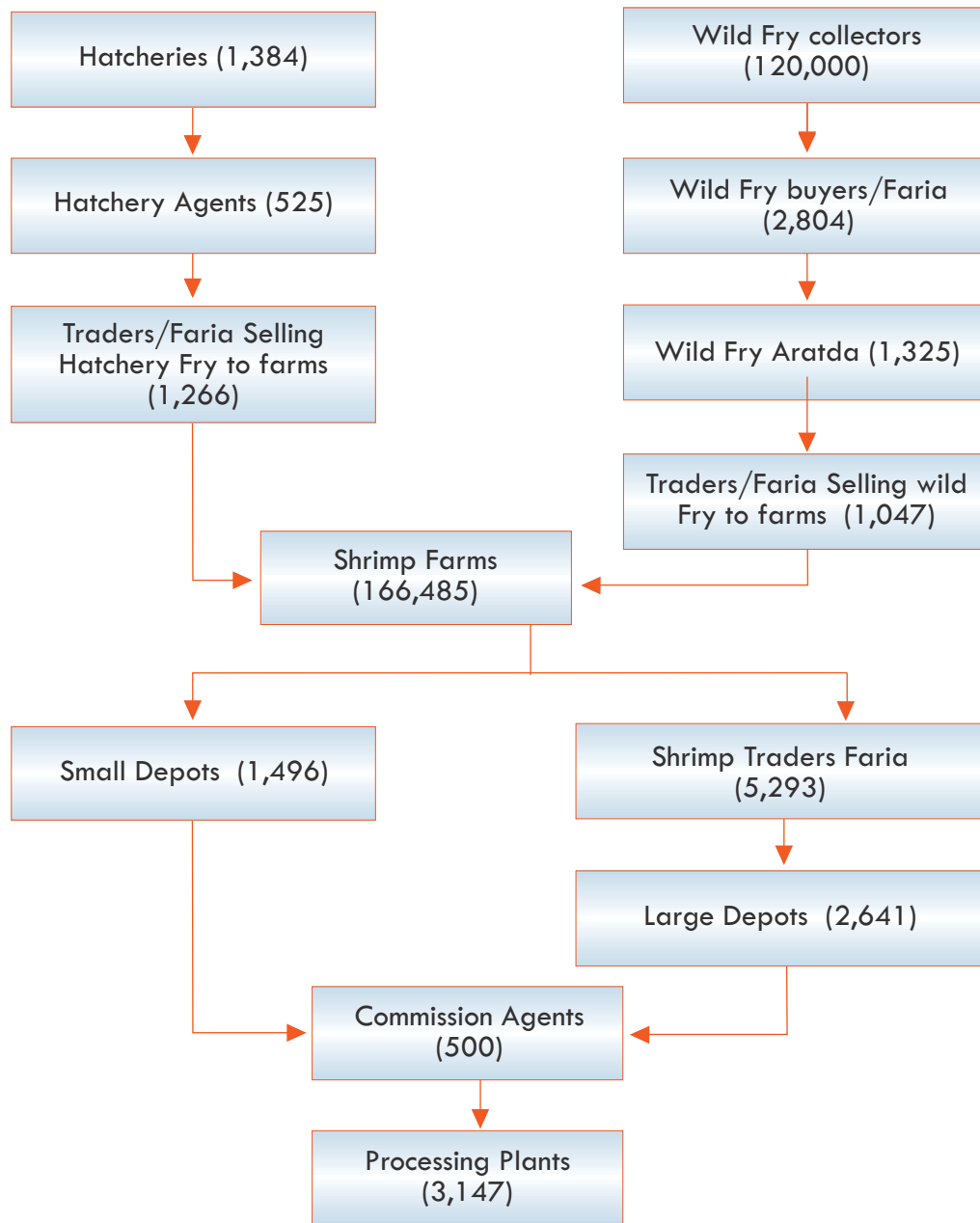
Note: Faria, Aratdar and agents are specific types of middlemen engaged in the shrimp value chain in Bangladesh
Source: (BCAS 2001)

Take Note

Estimating the levels of employment at each level of the chain is difficult. The information often does not exist and large assumptions need to be made. For example, if total volumes of production are known, and the average production per farmer can be estimated, then employment at the farm level can be calculated. Similarly, average volumes of trade by individual wholesalers can give an estimate of the number of wholesalers in the value chain.

