



Pineapple value chain analysis in the Dominican Republic

Value chain analyses assist in informing policy dialogue and investment operations. They help the understanding of how agricultural 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/value-chain-analysis-for-development-vca4d/wiki/1-vca4d-methodology>). It aims to understand to what extent the value chain allows for inclusive growth and whether it is both socially and environmentally sustainable.

Context of the value chain

Pineapple production developed thanks to the presence of two multinational agro-industries that settled as concessions on State land between 1987 and 1995. The sudden departure of these two enterprises in the mid '90s, left a large number of skilled technicians and knowledge, as well as a technological package that keeps being used nowadays in the country.

Some of these technicians, as well as other producers, accessed lands in those production areas and formed associations to relaunch the pineapple cultivation. The introduction of the MD-2 variety from Costa Rica in 2000, together with the launch of a national programme and of various initiatives to support the sector, led to a new development of pineapple production at the national level.

The European Union Intervention

The programme "Fortalecimiento de la Calidad para el Desarrollo de las MIPYMEs" (quality improvement for the development of micro, small and medium enterprises (MSMEs)), implemented by the Ministry of Industry, Commerce and MSMEs (MICM), supports the strengthening of the value chains (VCs) of cosmetic products and of processed fruits, linked in particular to pineapple, mango and avocado. The objective is to improve the quality of the production of MSMEs in order to increase their competitiveness in domestic and foreign markets and to contribute to a more inclusive and sustainable economic growth in the country. The EU also has other programmes to support the banana, mango and pineapple VCs and various other sectors via small-scale rural projects, such as the one managed by the CODESPA foundation.

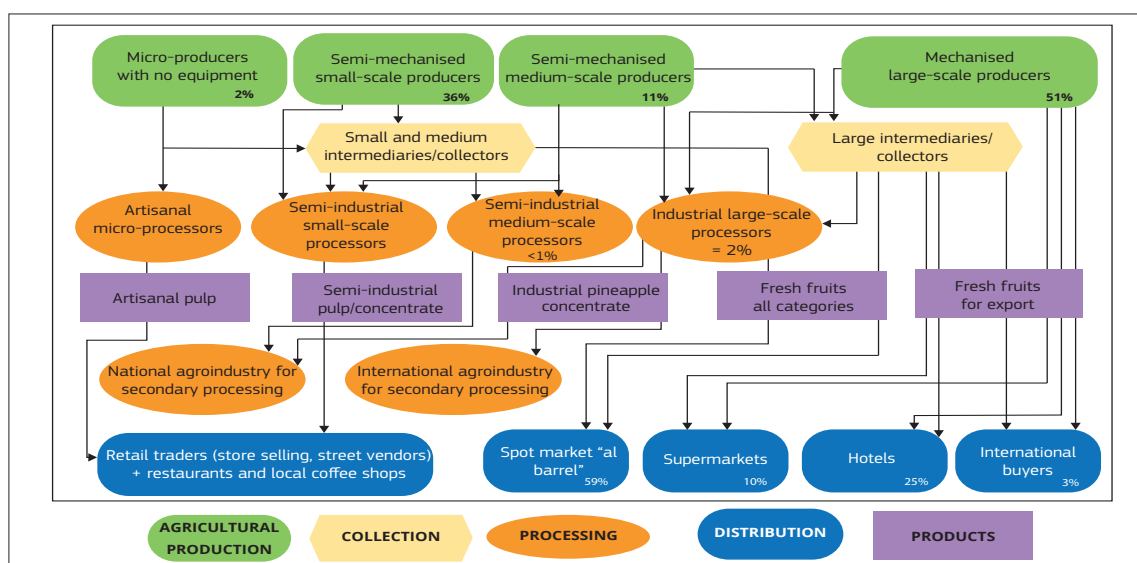


Figure 1: Map of the pineapple value chain in the Dominican Republic

Warning

This summary is extracted from the study on the "Processed fruits VCs (mango, pineapple)". Two separate documents have been chosen in order to highlight the figures of each chain.

Functional analysis

A diversified production but geographically concentrated and dominated by a few actors

In 2018, the volume of pineapple production was around 263,000 t over a total planted area of 5,900 ha (1/3 being plantations in development and nurseries), **mostly located in the centre of the country**, in the provinces of Sánchez Ramírez and Monte Plata. Pineapple is cultivated in **monoculture plantations** (with the hybrid variety MD-2 which has a strong market demand from the USA).

