



Strategic guidelines for the cassava value chain in the Ratanakiri Province, Cambodia

ILS LEDA

The study is realised by ILSLEDA experts, in the framework of the Project
***“CLESIDRA: Civil Society Links and Empowerment for Socially Inclusive
Development in Ratanakiri, Cambodia”***, co-funded by the European Union.

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Our greetings go, then, to all the components of the Focus Groups.

The work was possible thanks to the precious facilitation provided by BCV field team.



The Ratanakiri cassava can be presented as a product with unique appreciated characteristics, and capable to furnish the most exigent clients with its abundance.

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<https://commons.wikimedia.org/wiki/File:Cassava.jpg>

Chapter 1. INTRODUCTION

This paper has been elaborated in the framework of the project “CLESIDRA: Civil Society Links and Empowerment for Socially Inclusive Development in Ratanakiri, Cambodia”, co-funded by the European Union.

The main CLESIDRA expected outputs are:

Output 1: A platform (PLASED) established for networking, Civil Society Organizations (CSOs), Local Authorities (LAs), Socio-Economic Service Providers (SESP) and other relevant stakeholders of Ratanakiri Province in Cambodia, with the aim of building a free and permanent dialogue for the socio-economic inclusion of women, youth, indigenous, and the most marginalized and vulnerable people, including representative of each category (at least 110 people of which at least 40% women)

Output 2: At least 4 participatory strategies (STRAT) for competitive, inclusive, sustainable and resilient value chain development (possibly rice, cassava, forestry products, eco-tourism), realized through an innovative participatory exercise, as permanent key tool of the Platform delivered, and elaborated through the participation of at least 15 people for each value chain.

Output 3: A Comprehensive Services System (COSS) established for supporting socio-economic development of the province, as a branch of PLASED, including at least 20 CSOs, 10 SESP, and 10 LAs, of which at least 40% women

The paper refers, in particular, to the output 2.

The logic of the Action relies on the belief that the civil society and the CSOs have an important role for contributing to the province and national development, provided (A) their capacities are empowered, and (B) an environment does exist and enables their active citizenship in public and political life. With this aim, the action will sensitize and strengthen CSOs about the advantages to establish a permanent dialogue with local administrations, and other local actors (Output 1); This dialogue will be facilitated through achieving consensus about local competitive, sustainable, and inclusive territorial development, assessing needs and opportunities in favour of the targeted beneficiaries (Output 2), and enabling them to use the strategic framework to access to the correspondent employment and self-employment opportunities.

The project is run through a partnership between FELCOS, ILS LEDA, Build Community Voices (BCV) and Urban Poor Women Development (UPWD).

The paper aims at recommending strategic guidelines and a plan of action for the development of a competitive, inclusive, and sustainable CASSAVA value chain in the targeted territories.

The Cassava is one of the four prioritised value chains for the exercise, the other being eco-tourism, rice, and cashew. The prioritisation was realised in accordance with the following elements:

- Presence in the province
- Competitive advantages
- Resilience
- Prioritisation from public policies

The value chain development strategy is a key element for addressing the CLESIDRA plan of action.

In particular, chapter 2 will provide details about the RESCO methodology for the value chain assessment; chapter 3 will describe the background of the value chain; chapter 4 will analyse the assessment of the competitive advantages, inclusiveness, and sustainability of the value chain in the target areas; chapter 5 will

outline the Strategic Actions Guidelines and priorities for the value chain development; and, finally, chapter 6 will present the conclusions.

The document is still a draft proposal, submitted to the endorsement of the local actors involved in the Value Chain Focus Group, through which the assessment was carried out.

Chapter 2. METHODOLOGY

In general, the RESCO methodology seeks to recommend value chain strategic guidelines and plans, and it can be applied to any sector. With regard to this specific project, the sector of intervention is agriculture and the RESCO methodology will assess the main characteristics, potential, and obstacles for each of the four selected value chains, by involving the main territorial actors.

The assessment considers six main components, i.e.: the competitive advantage, the market positioning, the gender dimension/equality, the sustainability (financial, social, environmental), the value chain status, and the obstacles (to the value chain development).