Step 4 Analysis of the employment distribution contribution

Comparing the distribution of employment across each level of the value chain enables a comparison of benefits actors are getting at various levels of the chain. This is complementary to the analysis of the margins and the profits at each level of the value chain. However, an analysis of the employment gives a more accurate picture of the true distribution of benefits at each level of the value chain, as it reflects the often vastly different number of players at each level of the chain. A matrix can be developed that shows the numbers of actors by category at each level of the chain; see the example in Table 41 below.

Table 41: Example of analysing the number of actors at each level of the chain

		Farmer	**Collector**	**Trader**	**Wholesaler**	**Input supplier**	**Service suppliers**	**.........**
Number of People	Poor Average Better-off							
Volume of sales	Poor Average Better-off							
Number of people	Unskilled Low-skilled High-skilled							
....								

Box 32: Example of employment impact evaluation

Within the framework of the GTZ Value Chain development program in Vietnam an avocado value chain analysis was carried out in Dak Lak Province. As avocado trees are mostly grown as shade trees or windbreakers around coffee fields, the avocado sector in Dak Lak has not been very visible for policy makers. On average a farmer has about five avocado trees, which might suggest that avocado is not an important product in Dak Lak. Based on data collected during a rapid diagnostic appraisal and a short survey among the 98 major avocado wholesalers in Dak Lak province it was possible to calculate the number of persons involved in the avocado sector. This example only makes estimates of the avocado sector in Dak Lak and does not include all the employment involved of wholesalers and retailers in Ho Chi Minh City, Hanoi and all other cities to which the avocados are transported.

Based on the census it was estimated that during the main avocado season, 337 ton of avocados per day are exported from Dak Lak to other provinces in Vietnam. This figure was obtained through very short interviews (max 20 min per wholesaler) with almost all avocado wholesalers in Dak Lak province. These 337 ton per day are only exported during the main season, which lasts four months. Avocado is also traded during the other eight months of the year but in very small volumes. Employment analysis was focused on the main season only, so the data presented below are an underestimation of the employment generated by the sector.

4

Sector size in Dak Lak:

Avocados exported by Dak Lak wholesalers	337 ton/day	40,410 ton/season
Harvested number of trees	3,368 trees/day	404,100 trees/season
Number of farmers involved	674 farmer/day	80,820 farms/season
Number of collectors involved	1648 persons/day	
Harvested area	22 ha	2,649 ha
Truckloads	42 truckloads/day	5,051 truckloads/season

In addition to the 100 avocado wholesalers there are also about 1648 active collectors. These actors play the most critical role in the avocado value chain as they harvest and collect the avocados. They visit the farmers and harvest one or two trees per visit. In total about more than 80,000 farmers are involved, with an estimated harvested area of more than 2,600 ha.

Assumptions for these calculations:

Average harvest per tree	100 kg/tree
Mean no. of trees per farmer	5 trees/farmer
Turnover per collector	200 kg/day
Number of trees per ha	150 trees per ha
Average truck load	8 ton/truck

These data do not include the employment the sector generates for a business service provider like the bamboo basket makers. All avocados are transported in large bamboo baskets, with each basket containing about 100 kg of avocadoes. This means that every day about 3,368 bamboo baskets are required. As the baskets are recycled and data was not collected about this no estimate was made of the employment generation for bamboo basket makers, but it must be significant.

It was further calculated that the total value added of the avocado sector in Dak Lak province was almost USD 7 million in every main season. With these data and the employment estimates it was possible to create an increased awareness among provincial policymakers about the economic importance of the avocado sector in Dak Lak.

Source: (Wijk 2006)

Comparing employment across value chains is a good indicator of alternative activities which households could undertake. In the example in Table 42 below, the value chains for five different sectors in Zambia are compared for employment and income. The results indicate that the domestic horticulture, cotton and tobacco sectors are the ones with the most employment, and that there are significant opportunities for wage employment in the tobacco and export horticulture chains.