There are **4 types of producers that differ depending on the surface, on the density of the plantation, and on the agronomic practices linked to the level of technology and mechanisation used** (Figure 2). Most producers are micro or small, scarcely mechanised, using few or inadequate agrochemicals and with no equipment. **7 large producer/exporter companies control the majority of the planted areas and production**, with high usage of agrochemicals, technologies and mechanisation. The trend is towards a high concentration of the production.

The entry of increasingly large companies that buy land to produce and export pineapple, represents a threat for the other producers. In fact, the fruits rejected for export are sent to the local markets, lowering the prices, thus imposing a readjustment of prices also to the small and medium producers who only access the domestic market.

Production generates a large amount of waged work on the fields, generally done by Haitian men paid in advance or at the minimum wage. Most producers of all types are organised in two associations (APROPIC and ASOPROPIMOPLA) that gather producers from different sub-chains. The two associations have been assembled in a **cluster**, named Conjunto Productivo de Piña, created by the **Junta Agroempresarial Dominicana (JAD)**, that could play a key role to help producers in accessing support and technical assistance in a context where the public extension services are scarce.

Types of producers	Number of producers	Area (ha)	% area	Production (t/year)	% production
Micro-producers with no equipment	1,000-1,200	1,000	17%	6,000	2%
Semi-mechanised small-scale producers	330	2,300	39%	94,500	36%
Semi-mechanised medium-scale producers	30	600	10%	28,500	11%
Mechanised large-scale producers	7	2,000	34%	134,000	51%
Total	1,350-1,550	5,900		263,000	100%

Figure 2: Types of pineapple producers

Sub-chains differentiated by volumes and quality of the product

The classification of fruits is the first step to integrated certain sub-chains and aggregate value. Differentiated according to quality, fruits classified as premium, second rate or reject are sold at different prices in the sub-chains of fresh and processed fruits (Figure 3).

Non-classified fresh fruits for traditional markets	59% of the production
Quality fresh fruit for supermarkets and national hotels	35% of the production, direct selling from large-scale producers or via big intermediaries
Quality fresh fruit, packaged for export	~ 3.2% of the production, 27 producers selling via 9 exporters/packaging units (that are also large-scale producers)
Agro-industrially processed fruit, in concentrate for second processing in the domestic market and for export	~ 1.8% of the production – only 2 companies producing concentrated
Semi-industrially processed fruit in the form of pulp for the domestic market and export	< 1% of the production, number of enterprises unknown, 1 enterprise identified
Artisanal processed fruit in the form of pulp for the domestic market	Number of enterprises unknown

Figure 3: Pineapple sub-chains

Regarding export, which is still incipient, there are certifications (GlobalGAP for European markets, organic) that are not always used by the few established exporters. The issue of certification represents a critical barrier to access the export market for small and medium producers, even when they are organised and comply with the quality requirements.

In the other sub-chains, intermediaries collect, classify and transport pineapple to sell it in the domestic markets of fresh and processed fruit, in which prices variations are significant during the year in spite of the national demand being high. This is a limitation to processing: with low purchase prices, producers cannot cover their production costs and they do not want to sell to processors. In fact, most of the pineapple production costs are high due to the consistent use of agrochemicals.



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Economic analysis

Profitability for the actors

The activities of the pineapple value chain are financially viable: all types of producers have positive operating profits. **Except for the micro-producers, all producers obtain significant returns on turnover**, beyond 65%.

The use of technology in production affects the costs for large-scale producers, with a considerable part being absorbed by the depreciation of technology, the use of agrochemicals and the labour force.

Large-scale producers obtain the highest operating profits from the value chain, followed by small and medium intermediaries (high prices in the domestic market).

Effects within the national economy

The total value added (VA) of the pineapple VC is estimated at 9,300 million DOP (€162 million) in 2018, representing around **6.2% of the agricultural GDP**. The direct VA is distributed mostly to producers (45%), traders (32%) and waged workers (21%) (Figure 4). The value chain has a low spill over effect on other sectors of the economy.