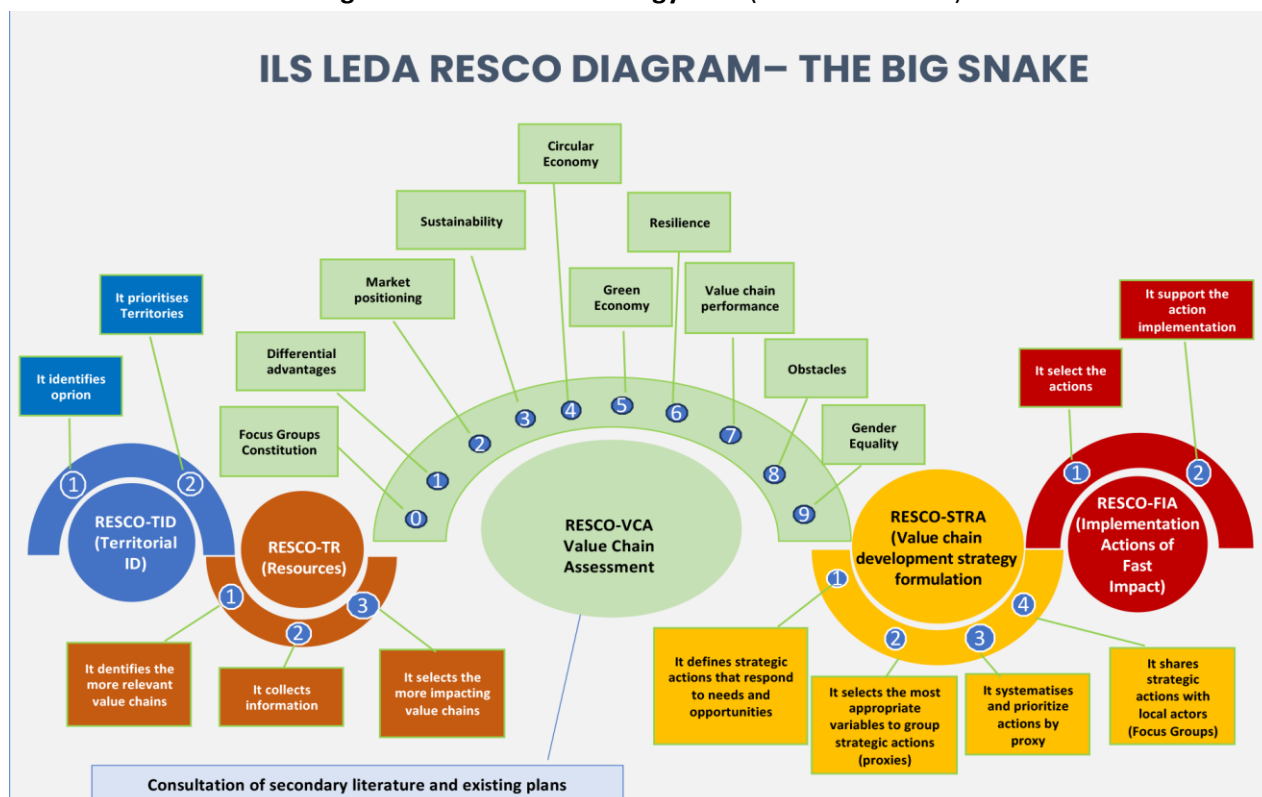
For each component a set of factors are considered, and, for each factor, specific variables are evaluated, according to a special scoring methodology.

The assessment is carried out by following these steps:

- 1) Focus group meetings with 15 people representing local actors of the public and private sector, through a questionnaire;
- 2) Consulting secondary literature;
- 3) Meeting with experts.

The picture below illustrates the RESCO methodology logical and chronological flow.

Figure 1. RESCO methodology flow (Source. ILS LEDA)



Chapter 3. BACKGROUND

According to Donald L. Plucknett, and Robert B. Kagbo (2020), Cassava is the basic staple for hundreds of millions of people in the tropical and sub-tropical belt, as well as being a feedstock for numerous industrial applications, including food, feed and starch. Cassava production is closely allied with, but not the cause of, poorer farm households. This relationship exists because poorer households are marginalized and often live in marginalized areas – the same areas where cassava performs well. Cassava is a source of food security, not only because it can be grown on less productive land, but because it is a source of income for producers and generally a low-cost source of food. These relationships suggest that the development of market opportunities for cassava can contribute substantially to poverty alleviation, especially for resource constrained households, and can increase household food security.