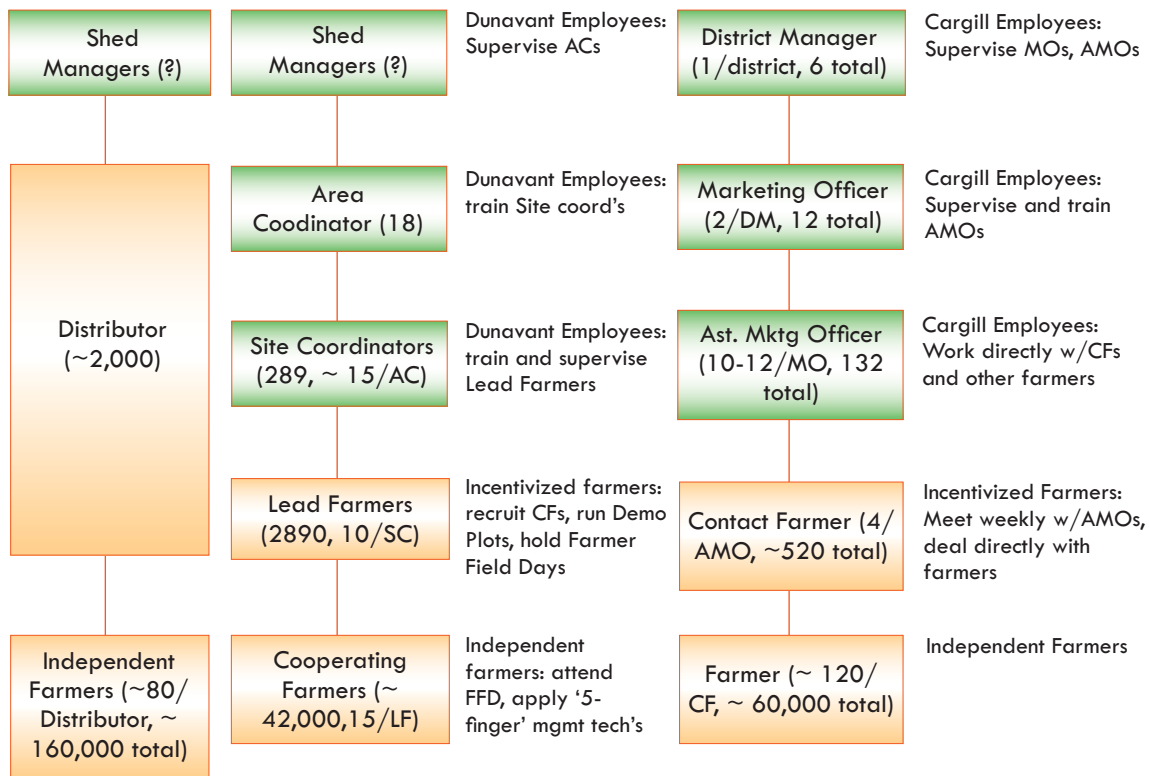### Table 42: Income distribution and employment across value chains in Zambia

Value Chain	Sector Earnings (USD million)	Wage Employment	Small Farmers	Earnings per Person (USD/day)
Cotton	81	2,300	280,000	1.30
Tobacco	63	92,000	23,000	2.49
Sugarcane	65	4,000	1,692	51.91
Export Horticulture	55	14,500	2,500	14.71
Domestic Horticulture	116	10,000	525,406	0.98

Source: (Purcell, Gent et al. 2008)

Step 5 Determine the impact of Governance on employment

With this step, a researcher can compare employment across sub-chains of the value chain that have different governance structures (e.g. informal linkages versus contract linkages). The analysis in the steps above can be ungrouped by governance structures. In the example in Box 33 below, the value chain for cotton in Zambia is separated into three governance chains, which show the levels of employment at each value chain stage.

