

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 and businesses.

The European Commission has developed the methodological framework for analysis. It aims to understand to what extent the value chain allows for inclusive growth and whether it is both socially and environmentally sustainable.

to financial, economic and environmental shocks. Palm oil is one of the most important agricultural commodities in Sierra Leone and has recently seen an increase in foreign and private investments in the sector.

The European Union intervention

Through the Technical Assistance Facility (TAF) of the African Agriculture Fund (AAF), the EU has financed since 2012 support programmes for out-growers with the aim of sustainably increasing their income, efficiency and access to market. This was pursued through replanting strategies, training in agricultural practices and the identification of a roadmap for the development of rural roads.

The value chain context

Agriculture accounts for almost half of Sierra Leone's GDP and is the largest source of employment, engaging more than three-quarters of the population. The agricultural sector remains highly vulnerable

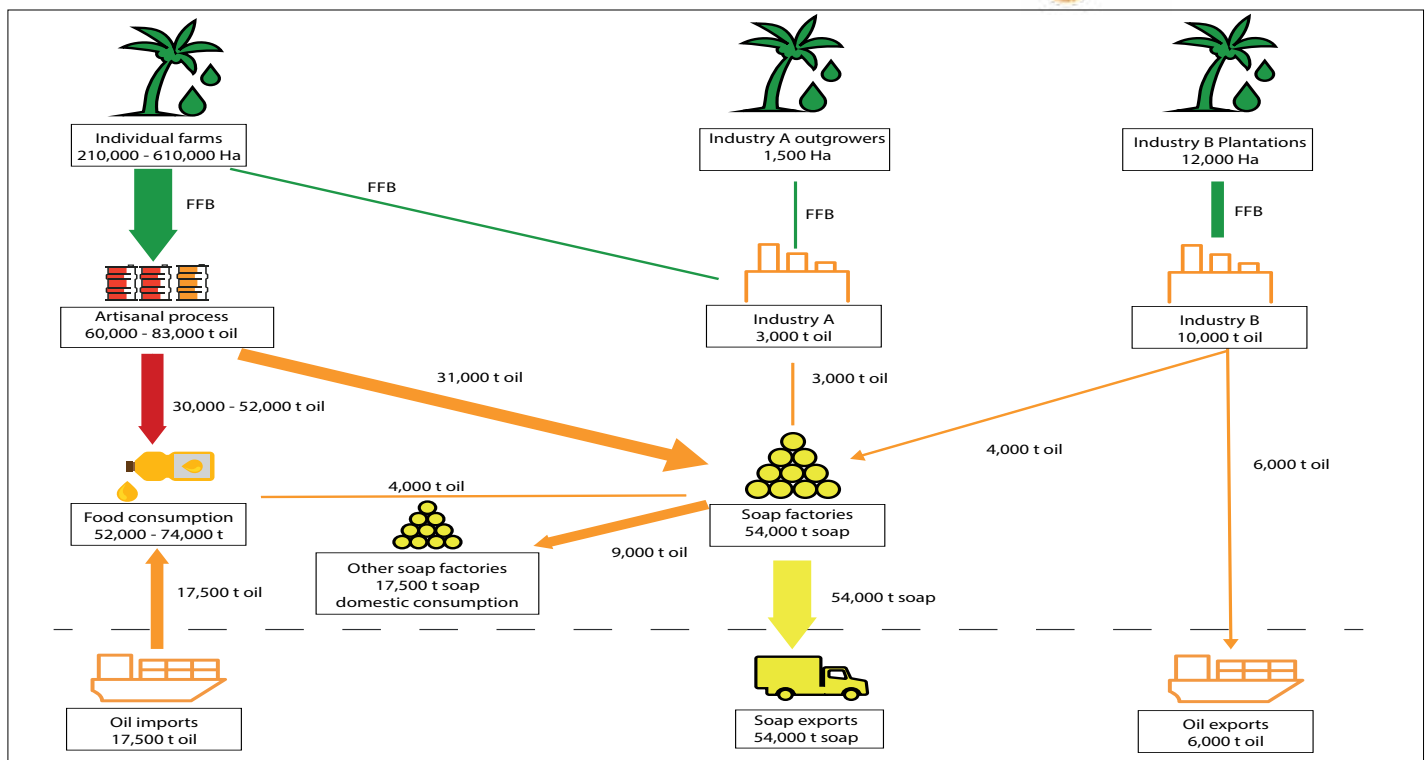


Figure 1 : The main flows of the palm oil value chain (in Sierra Leone)