Cassava can grow and produce dependable yields in places where cereals and other crops will not grow or produce well. It can tolerate drought and can be grown on soils with low nutrient capacity, but responds well to irrigation or higher rainfall conditions, and to use of fertilizers. Cassava is highly flexible in its management requirements and has the potential of high-energy production per unit area of land. Once thought to be resistant to pests and diseases, the crop can be improved genetically to increase its resistance to damage from serious pests and diseases. Cassava yields can be quite high, as high as 25 to 40 metric t/ha, although national yields are often well below these levels. World average is about 10 mt/ha. The crop has long been used as a famine reserve and food security crop. Because cassava has no definite maturation point, harvest may be delayed until market, processing or other conditions are more favourable; this flexibility means cassava may be field stored for several months or more.

Cassava is the basis of a multitude of products, including food, flour, animal feed, alcohol, starches for sizing paper and textiles, sweeteners, prepared foods and bio-degradable products. The products are derived from a number of forms of cassava, ranging from fresh leaves and roots to modified cassava starch. The degree of processing and the technical requirements tends to increase from the fresh form to the modified starch form.

- Products from leaves and roots: Fresh roots and leaves are used primarily as human food. Roots can be peeled, chopped into chunks and frozen for specialized markets. Cassava leaves can be eaten as a fresh vegetable, ground fresh and frozen in plastic bags, or dried and ground for sale in plastic bags.
- Products from dried roots to produce toasted flour or to make flat bread (casabe in the Caribbean). Farinha and gari etc. can be produced in both small and large-scale operations. Dried cassava as an animal feed ingredient has been a major success in Europe
- Products from cassava starch: Cassava starch is used directly in different ways or as a raw material for further processing. The main classes of starch-based products are: (1) unmodified or native starch; (2) modified (physical, chemical, biological) starches for industrial purposes; and (3) sweeteners, including high fructose syrup, glucose (dextrin, monosodium glutamate, pharmaceuticals, etc.).

For the authors, the growing cassava demand is stimulating research and development activities related to the production and processing of cassava. They include

- Varietal development for increasing insect and/or disease resistance along with high starch content and recoverability
- biotechnology research to help speed development of new varieties, improve integrated pest management practices, identify needed genes and speed up genetic enhancement and plant breeding

- Research for improving production systems (higher product per unit of land), for reducing costs of production
- Increasing product value,
- Improving agronomic practices
- Introducing new mechanization, mainly small-scale mechanization
- New products
- Research for modified starches, including use of biotechnology
- Environmental protection practices, including reduction of soil erosion, of pollution, especially in the production/processing for starch; prevention of destruction of ecosystems, forests
- Improving institutional support, including public/private partnerships, e.g., for herbicide resistance, response to plant nutrition practices, research infrastructure, training of scientists, farmers, organizations, and cassava networks.

Chapter 4. THE VALUE CHAIN PERFORMANCE

The value chain performance, its opportunities and needs were assessed according to the following components:

1. Competitive advantage, and causes.
2. Marketing positioning
3. Value chain performance
4. Sustainability
5. Environment sustainability
6. Circular economy
7. Resilient economy
8. Gender gaps
9. Obstacles

4.1. *Competitive advantage*

IFAD identifies three main competitive areas for the cassava producers to compete in the global markets.

1. Concentration: realization of a critical mass of the resources, through grouping many small producers in a bigger commercialization unit
2. Innovation: providing innovative characteristics and meeting consumer specific needs, through working on genetics, new products, new methods and techniques
3. Competitive advantage: Valorising the special characteristics, related to a specific place

According to Teguh Endaryanto (2022) and others from the University of Lampung (Indonesia), the competitive advantage of cassava relies on:

1. Quality of seeds
2. Access to fertilisers
3. Access to knowledge
4. Access to capital
5. Access to water

The CLESIDRA Casava RESCO Focus group reported two typologies of Cassava cultivated in Ratanakiri

- 1) The cassava, initially imported from Vietnam and Thailand (now the cutting is generated locally) is not suitable for human or even animal consumption, because it is highly toxic, and it is entirely sold by intermediaries who direct it to industries in other provinces which they obtain the flour to process it. Since 2015, cultivation has expanded significantly in the province thanks to the large areas available and is highly profitable.
- 2) The second type of cassava is a reduced production limited to domestic gardens, intended only for internal consumption by families, not for sale.

