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VCA4D
VALUE CHAIN ANALYSIS FOR DEVELOPMENT

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Milk value chain analysis in Burundi

Value chain analyses assist in informing policy dialogue and investment operations. They help the understanding of how agricultural, aquaculture and fisheries development fits within market dynamics. They permit an assessment of the value chains' impact on smallholders, businesses, society, and environment.
The European Commission has developed a standardised methodological framework for analysis (https://europa.eu/capacity4dev/valuechain-analysis-for-development-vca4d-/documents/methodological-brief-eng). It aims to understand to what extent the value chain allows for inclusive economic growth and whether it is both socially and environmentally sustainable.

The value chain context

The growth in Burundi's cattle population, from 400,000 to 1,000,000 head between 2005 and 2022, bears witness to the rapid expansion of the milk supply in Burundi. This growth is the result of a series of projects that have been implemented by a number of donors over the last fifteen years to rebuild the livestock herd, which was severely affected by the socio-political unrest of the late 1990s.

The enthusiasm of rural households for livestock farming

reflects the attractiveness of this activity as a source of income, but also as a contributor to maintaining the fertility of farmland (through manure) under increasing demographic pressure. The value chain (VC) also generates numerous jobs in the trading and processing of milk in rural and urban areas. The public authorities would like to continue upgrading the VC, based on distribution and processing practices that comply with health standards.

The European Union intervention

In the 11th EDF, the European Union (EU) has contributed to the objectives of Burundi's National Development Plan 2018-2027 (NDP) through the projects 'Mesures d'appui à la résilience des populations du Burundi' et 'Soutien à l'entrepreneuriat du secteur agricole (SESA)'. It is involved in boosting milk production by financing projects to disseminate improved breeds and set up milk collection centres.

The EC funded the study of the milk CV to provide public and private decision-makers with a benchmark to support the debate on the future of the value chain. The contribution of the EU-funded Assistance Technique Agrinatura au Burundi (ATAB) project strengthened the expert capacity within the VC by including three lecturers from the University of Burundi in the study.