Functional analysis

Red oil and masanke

Crude palm oil (CPO) is the oil extracted from the mesocarp of oil palm fruits through artisanal or industrial methods. In the **artisanal extraction**, fruits are mostly pressed by foot stomping, whereas **industrial extraction** is mechanised.

Artisanal oil is mostly extracted from the fruits of wild dura palms tree. When extracted the artisanal way, CPO is decomposed into two types of oils: one rich in carotenoids locally called **'red oil'**, and a more saturated oil locally called **'masanke'**. When palm oil is extracted industrially, part of the carotenoids is destroyed, so that the red colour of industrial CPO is less pronounced than the artisanal one.

There is a **local preference for red oil for cooking** because the nutritional qualities of palm oil depend on their carotenoid and vitamin contents, which vary according to the type of extraction process and are higher in the red artisanal oil.

Palm oil production and imports

Palm oil is produced almost everywhere in Sierra Leone, but most of the production occurs in high rainfall regions, in the southern and eastern parts of the country. **It is mostly produced at an artisanal scale.** There are currently **three main industrial palm oil producers** (Figure 2).

The largest part of the palm oil production is used to **manufacture soap** (Figure 1), which is in great demand into the West-African regional market and therefore mainly exported. In a context of galloping inflation of the national currency, this sub-sector is vital and has a crucial function as cash generator (including foreign exchange such as Guinean Francs).

Despite the abundance of palm trees and the traditional use of red oil, the domestic production is not sufficient to cover demand, and **Sierra Leone is importing about one fourth of its palm oil needs.** The overall deficit of palm oil for food use is also due to the high volumes diverted to soap manufacturing.

Currently, industrial stakeholders produce palm oil that is destined for soap manufacturing for more than half of their current level of production. The plantations production cycle lasts for at least 25 years. Most of the industrial plantations are currently at early stages of development, between 2 and 8 years old, the companies are not yet achieving their full production potential. Difficulties in transporting palm oil to Freetown, in particular during the rainy season, are a major bottleneck in the development of the sector.

Figure 2: Palm oil production apparent surpluses and deficits (in Sierra Leone)

Palm oil and soap flows

The main flow of palm oil (either artisanal and industrial) goes from the oil production sites towards the **main market in Freetown**, which is by far the biggest. However, a share of palm oil also transits to Guinea (in particular in the form of soap) and there is evidence of flows through the Liberian border. Significant quantities of palm oil are still imported via the port of Freetown from Southeast Asia.

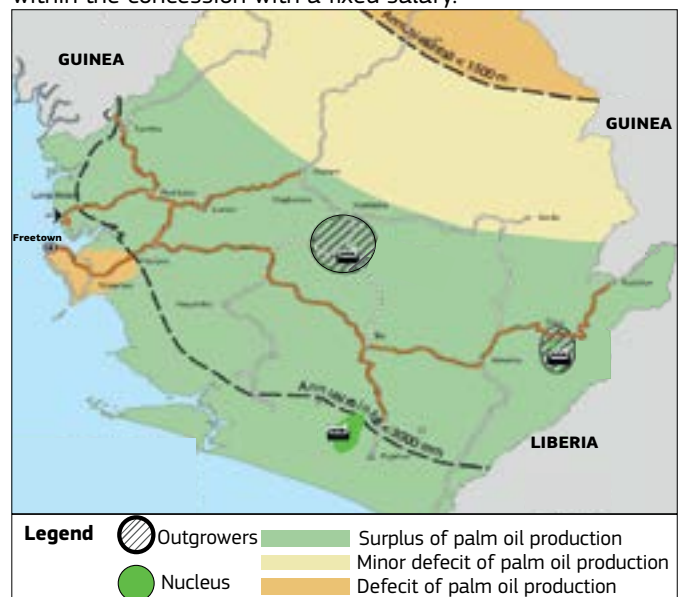
Most of the soap production units are very small in size (between 13,500 to 15,000 balls of soap per day during 8 months) and located in the districts of palm oil production surpluses (Figure 2). These units buy most of their oil from villages, through local brokers, or sometimes order trucks of oil from the industrial mills.