Box 33: Example of employment across different governance structures in cotton in Zamia

Shed Managers (?)	Shed Managers (?)	District Manager (1/district, 6 total)
	Dunavant Employees: Supervise ACs	Cargill Employees: Supervise MOs, AMOs
Distributor (~2,000)	Area Coodinator (18)	Marketing Officer (2/DM, 12 total)
	Dunavant Employees: train Site coord's	Cargill Employees: Supervise and train AMOs
	Site Coordinators (289, ~ 15/AC)	Ast. Mktg Officer (10-12/MO, 132 total)
	Dunavant Employees: train and supervise Lead Farmers	Cargill Employees: Work directly w/CFs and other farmers
	Lead Farmers (2890, 10/SC)	Contact Farmer (4/ AMO, ~520 total)
	Incentivized farmers: recruit CFs, run Demo Plots, hold Farmer Field Days	Incentivized Farmers: Meet weekly w/AMOs, deal directly with farmers
Independent Farmers (~80/ Distributor, ~ 160,000 total)	Cooperating Farmers (~ 42,000,15/LF)	Farmer (~ 120/ CF, ~ 60,000 total)
	Independent farmers: attend FFD, apply '5-finger' mgmt tech's	Independent Farmers

Company Employees   Incentivized farmers

Source: (ABD 2005)

Step 6 Determine the impact of technology structures on employment

Compare employment across different sub-chains of the value chain that have different technology structures (e.g. supermarket chains versus traditional retailing chains, village rice mills versus commercial rice mills, smallholders versus commercial farms).

For example, the development of a supermarket is expected to decrease employment of the poor, due to the use of capital-intensive versus labour-intensive technology in supermarket distribution. Thus, to achieve poverty alleviation objectives, the diversity of retail distribution, including distribution by small-scale markets, should be maintained as much as possible.

Also, the opportunities for the poor to participate in the supermarket-driven chain as supplier or trader of produce tend to be fewer because of stricter quality and consistency of supply requirements by supermarket chains as compared to less advanced types of retail distribution.

Finally, because of prices tending to be higher in supermarkets as compared to e.g. small scale markets, the poor (as consumers) may suffer if cheaper alternatives are not available.

Box 34: Example of employment generation for poor in a supermarket-driven chain in Vietnam

Summary of investigated issues on the poor's access to supermarkets and other Domestic Value Chains (DVCs) in Vietnam.
The case studies show that poor farmers as producers have no direct access to supermarkets because of the requirements of the latter in terms of safety (for vegetables) and quantities (for all products).
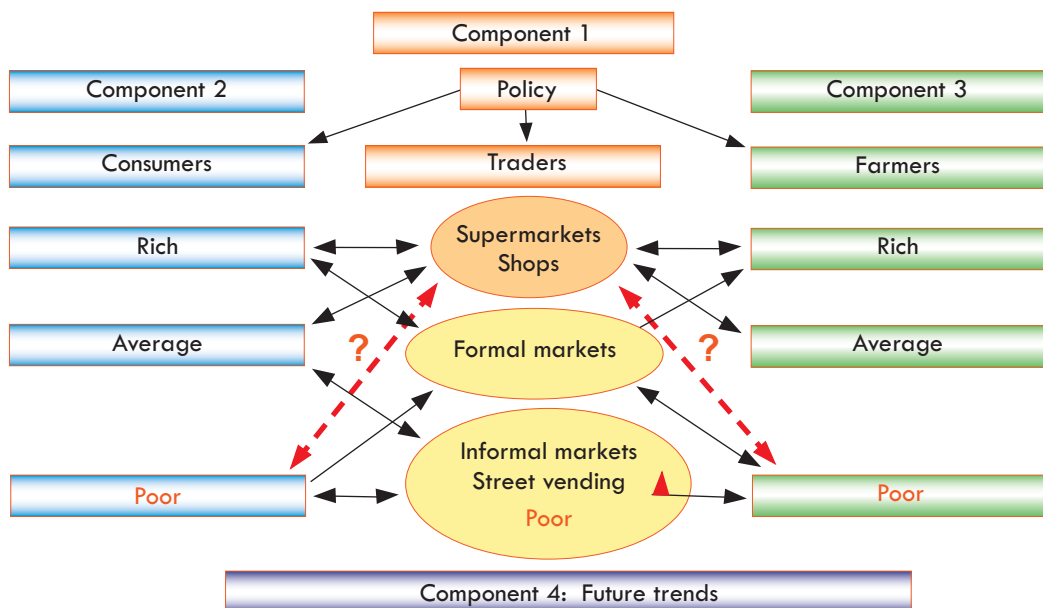
Source: (Moustier, Anh et al. 2006)

Step 7   Determine the employment variability over time

Look at the changes in employment over time, both within the year (seasonality), as well as between years. Timelines of changes in employment across different sub-chains over a longer period (e.g. 5 years) can be very informative and useful.