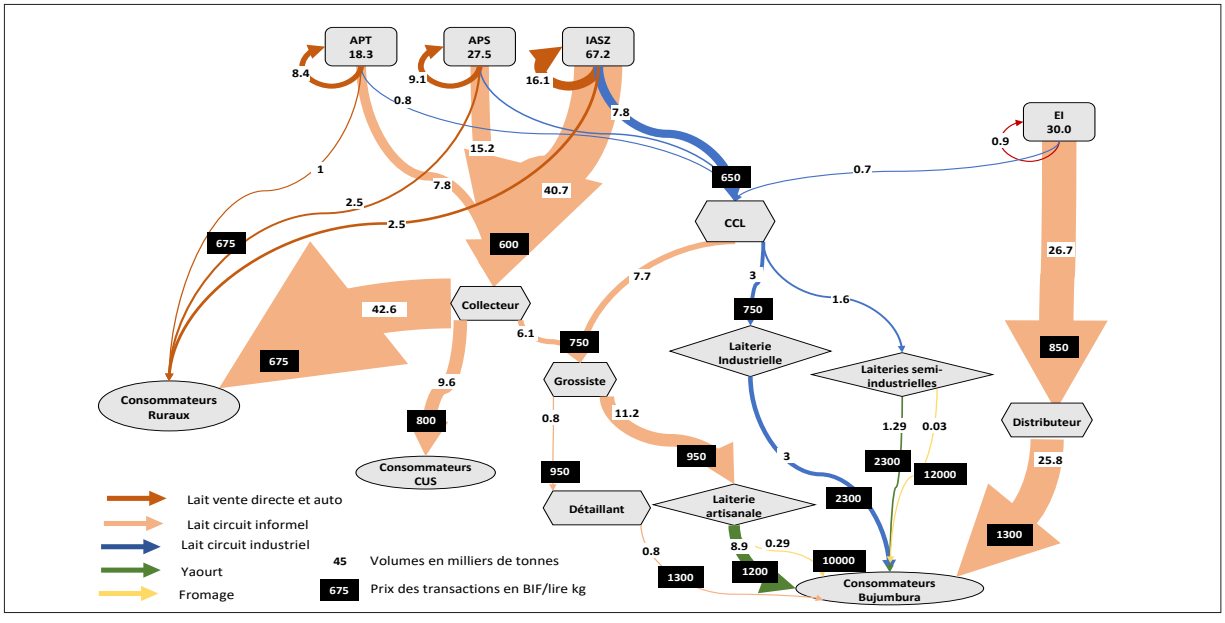

Figure 1: Flow chart of the milk value chain in Burundi

Functional analysis

Production

Milk production is estimated at **155 million litres of milk** for 2020, which corresponds to an average annual consumption of 11 litres of milk per inhabitant, admittedly still lower than the average consumption in neighbouring countries (more than 20 litres per year) but growing strongly. 32% of production is consumed by farmers themselves, 38% is consumed in rural areas close to production sites, and the remaining third is consumed in Bujumbura. This increase in demand has not translated into growth in imports, which remain very marginal (less than 500 tonnes per year since 2016).

Livestock farming systems

The **Agropastoral** system (APT) is the historical livestock farming system based on grazing a herd of 5 head on average, producing 1,000 litres of milk per year per cow, mainly of the local breed. Half of the milk is consumed within the household. This system accounts for 13% of total milk production and involves 16% of farmers (59,000).

The **Agropastoral** system with semi-permanent stabling (APS) combines pasture feeding with forage intake in the stall. This system of transition to more intensive practices includes more improved breeds, with annual milk production per cow of up to 1,300 litres. It accounts for 19% of total milk production for 10% of farmers (36,000).

The **integrated agro-silvo-zootechnical** system (IASZ) is the system promoted by projects to support livestock restocking. It is based on feeding fodder (self-produced or purchased) in stalls of one or two head of improved breeds, which produce 2,500 litres of milk per head annually. Milk is a strategic source of income for households (regular sales), which consume only a quarter of their production. This system accounts for 47% of production and includes 74% of farmers (268,000).

The **Intensive Breeding** (IB) system corresponds to large herds (35 head on average) of improved breeds, reared in stalls and fed on totally purchased fodder. Yields are around 2,500 litres of milk per head per year. These farms very often belong to urban households wishing to diversify their sources of income and build up capital (civil servants, pensioners, etc.). They supply the major towns and are expanding into peri-urban areas. They produce 20% of total milk production and are estimated to number 650 units.

The informal sub-system

Of the 120 million litres of milk traded annually, 96% is distributed by informal actors. Most of the milk is traded close to where it is produced (within a 20km radius) by **collectors** in rural areas (5,300) and by **distributors** in peri-urban areas (150) equipped with plastic containers and bicycles or mopeds. Around fifty wholesalers market milk over long distances (11% of the informal system), mainly to Bujumbura. The milk is processed into yoghurt and cheese by **small-scale dairies** (65 actors) or resold fresh by **retailers** (250 actors).

The industrial sub-system

The industrial sub-system is based on the establishment of **Milk Collection Centres** (MCCs) financed by livestock restocking projects. These fifty or so centres supply a nascent dairy industry consisting of one **industrial dairy** producing UHT milk and yoghurt, and around ten **semi-industrial dairies** producing yoghurt and cheese. The market for "formal milk" that complies with health standards remains very marginal (4% of total consumption), constrained by a retail price that is higher than that prevailing in the informal sub-system (BIF 2,300 - €0.95 - per litre for UHT milk BIF 1,300 - €0.54 per litre for "informal milk"). The semi-industrial and industrial dairies are not operating at full capacity and cannot buy all the volumes collected by the MCCs, 60% of which is sold in the informal sub-system.

Governance

The governance of the informal sub-system is based on non-exclusive interpersonal relationships that allow **competition between suppliers and customers**. However, these relationships are highly stable and habitual, which reduces transaction costs and guarantees the confidence needed to market a perishable product. Relations between the actors in the industrial sub-system are mainly governed by **contractual relations concerning** prices, volumes and milk quality.

What is the contribution of the value chain to economic growth?

Viability of actors

The VC is attractive for all actors in the informal sub-system who have a positive profit/cost ratio of between 10% and 40%, with the exception of the industrial dairy, whose low capacity utilisation means that it can just about cover its costs, with a net operating profit (NOP) of almost zero. The remuneration of a day's family work among farmers is much higher (BIF 6,000 - €2.5 to BIF 4,500 - €1.78) than what they could obtain for low-skilled jobs (BIF 2,500 - €1) and confirms the value of investing in livestock farming for rural populations.