Different models of investment

There are **two main models of investments** in the palm oil sector used by the industrial mills to ensure fruit procurement: the out-growers scheme and the concession scheme.

In an **out-growers scheme**, a company provides a contract to a landowner for them to grow palm trees during a given period. In some cases, the company pays an annual fee to the landowners to get the exclusive right to purchase the fruits. The company does not directly take care of the palm trees, but provides improved material and training to the owners, and subsequently buys their production.

In the **concession scheme** based on compensation (fee paid at the beginning), a company leases land under a contract with landowners. The company itself takes care of the husbandry, carrying out all the production activities. It compensates the landowner for the duration of the concession, and employs preferentially the landowners family and other inhabitants within the concession with a fixed salary.



Economic analysis

Value added and contribution to growth

The palm oil value chain (VC) contributes significantly to the economy of Sierra Leone. The **direct value added (VA)** is estimated at **354 million USD** in 2017. Soap and oil respectively represent 76% and 24% of the direct VA.

The soap sub-chain is dominated by Guinean entrepreneurs who sell to their sister-companies in Conakry. It is thus estimated that on top of the 270 million USD of direct VA created by soap in Sierra Leone, another 60 to 70 million USD may be realised outside Sierra Leone (mainly in Guinea) by soap resales.

The VA induced by the use of intermediate goods and services supplied to actors of the VC is estimated at another 146 million USD. The equipment for industrial mills, the soda for soap manufacturing and transports (imported second hand vehicles and imported fuel) constitute the bulk of the imports.

The **total VA** thus represents around **500 million USD** i.e. 82% of the value of the production (of 608 million USD). This rate of integration is rather high, in this case expressing a feature of an artisanal economy. It also encompasses hidden costs such as “informal taxes”. **The total VA represents 13.6% of the GDP** with 9.6% accruing to the actors operating within the VC.

Inclusiveness

The highest share of the profits goes to the farmers (15% of the direct value added), this crop being the main cash crop for many families (Figure 3). On average, a household of 6 people produces and auto-consumes 40 litres of palm oil per year, while producing and selling 160 litres of palm oil. Taking self-consumption into account, 53 million USD of palm oil (red oil and masanke) were generated as value added for the farmers in 2017. Traders generated 26 million USD or around 7% of the direct VA (Figure 3). The pivotal role of the local artisanal transformation is illustrated by the fact that workers’ income amount to 274 million USD, i.e. 77% of the direct VA. Less than 1% of the direct VA goes to other actors, such as banks and other services (Figure 3). Therefore, the VC provides **basic income for a significant number of households** in the rural sector and small towns.