Table 43: Seasonal labour patterns in Houysan Village, Savannakhet Province, Lao PDR

Activity	Labour — Males	Labour — Females	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wet Season Rice	50%	50%		■	■	■	■	■	■	■	■	■	■	
Irrigated Rice	50%	50%	■	■	■	■	■							■
Vegetables	10%	90%	■	■	■							■	■	■
Maize	40%	60%				■	■	■	■	■	■	■		
Sweet Potato	40%	60%	■	■	■							■	■	■
Tobacco	80%	20%	■			■								
Resin	50%	50%							■		■			
Bamboo Shoots	20%	80%								■	■	■		
Daily Labour	60%	40%	■	■	■	■	■							
Alcohol Making	0%	100%	■					■	■	■	■	■	■	■
Blacksmith	100%	0%		■	■	■								

Source: (UNDP and NERI 2005)

Box 35: Survey questionnaire for calculating distribution of employment

Labour Use Schedule

Get the farmer to list all farm and non-farm activities and sources of income and livelihood. Put them into the categories below. Using 200 seeds, ask the farmer to partition and weight each activity according to total household labour use over the year. For After the farmer has finished weighting review the results with the farmer. Do pair-wise comparisons between the cells, asking the farmer to verify that the relative weightings are correct.

Farm and non-farm activities	Jan-Feb	Mar-Apr	May-Jun	July-Aug	Sept-Oct	Nov-Dec
Rice	___%	___%	___%	___%	___%	___%
Root and Tuber Crops (cassava, potato etc)	___%	___%	___%	___%	___%	___%
Upland Crops (maize, other cereals, legumes etc)	___%	___%	___%	___%	___%	___%
Vegetables	___%	___%	___%	___%	___%	___%
Perennial Crops (rubber, coffee, pepper etc)	___%	___%	___%	___%	___%	___%
Annual Industrial Crops (sugarcane, cotton, etc)	___%	___%	___%	___%	___%	___%
Fruit Trees	___%	___%	___%	___%	___%	___%
Fishing and Aquaculture	___%	___%	___%	___%	___%	___%
Small livestock (poultry, pigs, goats, etc)	___%	___%	___%	___%	___%	___%
Large Livestock (cattle, buffalo, etc)	___%	___%	___%	___%	___%	___%
Non-Timber Forest Products	___%	___%	___%	___%	___%	___%
Forest Products	___%	___%	___%	___%	___%	___%
Other Farm Activities	___%	___%	___%	___%	___%	___%
Handicrafts and Weaving	___%	___%	___%	___%	___%	___%
Off-Farm Work (Not Including Remittances)	___%	___%	___%	___%	___%	___%
				Check Sum Total	**= 100%**	

Source: (UNDP and NERI 2005)

4

The questionnaire above can be implemented in the field using a large sheet of card paper, which can be laminated to allow repeated use. The respondent can place seeds on each of the boxes to represent their labour use. The example in Figure 23 shown below is an analysis of a farming system in Mindano, Philippines. The picture indicates that the household spends an equal amount of time over the year "saging" their banana trees (weeding and cutting on a regular basis) and taking care of their single cow "Baka". They have a second field where they plant maize in July-Oct and rotate with sweet potato ("camote") and squash. Finally, under the banana trees they plant a small bit of taro ("gabi") which they harvest one year later (hence the activities all occur in the Jan-Feb period).

Figure 23: Example of analysing labour utilization using participatory approaches in the Philippines

The results of individual respondents can be grouped within specific categories (e.g. location, income level) and presented in a tabular format as shown below.