As milk is mainly consumed fresh close to where it is produced, livestock farming generates 74% of the Direct Value Added (DVA), compared with 20% for trading operations and only 4% for processing for the VC as a whole. The **distribution of NOP between the three groups of actors is similar**. On the other hand, in the industrial sub-system, processing operations account for 60% of DVA, while livestock farming accounts for only 35% of DVA and trading for 5% (Figure 2). However, in this industrial sub-system, livestock farming still accounts for the majority (62%) of NOP, while industrial processing accounts for only a small proportion, confirming its low profitability.

Impact on the national economy

The Total Value Added of the milk VC in 2020 was BIF 126 billion (€52.5 million), representing 2% of GDP and more than half the value added of the livestock sector. **The purchase of fodder by livestock farmers accounts for 82% of intermediate consumption in the VC** (Figure 3). This fodder is supplied by agriculture and the co-products of the agri-food industries (bran, molasses, hemp), which maximises the knock-on effects of the VC on the Burundian economy. With an integration rate of 86%, the VC depends very little on imports.

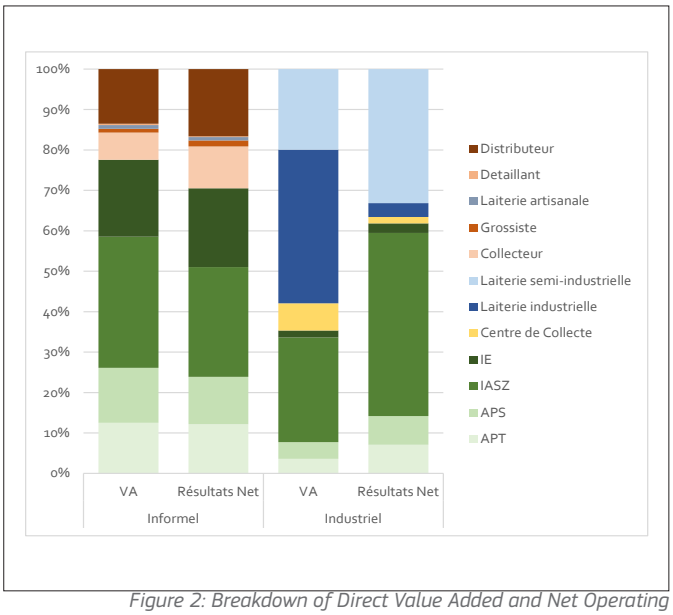

Figure 2: Breakdown of Direct Value Added and Net Operating Profit in the informal and industrial sub-systems

In terms of contribution to public finances, subsidies to the VC (BIF 3.4 billion in annual equivalent, t €1.36 million) for restocking livestock and building MCCs is offset by taxes of BIF 4.5 billion (€1.8 million), mainly collected from traders and processors, 60% of which relates to the supply of inputs and services to VC operators. Finally, 75% of the DVA corresponds to the remuneration of the actors and the salaries paid by these actors.

Viability in the international economy

The VC has little exposure to international competition; the volumes of imports recorded by customs remain marginal (less than 500 tonnes per year since 2016), supplemented by flows of unrecorded cheese imports. The preponderance of the informal sub-system supplying mainly fresh milk enables the VC to be competitive. However, if UHT milk prices were to be brought into line with those in neighbouring countries, the NOP would fall by 50%.

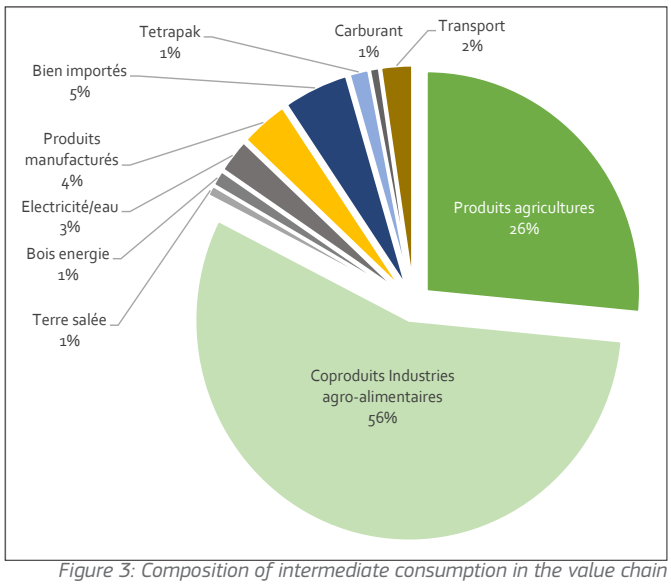

Figure 3: Composition of intermediate consumption in the value chain

The milk value chain is attractive to farmers, as milk production provides better remuneration for their work than alternative activities. Most of the Value Added is generated at the livestock production level, because milk is not processed to any great extent and because the purchase of fodder accounts for most of the effects on the rest of the economic activity. The dairy industry benefits from low exposure to international competition, but is not very profitable because of low demand for milk that meets health standards.