© Ravinder Kumar

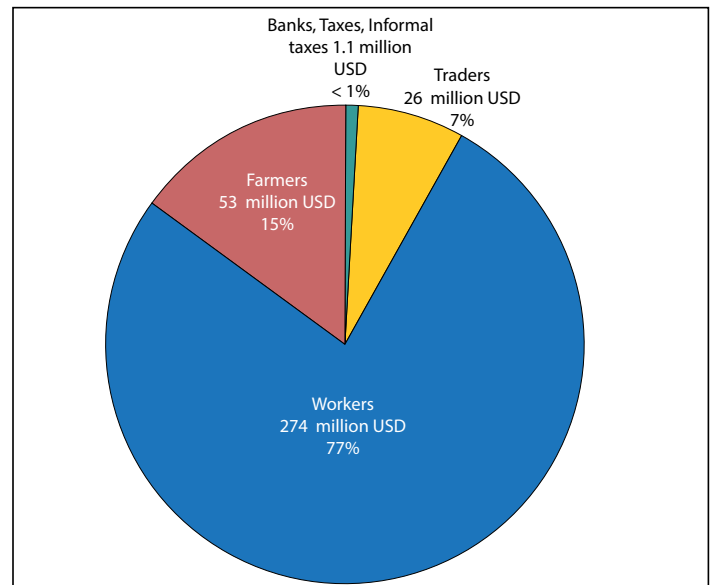


Figure 3 : Shares of the direct value added among the major actors (of the palm oil VC) in 2017

Informal economy and emerging industrial production

Most of the traders and brokers do not pay taxes and many loans take the form of barter-trade. Traders use banking services as little as possible, given the high interest rates and inflation. Only the industrial sector pays formal taxes to the Government. In addition, it is quite probable that substantial “informal taxes” are part of actual production costs.

As the industrial actors are still in investment phase, they still do not currently create significant direct value added and are not yet profitable; soap manufacturers sell at cost in Sierra Leone, making profits in Guinea, to escape the devaluation of the local currency.

WHAT IS THE CONTRIBUTION OF THE VALUE CHAIN TO ECONOMIC GROWTH ?

The palm oil value chain in Sierra Leone is relatively stable and independent from most economic shocks and from the international palm oil markets. The value added of the whole palm oil value chain represented around 14% of the Sierra Leonean GDP, which is relatively high. 20% of the production is self consumption by families, and the surplus is shared between sales for local consumption of traditional oil, and soap manufacturing for the regional market.

Direct value added represents 58% of the value of the production. Indirect value added represents another 24%, and total imports represent 18%. This is typical of an extremely artisanal chain that provides revenues to poor actors, but cannot yet contribute significantly to economic growth without important changes in the infrastructure and services sectors.

Social Analysis

Working Conditions	<ul style="list-style-type: none"> A number of workers earn less than the minimum wages. The worse-off are working on farms and at palm oil processing sites. Relatively better-off are industrial workers. Very poor working environments in soap factories and on the processing sites. Even though school enrolment figures are increasing, child labour (paid jobs) is observed.
Land and Water Rights	<ul style="list-style-type: none"> Examples of large-scale land leases suggest a history of violations and non-compliances with the principles of VGGT which have not been applied until recently. Weak legal and regulatory framework governing large-scale land investments is weak in the country. The Environmental and Social Impact Assessments (ESIA) is done, however it is still not properly performed in large-scale land investments. The new National Land Policy (NLP) contains provisions to address the above. NLP needs an implementation framework, capacities and mechanisms to ensure fairness, transparency, participation and consultations in land deals.
Gender Equality	<ul style="list-style-type: none"> Women involved economically in all segments of the VC, except the industrial segment that offers better wages and working conditions. Women do more than 60% of the job on the traditional palm oil production and processing and are heavily involved in processing activities, trading and enhancing incomes and strengthening their empowerment. Women not at all involved or consulted in the decision-making for land-leasing processes even though the new NLP includes specific provisions. Women have very poor access to financial and agriculture extension services.
Food and Nutrition Security	<ul style="list-style-type: none"> Vulnerability to food price inflation and currency fluctuations which increases deficit pressures on household economy. Family safety net is non-existent. Farming investments are very low (max. 10-15% of income). However, palm oil is one of the main crops for cash income and livelihoods for large majority of farmers in the North West and South East of the country. Third largest food crop contributor for calories intake. Significant role in household economy for low-level rice producers (due to the weak climatic conditions and vulnerability to conflicts).
Social Capital	<ul style="list-style-type: none"> More than half of palm oil producers and processors are not part of any farmer-based organisation or agri-business centre. Lack of accountable and transparent leadership. Very low access of the farmers to information and agriculture extension services.
Living Conditions	<ul style="list-style-type: none"> Very limited basic health infrastructure in rural areas, including palm oil growing areas. The health services are rudimentary and increasingly less affordable. Most (>80%) palm oil producers and processors in dilapidated dwellings. Drinking water mostly taken from open-sources (streams and river). Very limited awareness on sanitation issues. High drop-out rates (after primary) due to the lack of schooling infrastructure and very high fees.