Table 44: Average use of labour (%) by livelihood activities - poor families in Houysan Village, Lao PDR

Farm and Non-farm Activities	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec	Total
Rice		5.6	7.4	14.6	6.2	12.0	45.8
Root and Tuber Crops (e.g. cassava, potato)							
Upland Crops (e.g. maize, other cereals, legumes)		1.8	2.6	3.4	2.8	2.0	12.6
Vegetables	4.6	3.2	1.2		3.2	3.4	15.6
Perennial Crops (e.g. rubber, coffee, pepper)							
Annual Industrial Crops (e.g. sugarcane, cotton)							
Fruit Trees							
Fishing and Aquaculture							
Small livestock (e.g. poultry, pigs, goats)	0.6	0.6	0.6	0.6	0.6	0.6	3.6
Large Livestock (e.g. cattle, buffalo)							
Non-Timber Forest Products			1.0	6.4	7.0	1.4	15.8
Forest Products	2.0	1.2	1.0	0.8	0.8	0.8	6.6
Other Farm Activities							
Handicrafts and Weaving							
Off-Farm Work and Remittances							
Total	**7.2**	**12.4**	**13.8**	**25.8**	**20.6**	**20.2**	**100.0**

Source: (UNDP and NERI 2005)

Table 42 above can be used to carry out additional analysis which can be presented in graphical format, such as the distribution of labour over the year (data presented in the final row of the table).

Figure 24: Graphic presentation of grouped labour use
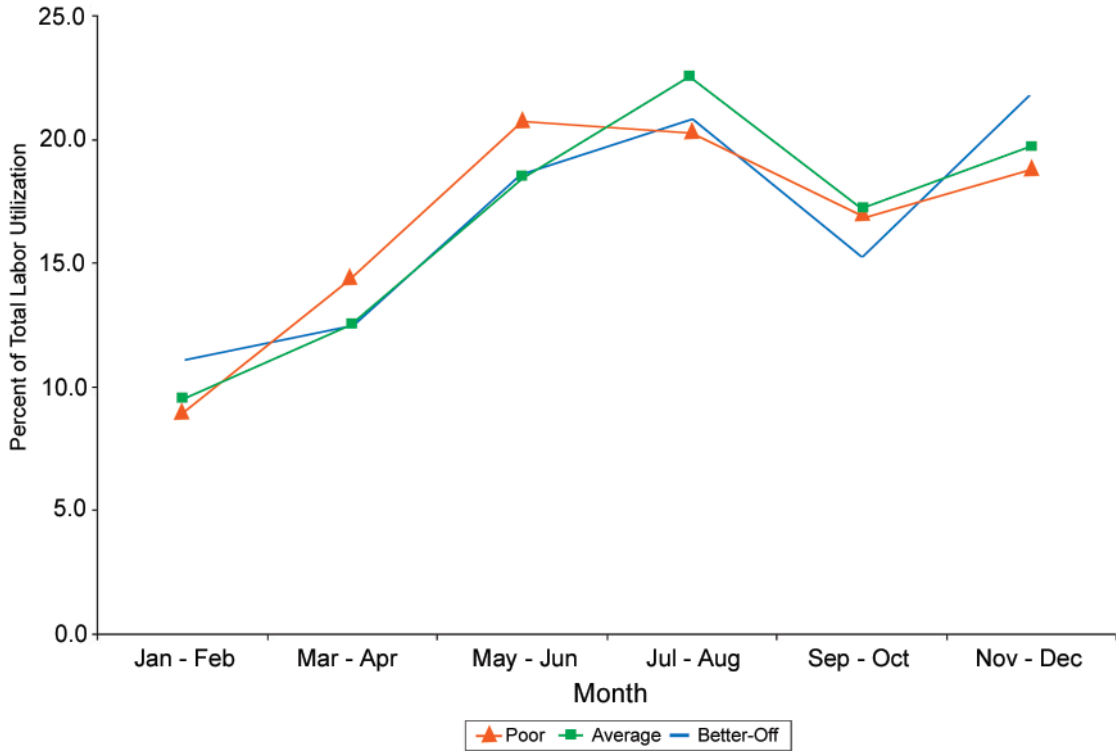
Source: (UNDP and NERI 2005)

Similarly, an analysis can be carried out to show the labour constraints over time, which may indicate when hired labour is used, and what changes to the production system may need to be put in place to alleviate labour shortages. Using the example questionnaire in Box 36 below, a graphical representation of seasonal labour constraints can be constructed.