The sub-chains that aggregate the most value at national level are **fresh fruits of high quality and non-classified fruit directed to the traditional market**. However, processed products are those that create the highest operating profit per kg of fresh fruit: i.e. more than 80 DOP (€1.4) for semi-industrial pulp and concentrate.

The VC impact on the balance of trade is negative, the VC generates a trade deficit of 341 million DOP (€6 million): low volumes of pineapple are exported while agrochemical inputs are imported. Indeed, **pineapple production depends strictly on the use of agrochemicals that are mostly imported** (58% of intermediate consumptions are represented by direct imports). This situation also negatively impacts the environment and human health, including of workers in the fields. The VC also has a **weak contribution to the public finances**, i.e. 109 million DOP (€1.9 million).

Viability in the international economy

The Domestic Resource Cost (DRC) of the VC is below one (0.4). This means that the VC represents a gain for the country, given that the economic value generated by the VC, measured at the international prices, is higher than the costs of the domestic factors used for production (labour, land, etc.). **The Effective Protection Coefficient (EPC) above 1 (1.5)** indicates that the difference between the international and domestic prices (influenced by the national price policies) favours the VC: the direct VA in domestic prices is 50% higher than the one calculated at international prices. This means that **the VC is not competitive at the international level**.

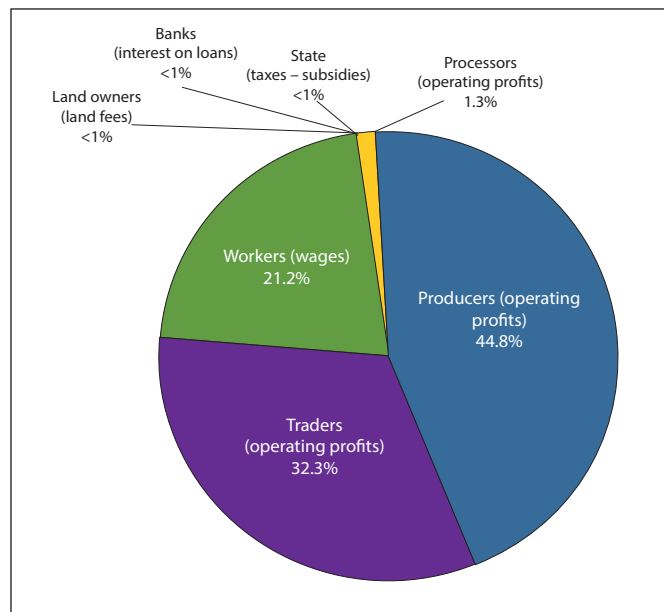


Figure 4: Direct value-added distribution per actor

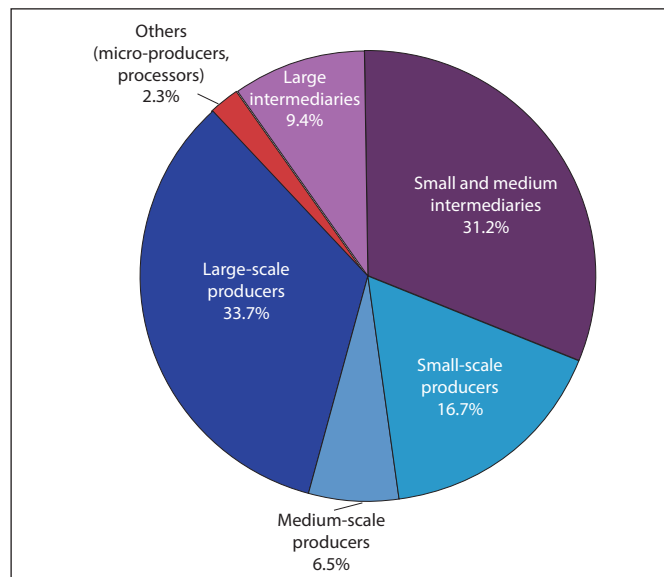


Figure 5: Net operating profits distribution per actor

WHAT IS THE CONTRIBUTION OF THE VC TO ECONOMIC GROWTH?

The VC contributes more than 6% to the agricultural GDP. This represents a significant percentage, considering that there are less than 1,500 producers (0.6% of all producers at the national level) cultivating on less than 1% of the total area sown.