IS THIS ECONOMIC GROWTH INCLUSIVE?

The VC is quite inclusive for the independent artisanal palm oil producers: they receive a fair share of the price paid by the final consumers, amounting to 50% (or on average 4,250 SLL/litre) in the case of the Masanke oil, and to 53% (or on average 3,000 SLL/litre) in the case of Red oil. Several independent farmers interviewed stated that they had no economic interest to switch to an out-grower scheme, because the new palm tree varieties, despite their higher yields, would not produce the red oil that they can currently eat and sell.

However, the incomes of palm oil producers and processors are not growing commensurately with food or overall inflation, thereby progressively increasing economic distress in rural areas.

Except for industrial workers, many workers in the palm oil VC are earning much less than the minimum wages of ~800 USD per year. Apart from industrial staff, most of the other workers in the VC are 'informal', meaning that they neither have a contract nor benefits (health, insurance, pension etc.).

IS THE VALUE CHAIN SOCIALLY SUSTAINABLE?

The palm oil VC, at the present juncture, carries considerable social drawbacks: several non-compliances with VGGT and small compensation for land-lease, very poor working environments in soap factories and on the processing sites, basic health infrastructure in rural areas, very poor access of women to financial and agriculture extension services, etc. At the same time, the VC offers vast opportunities for interventions that can improve the well-being of small producers, processors, workers and other actors in the value chain.

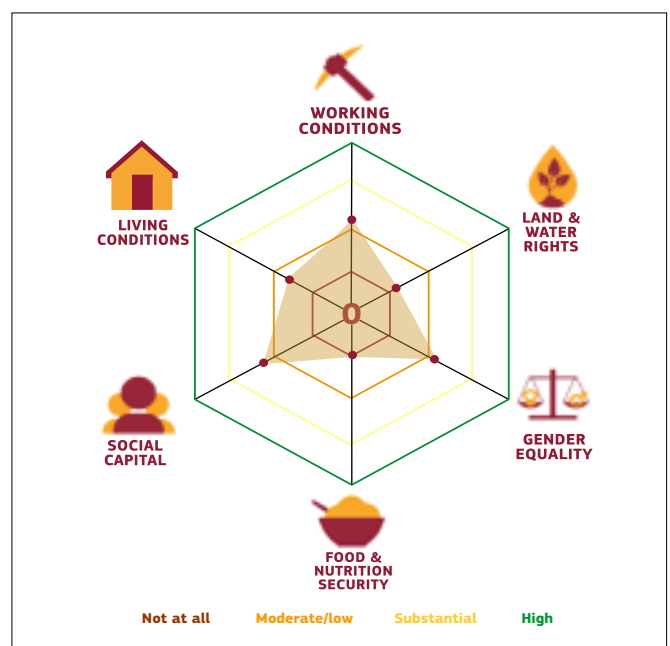


Figure 4: Social profile

Environmental analysis

The main factors of environmental impacts

In the case of **industrial production systems, synthetic fertilisers and methane emissions** from palm oil mill effluents are key contributors.

In the case of **artisanal production systems**, nitrogen emissions due to **biomass decomposition in the field** and the **transport of palm oil to Freetown** are the main contributors.

The impacts of the production of **artisanal soap** are mainly driven by the background palm oil production and **the use of soda ash, water and firewood** during processing.

Different types of existing systems (“scenarios”) have been compared to identify the places of higher environmental damage for industrial production (4 scenarios) and artisanal production (3 scenarios) (Figure 5 and 6).