Is this economic growth inclusive?

Income distribution and governance

The milk VC provides work for **360,000 farmers**, plus **5,300 self-employed milk collectors** and 500 companies employing 17,000 wage laborers. The NOPs per player vary from 1 to 1,000 and are determined by the volumes of milk produced or processed by each, ranging from around 1,000 litres of milk per year for the smallest farmers to several hundred thousand or even millions of litres for the largest. However, the margins (NOP/Production) observed for trading and processing vary from 1% (MCC, industry) to 5%, 10%, for intermediaries in the informal sub-system, which does not indicate the existence of a position of rent and excessive market power. **The competition that prevails in the informal sub-system and the consultation and contractualisation processes in the industrial sub-system reinforce the inclusive and redistributive nature of the value chain.**

Jobs

The VC generates 17,000 full-time equivalent salaried jobs (252 working days), the remuneration of which accounts for 18% of all income distributed in the VC. Farming operations account for the bulk of employment (80%), while 12% is in distribution operations in the informal sub-system and 8% of jobs are in the industrial sub-system. Female employment is very much in the minority (20%), and most jobs are unskilled and temporary (day labourers and those without contracts).

The value chain is a source of income for more than 365,000 households, most of which are livestock farmers. The income differential between actors is significant, but is determined by their volume of activity rather than their dominant positions in the system. The 17,000 salaried jobs are mainly low-skilled rural jobs, and mainly held by men.

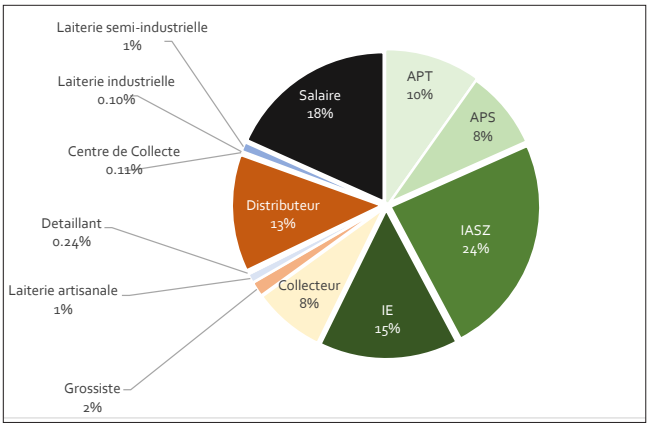

Figure 4: Breakdown of actors NOP and salaries paid in the VC

Is the value chain socially sustainable?

The income generated by the milk VC has a positive effect on the living conditions of those involved and on the food and nutritional security of farmers, with attractive incomes. Particular attention needs to be paid to the **materialisation of formal rights (unionisation and association)** and to health and safety protection in industrial and processing operations. Women are largely under-represented in the VC, both as actors and as employees. This imbalance is particularly marked when it comes to land issues, both in customary law and in the **establishment of Communal Land Services**, which is a **major challenge in a context of strong demographic pressure**.