Overall, the national economy is affected by the negative impact of the value chain on the balance of trade, due to the high costs of the mostly imported agrochemical inputs. However, except for the micro-producers, all producers obtain high returns on turnover, especially the large ones. Export and processing are still emerging while commercialisation is well-developed.

Social analysis

Figure 6 and the table provide an image of the situation in the six strategic domains of the social analysis.

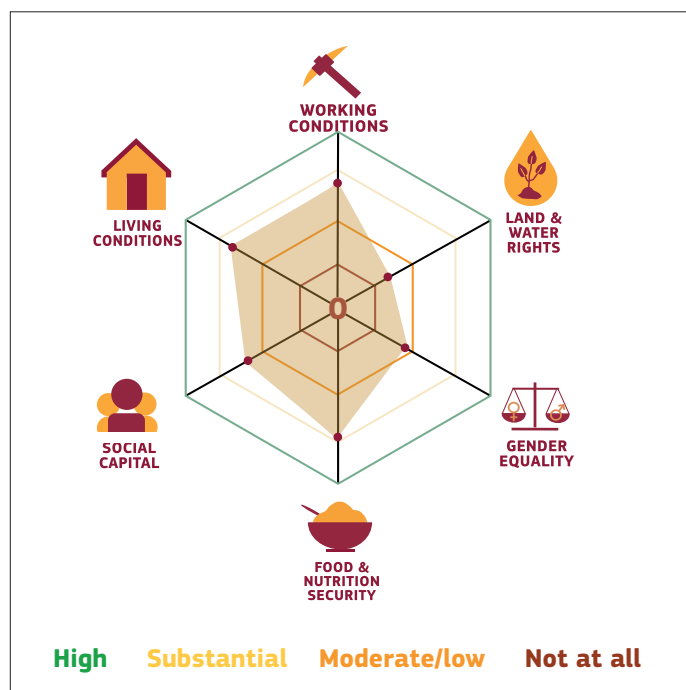


Figure 6: Social profile

IS THIS ECONOMIC GROWTH INCLUSIVE?

The income distribution is more equal in the pineapple value chain (than in the mango) at all levels. The main part of the net operating profit is distributed between the large producers (34%) and the small and medium producers (24%). The small and medium intermediaries gain another substantial part (31%) while the large intermediaries only receive 9% (Figure 5).

The VC generates many direct jobs at all levels, i.e. around 7,300 permanent employments and 5,800 temporary ones. It is important to underline that Haitians have a considerable role in the production, not only as labour force but also as foremen, which represents an opportunity for social mobility.

IS THE VC SOCIALLY SUSTAINABLE?

The value chain has a positive impact on food security and living conditions even though the social sustainability of the value chain is precarious. The symptoms of this precariousness are represented by the high-barriers to access some sub-chains, the scarce availability of public extension services, the land concentration, the informality and gender inequality existing in the different steps of the value chain. This can marginalise the most vulnerable producers.

Working conditions	<ul style="list-style-type: none"> Informality concerns most actors in the VC (work precariousness), jeopardising the access to markets, credits and other forms of support. Most field workers are Haitians. They do not have formal contracts nor social benefits, but they have medium to long-term oral agreements. There are no differences in wages and labour conditions between Haitians and Dominicans. Indeed, given the labour force scarcity in the country, Haitians are demanded to work in the cultivations (included as foremen). In large farms, there is large use of tractors, heavy machineries and agrochemicals. This increases the risk of accidents for workers.
Land and water rights	<ul style="list-style-type: none"> Producers generally rent the land to cultivate pineapple, except for large companies that buy it. Prices to obtain land with property titles are much higher. There is a general trend towards land concentration. The difficulty to obtain land titles reduces the attractiveness for foreign large-scale investments.
Gender equality	<ul style="list-style-type: none"> Women have limited access to production assets and weak empowerment. Few women are active in the VC as owners. Women are the predominant waged workers in packaging and processing companies.
Food and nutrition security	<ul style="list-style-type: none"> Production and availability of pineapple increased consistently in the last years. At local level, pineapple production guarantees better living conditions and provides income (although with high risks) that households can use to buy food.
Social capital	<ul style="list-style-type: none"> Currently, there are very few concrete actions of collective strategies promoted by producers' associations and the level of entrepreneurship is weak. Strong trust relationships exist among the VC actors, except between producers and the rest, and between intermediaries and buyers from hotels and supermarkets. Large-scale producers have better access thanks to their networks and their access to private consultants.
Living conditions	<ul style="list-style-type: none"> The endowment in infrastructures and services (health, education) reveals the significant gap between the rural and urban areas. If there are health and education infrastructures, their quality is not adequate.