Comparison of industrial production scenarios

The ranking between scenarios remains mostly consistent across the 3 areas of protection (Figure 5). Scenario B has higher impacts on human health and ecosystems than scenario A due to the **severe impacts of land use change from secondary forest**. Scenario D has high impacts due to **lower yields and lower extraction rates** given

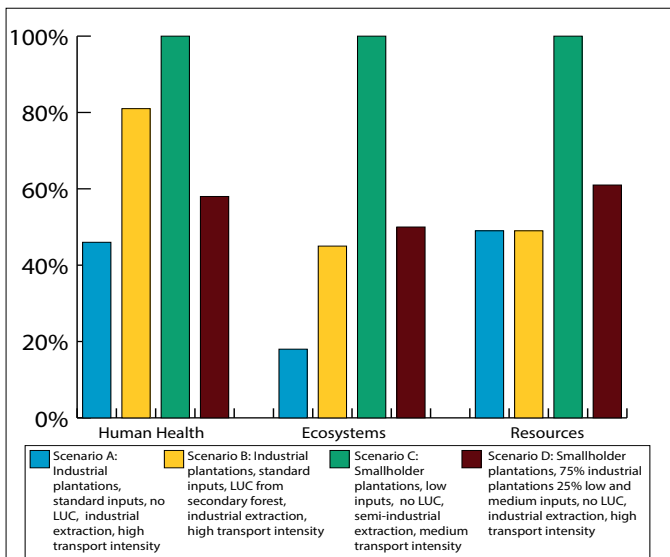


Figure 5: Comparison of industrial scenarios (at Freetown market gate, per tonne of CPO)

the heterogeneity in fruit supply origins. Finally, scenario C combines low yields at both plantation and extraction levels.

Comparison of artisanal production scenarios

Scenario C (Figure 6) has higher impacts due to the **land use change from secondary forest**. Scenario B is globally more suitable than scenario A, provided that **harvest frequency is maintained over the 35-year cycle**.

Comparison between industrial and artisanal scenarios

Industrial systems have lower impacts than artisanal systems across all impacts, except for mineral resources, because impacts are broken down to the tonne of CPO produced. Yet, industrial systems have much higher **yields both at plantation and mill levels**. Therefore, due to the larger need for land area and fruits to produce one tonne of CPO, artisanal systems have higher impacts. The **transport of the artisanal CPO by jerrycans** has also a higher impact by tonne of CPO compared to **transport by tank**.

Another key difference deals with **by-product allocation**: in the artisanal CPO extraction process, palm kernels are considered as waste and given away to the poorest villagers. While in industrial mills, palm kernels are first crushed to recover the shells used to feed the boiler and palm kernel oil is extracted in palm kernel crushers.

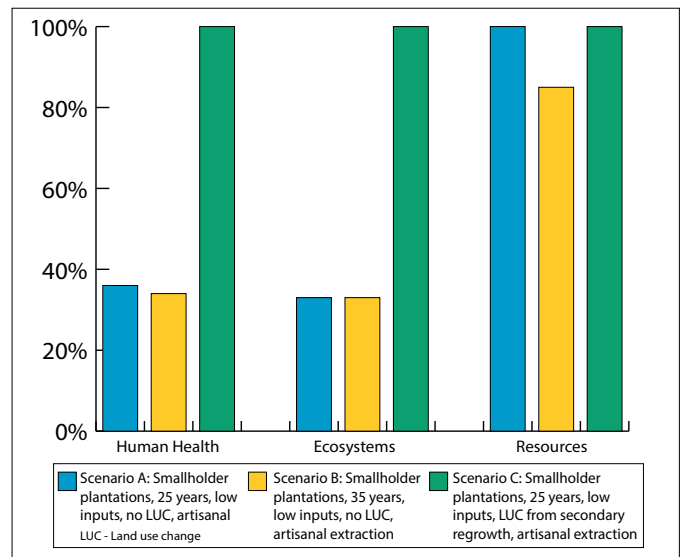


Figure 6: Comparison of artisanal scenarios (at Freetown market gate, per tonne of CPO)

IS THE VALUE CHAIN ENVIRONMENTALLY SUSTAINABLE?