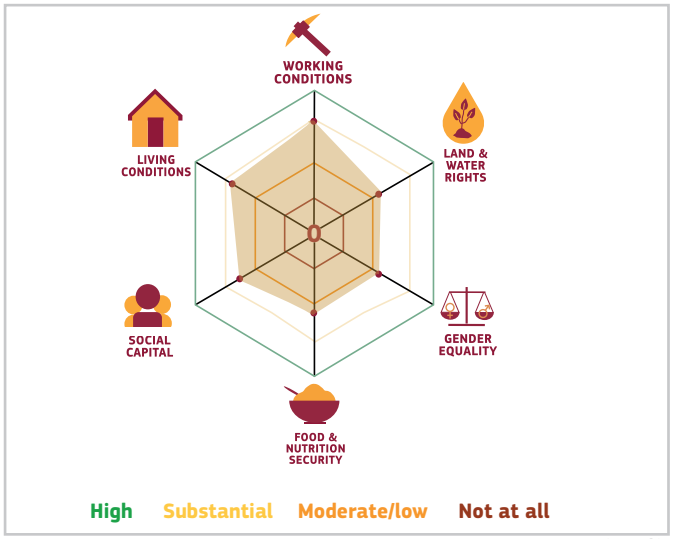

Figure 5: Social profile

Working conditions	• Lack of safety systems to minimise the risk of accidents at work in processing companies
Land and water rights	• Marginalisation of women in land rights
Gender equality	• Under-representation of women in the VC • Multiple dimensions of gender inequality in rural areas
Food and nutrition security	• Scarcity and degradation of arable land
Social capital	• Farmers' limited trust in cooperative managers and milk buyers. • Lack of reliable means of disseminating information • Limited capacity of dairy co-operatives
Living conditions	• Household poverty and an environment that limits rural initiatives

Livestock farming is a key component of rural Burundi, and adding value to milk clearly helps to improve the living conditions of those involved in the value chain. However, the social sustainability of milk is affected by the issue of access to land resources, particularly for women (who are not very involved). The dynamism of the interprofessional association does not compensate for the low participation of farmers in dairy cooperatives.

Is the value chain environmentally sustainable?

The environmental impact of milk VC is relatively minor in relation to the estimated total impact of human activities in Burundi and in relation to its contribution to growth (2%). Thus, the damage caused by the VC represents only 1.2% of the total impact caused by human activities in the country on human health, 0.2% of the total impact on ecosystems and 0.001% of the total impact on natural resources. In terms of greenhouse gas emissions, the VC accounts for 4.7% of Burundi's total estimated emissions.

Impacts by sub-system and stage

The industrial sub-system generates more impact on natural resources because it uses resources (wood, fuel and water) more intensively per litre of milk produced, particularly during processing. If we analyse the impacts according to the different stages of the VC, the production stage has the greatest impact throughout (Figure 5). **There is little transport and processing in the VC,** as most milk is consumed fresh and close to the farms.

Biodiversity

The impact of the VC on biodiversity is difficult to assess because the interactions between livestock farming and the natural environment are particularly complex. It should be emphasised that areas with high livestock densities largely correspond to areas of average species richness (biodiversity), which limits the effects of livestock farming on the degradation of biodiversity. However, while the promotion of zero-grazing could reduce the direct land pressure of grazing livestock systems, and therefore their impact on biodiversity, it will also lead to a greater demand for fodder. **The impact of the VC on biodiversity could increase as a result of fodder cultivation practices** (excessive use of fertilisers, pesticides, etc.). It will also depend on the location of fodder production areas. Finally, the promotion of improved breeds in the process of reconstituting livestock herds ultimately encourages the marginalisation of local breeds and therefore the loss of animal biodiversity.