Environmental analysis

Impacts at the different steps of the value chain

The analysis of the sub-chains reveals that the steps of **production and transport by the intermediaries represent more than 95% of estimated damages** on all the three areas of protection: resources depletion, ecosystems and human health (Figure 7).

Impacts according to the type of farm

In all types of farms, **field emissions represent the main contribution to damages on human health and ecosystems**. Concerning the use of resources, damages are mostly caused by the **production of fertilizers, the ploughing activities** (for micro and small producers) and **the use of vehicles for harvesting** (medium and industrial farms). More intensive farms entail impacts because of the use of **small tractors**, for the harvest and the spraying of products.

A scenario considering the **expansion of cultivation in forest areas** revealed that in cases of deforestation **the environmental impacts could increase by 30%** (due to the loss of carbon stock from biomass and soil). Thus, the promotion of large-scale cultivations could represent a threat to the environmental sustainability.

Impacts caused by intermediaries' activities and processing

Transport operations are key as an environmental burden. By ton of fruit, **vans used by the small intermediaries have more impact than the trucks of 22 t used by the large intermediaries**. This difference is determined by the load capacity that each vehicle can transport (more volume per journey means a smaller impact per ton) as well as by the frequency of return journeys with empty trucks. In relations to processed and frozen products, the **use of electricity for refrigeration, even though with high costs and low accessibility, is a challenging issue**. Some industrial companies are trying to develop



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the cogeneration of electricity via the use of biomass. A scenario considering the **import of pineapple concentrate** as a replacement to the national one, revealed that its import from Brazil **would not have a negative environmental effect**. In fact, the impacts from transport are compensated by a lower impact in the processing of the fruit in Brazil, thanks to a better source of energy used. These imports are however minimal.

Impacts of the sub-chains

The export sub-chain causes the highest damage per t of pineapple in all of the three areas of protection (Figure 8). The damages are determined mostly by the inputs used to produce premium pineapple as well as by the transport from the farm to the packaging units. If the transport abroad is also considered, given that pineapple is exported to Europe by airfreight, this impact is multiplied by 20. **The sub-chain that has the least impact is the one of fresh fruit for hotels**, as it uses optimised transport means.

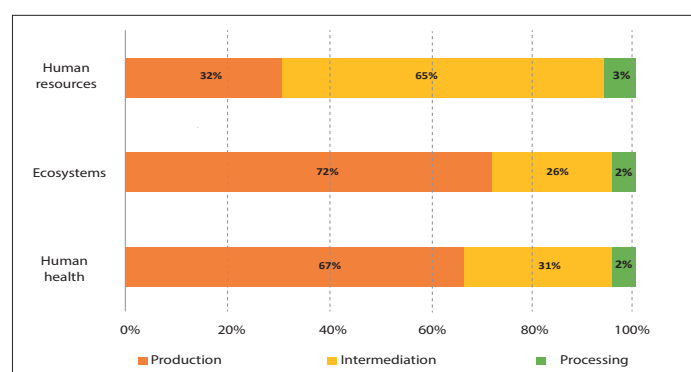


Figure 7: Environmental damages on the areas of protection according to the step of the VC

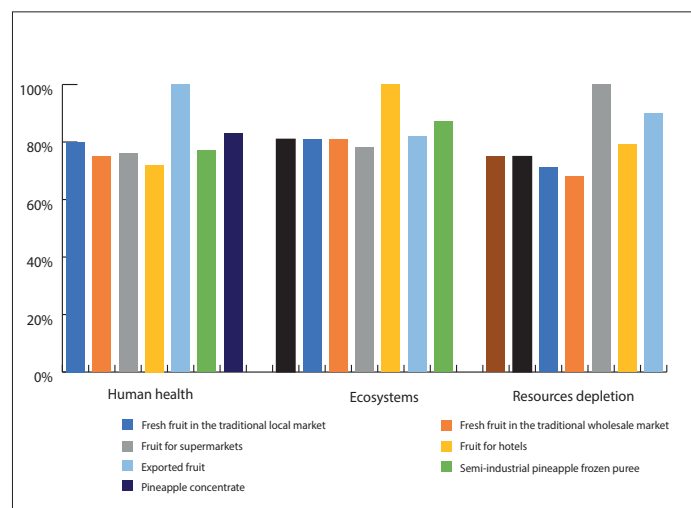


Figure 8: Comparison of the sub-chains per t of fresh pineapple

IS THE VC ENVIRONMENTALLY SUSTAINABLE?