The main issue in the artisanal production systems are the very low yields. Smallholders need 13 times more land area to produce the same amount of palm oil as industrial producers. Despite overall low inputs, this leads to cumulative impacts.

Pressure on land for agricultural use in Sierra Leone is still low. The country is mostly covered by secondary vegetation, i.e. savanna and secondary bush; there is very little remaining natural forest to protect. The sampled plantations were established quasi exclusively after secondary regrowth vegetation, grassland or agricultural land, including old palm plantations. Many of the wetland areas have since been converted to cultivated bottomland.

Main findings

The palm oil VC is a very significant contributor to the Sierra Leone economy. Its main component is by far the artisanal value chain. This VC allows some self-sustainability for many households, and for cash generation through sales.

The soap economy is well developed and favours most of all the Masanke oil which Sierra Leonean inhabitants appreciate less than the red oil for their food consumption. Despite the fact that the VC probably eludes most of the taxations, it is a much-needed source of liquidity in an economy which is still much characterized by barter-trade.

The local preference for red oil consumption is in contradiction with the industry need for palm varieties with higher productivity but which produce little or no red oil. The difficulty in establishing out-growers' schemes that are financially sustainable for the industry and economically sustainable for the producers is partly due to these specificities of palm oil

consumption in Sierra Leone, and partly due to the extreme inflation.

The soap sub-chain represents an adaptation to favour local work due to foreign demand, and it plays a major role in the injection of liquidities into the rural economy whilst remaining informal and partly under control of foreign actors. Any attempt to regulate or modify it should be extremely careful.

The main factors to strengthen the development of the palm oil VC are: the infrastructures, the cost of energy, the governance and the fight against corruption, the containment of inflation of the national currency and the promotion of education. They are limiting factors to industrialisation and mechanisation.

The table below presents some specific recommendations to make the value chain more sustainable.

To increase the productivity of smallholders' oil palm plantations	To improve the environmental sustainability of the whole VC
<ul style="list-style-type: none"> Continue planting good selected oil palm seedlings to rehabilitate old plantations and develop new ones on abandoned agricultural lands or grasslands. Establish new plantations following the Roundtable for Sustainable Palm Oil procedures. Slash and burn should be systematically avoided, as fires occur too easily during the dry season, devastating the landscape around the plantations. Support smallholders to improve their plantations' management in particular in order to increase harvest frequency and to better manage the vegetation cover and the organic matter use. 	<ul style="list-style-type: none"> Generalise the practice of recycling empty fruit bunches as mulch to return some of the nutrients to the palm plantations, notably potassium, for the whole plantations. Recover palm kernels shells, for fuel in the mill boilers; palm kernel oil, for cosmetic products; and palm kernel meal for feed. Recover glycerine by-product in the soap production system for recycling. Optimise transports (fruit collection) .

Recommendations of priority interventions

Companies/investors	Ministries, Departments and Authorities of the Government	EU Delegation and other development support partners in the country
<ul style="list-style-type: none"> Strengthen efforts towards VGGT-aligned land investments Strengthen the design and implementation of out-growers' models Design socio-economic activities through a household economic analysis approach Prepare and implement a company-wide gender-sensitive policy Scale up knowledge and skill building programmes for palm oil producers and processors 	<ul style="list-style-type: none"> Reconsider strongly equity, compensation and justice legal aspects in the NLP draft Improve agriculture extension delivery Contain food inflation Upgrade women's agency and opportunities in the VC 	<ul style="list-style-type: none"> Support actions for effective implementation of the NLP Support nutrition-components in development interventions Improve agriculture extension delivery Commission an independent research on socio-economic impacts of large-scale land investments Support initiatives looking at viable business models

Value Chain Analysis for Development (VCA4D) is a tool funded by the European Commission / DEVCO and is implemented in partnership with Agrinatura.

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 the report "Palm oil Value Chain Analysis in Sierra Leone" 2018, by Cécile Bessou (CIRAD), Jean-Marc Roda (CIRAD), Ravinder Kumar (NRI), Sanusi Deen (national expert). Only the original report binds the authors.