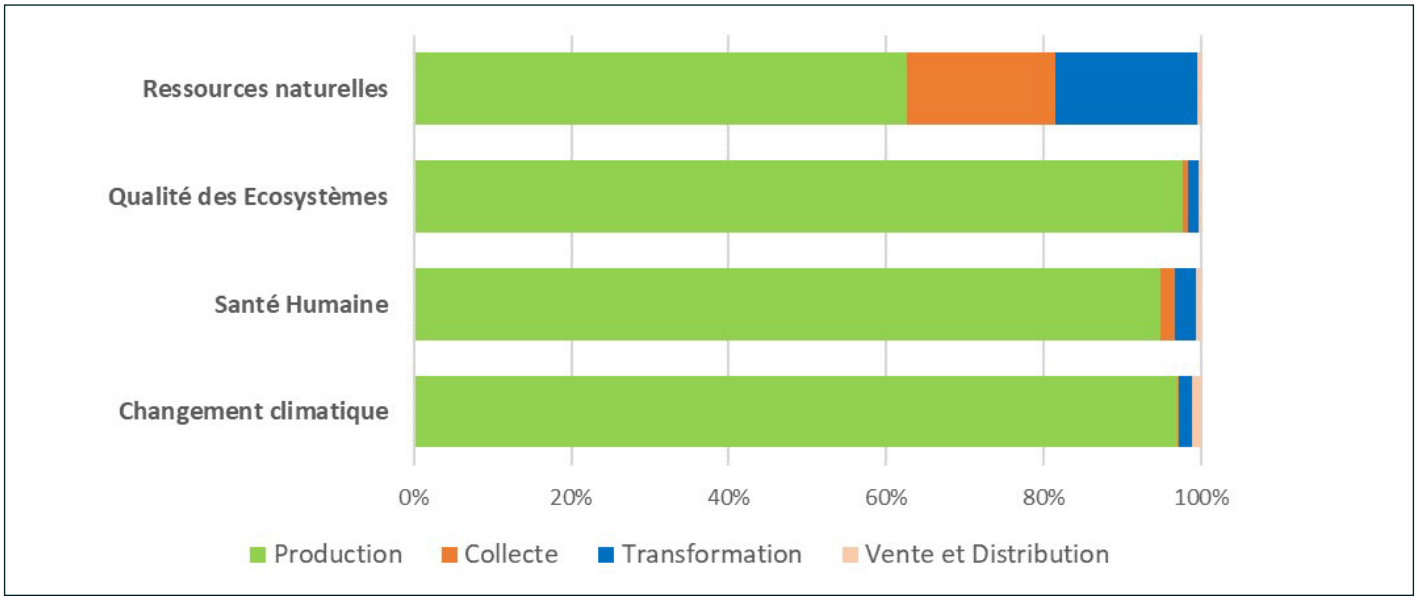

Figure 6. Contribution of the various stages of the VC to the impact on natural resources, the quality of water and the environment. ecosystems, human health and climate change

The configuration of the milk value chain in Burundi generates relatively little environmental damage in relation to its volume of activity. This is due to the large proportion of milk consumed fresh close to where it is produced, which limits the use of resources (energy, water) for transport, processing and marketing. Livestock farming systems are the main sources of impact, particularly greenhouse gas emissions. These could be reduced by the transition to more productive systems. While this transition to stall-based farming systems could also reduce pressure on the use of natural resources, it could, on the other hand, lead to greater use of inputs, which would have an impact on all areas.

Main findings and recommendations

Key findings

The dairy value chain is still essentially a rural VC, whose strong growth is determined by multiple objectives within farms (income, maintaining fertility). However, its development is also responding to growing demand in rural and urban areas, providing sources of income for thousands of actors involved in marketing and processing milk. **The transition to more intensive systems of 2 to 3 head of cattle based on zero-grazing has strong effects in terms of social inclusion**, income distribution and improved living conditions, with little impact on the environment.

STRENGTHS	WEAKNESSES
• Successful reconstitution of livestock herds with improved breeds • Attractiveness of livestock farming for producers (manure + income) and for downstream actors • High social capital (operational interprofessional association)	• Low productivity of farming systems • Insufficient supply of suitable fodder • Low capacity utilisation in the industrial sub-system • Quality of 'informal' milk uncertain
OPPORTUNITIES	**THREAT**
• Growing market for fresh milk • Strong interdependence between the informal and industrial sub-systems, which could facilitate the gradual modernisation of the informal sector.	• Limited consumer purchasing power constrains the emergence of an industrial sub-system • Intensification of production may increase environmental impact

Recommendations

The development of the VC is constrained by a ceiling on yields in systems under transition. Productivity of cows can only be increased by improving fodder systems that are well integrated into crop systems. **This increase in productivity is necessary to meet the growing demand for milk without increasing the pressure of livestock farming** on increasingly limited **natural resources** (land). It must also facilitate the viability of an emerging dairy industry by providing it with cheaper raw materials, so that it can offer milk that complies with health standards at a price affordable to a larger proportion of urban consumers. The support, continuation and **consolidation of this transition process** within the VC **will depend on the quality of collective action** between farmers and with downstream actors.

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Agrinatura (http://agrinatura-eu.eu) is the European Alliance of Universities and Research Centers involved in agricultural research and capacity building for development.
The information and knowledge produced through the value chain studies are intended to support the Delegations of the European Union and their partners in improving policy dialogue, investing in value chains and better understanding the changes linked to their actions. VCA4D uses a systematic methodological framework for analysing value chains in agriculture, livestock, fishery, aquaculture and agroforestry. More information including reports and communication material can be found at: https://europa.eu/capacity4dev/value-chain-analysis-for-development-vca4d-

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