Box 36: Example of survey questionnaire for calculating labour constraints

What are the seasonal labour constraints for the farmers? Get the farmer to place a ☑ or a ☒ in the appropriate row for each month.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Surplus Labour	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Enough Labour	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Lack of Labour	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Source: (UNDP and NERI 2005)

Figure 25: Graphic presentation of labour constraints by different household types over the year
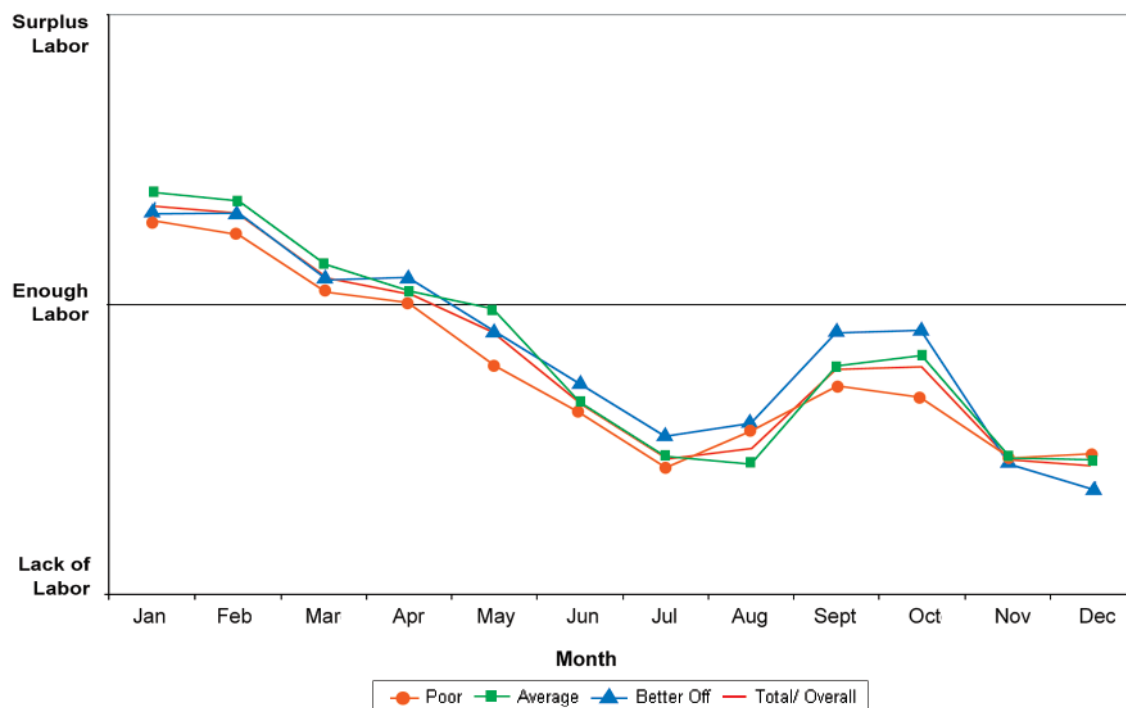
Source: (UNDP and NERI 2005)

5. What Should be Known

After Analysis is Complete After having followed all the steps, the key questions outlined below should be able to be answered:

1. What are the differences in employment within and between different levels of the value chain?

2. What are the impacts of the distributional outcomes of the value chain on the poor and other disadvantaged groups, both currently and in the future?

3. What are the changes in employment that result from the development of various types (e.g. vegetable trade through traditional open air markets versus modern supermarkets) of value chains?

4. What is the variability of employment and risks to livelihoods within and between various levels of the value chain?

5. What is the impact of various governance systems on employment distribution between and within various levels of the value chain?

6. What is the impact of various value chain technologies on employment distribution between and within various levels of the value chain?
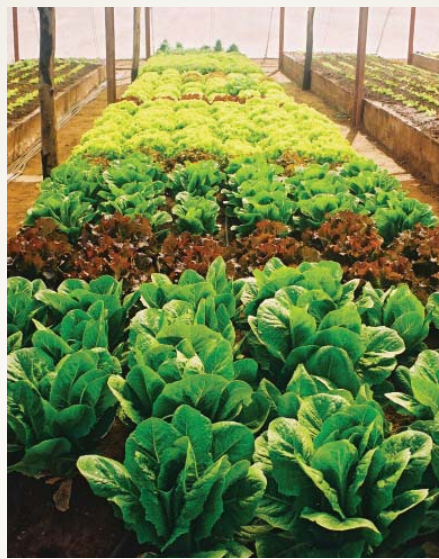
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