From the environmental point of view, the pineapple production stage is the most affected due to the production of fertilizers and the use of agrochemical inputs. There are different ways to improve sustainability. Increased knowledge on the use of agrochemical inputs can reduce the quantity used. Practices such as the flower induction and a better management of nurseries can improve productivity. Another possibility is to reduce the use of chemical inputs and support the development of the organic ones. Despite the potential in this domain, there is currently only one company that is establishing cultivations with the use of organic technology. Finally, another environmental challenge is to reduce the impact of small intermediaries that use vans for fruit transport to the local markets.

Findings and recommendations

Activities in the pineapple VC are profitable and financially viable. However, most of the profits go to a small number of large-scale producers that access the most profitable markets (for export but also the high-quality domestic market). Inclusiveness is jeopardized by the weak role and malfunctioning of producers' associations that did not manage to improve the market access for small and medium producers. The latter are weakened by their difficult conditions on land tenure (rental) and on access to credit as well as to technical information. Therefore, they have little opportunities to improve their agronomic practices, which impact on the environment.

Selling quality products inside the country requires addressing the barriers to market access

Domestic markets have a strong potential for increasing value and, possibly, including more producers. The sub-chains for the domestic market are the development engine of the VC, especially those serving supermarkets and hotels. However, because of the multiple market barriers, not all actors can take advantage of this potential. The creation of niche products and the dynamic of public purchasing could generate new market opportunities for processed and fresh fruits.

Processing: adds value to fruits and waste, and creates employment

Reducing or valuing fruit waste, that is consistent in pineapple production, is a key element for the future of the VC. However, because of the high production costs and the low prices that can be obtained in certain periods of the year, not all producers are interested in fruit processing (there is a high domestic demand for fresh fruit). Even so, **processing is key to creating employment, especially for women.** MSMEs processing pineapple are not easily identifiable, but they are present in the areas of production, sometimes connected with other chains (as in the case of the milk VC for the manufacturing of sweets). Like other MSMEs, they also suffer from the informality and lack of access to markets, credits and entrepreneurial support. Similarly, they are affected by the high energy costs to maintain the cold chain (frozen products) given that they do not benefit from the economies of scale nor the fiscal advantages as large-scale companies do.

Developing renewable energy sources is a solution, particularly exploiting the waste from processing, that can also be used to manufacture other products (for example essential oils).

Export: a limited potential

The potential for export is not evident. On the contrary, it was shown that Dominican pineapple is not competitive on the international markets. Despite the provided support, pineapple is still better valued in fresh fruit sub-chains in the domestic markets (whether it is of quality or not). While many producers cultivate pineapple with the initial objective to export it, only few achieve this goal due to the problem of low competitiveness.

Recommendations to improve the sustainability of the VC

Access to some markets depends on safety, quality and certification requirements. Administrative procedures to comply with the national phytosanitary rules are complex and they are not perceived by many actors as a gateway to more benefits.

MSMEs involved in processing and producers' organisations **should improve their organisational and management skills, with coherent and integrated marketing strategies.** Up to now, support mostly focused on technology, capacity building, and on infrastructures enhancement (for packaging), underestimating the improvements to governance and market access.

Support to the VC should be holistic and consider the economic, social and environmental impacts, so that investments are anchored to programmes for promoting a more inclusive and sustainable development of the VC.

Finally, the low contribution to the public finances and the informality of activities are to be considered as strong weaknesses.

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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->

This document is based on 'Análisis de las cadenas de valor de frutas procesadas en la República Dominicana' by Pamela Katic (NRI), Sandrine Freguin Gresh (CIRAD), Ivonne Acosta Alba, and Jesús de los Santos. Only the original report binds the authors.