It is grown in a traditional way, mostly without the use of chemicals.

This variety, when processed, generates a significantly reduced quantity of flour compared to the first type, and is therefore not required by the processing industries and has no market.

Furthermore, its specific weight is lower compared to the first, and would therefore be paid less by middlemen at the time of purchase.

The essential nature of the development strategy is, on one side, reducing the dependence from the middlemen in the first case, and increase production and markets in the second one.

The focus group identifies the main competitive advantages in:

- a) The abundance (64% of the participants)
- b) The uniqueness of the product (50%)
- c) The ecologic characteristics (36%)
- d) The food security (36%)

Minor weight was reported to

- e) The organoleptic characteristics (28,6%)
- f) The resilience (28,6%)
- g) The healthiness (21,4%)

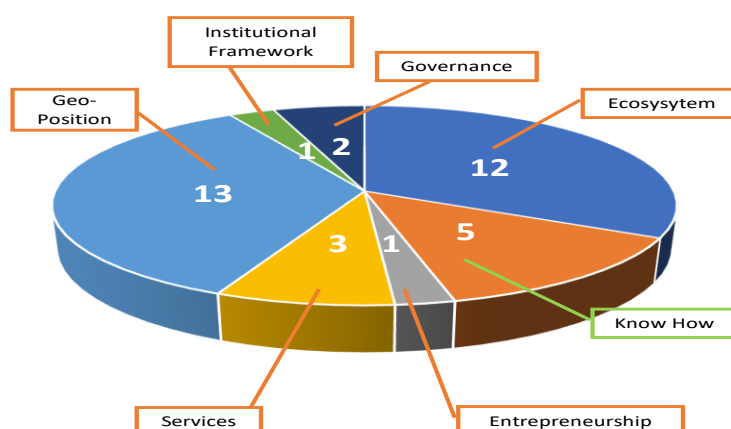
Furthermore, the RESCO focus group assessed those factors impacting with the aforementioned competitive advantages, and the result gave the 3 main causes:

- 1) **Geographical position** mainly thanks to its position at the borders, and proximity to Laos and Vietnam.
- 2) The **Ecosystem**, including microclimates, plants, soil, water, corresponding to the specific natural system made up of living organisms and the physical environment where they interact in an interdependent manner.
- 3) **The knowledge of population**, which corresponds to the specific knowledge local people accumulated in realising their economic activities, in terms of processes, techniques and technologies, organisation.

The result of this assessment is shown in the following figure.

Figure 2. Causes of competitiveness of the cassava value chain in the Ratanakiri Province

(Source. ILS LEDA RESCO Focus Group, 2024)



4.2 Market position

According to Grand View Research (2024), the global cassava market size was estimated at USD 164 billion in 2023 and is expected to grow at a CAGR of 4.4% from 2024 to 2030. One of the primary reasons for this growth is the increasing demand for gluten-free products. With rising health consciousness among consumers, particularly in Western markets, cassava has gained recognition as a nutritious alternative to wheat and other gluten-containing grains. This trend is reflected in the growing popularity of cassava-based foods, such as flour, snacks, and noodles, which cater to individuals with gluten intolerance or those pursuing gluten-free diets. Technological advancements in cassava processing also play a crucial role in market expansion. Innovations in processing techniques have improved the efficiency and quality of cassava-derived products. For instance, advancements in extraction methods for cassava starch have led to higher yields and better product characteristics, making it more appealing for use in food and industrial applications. Developing value-added products, such as cassava flour and biodegradable packaging materials, has further broadened the scope of cassava's market potential. Another significant driver is the growing awareness of cassava's nutritional benefits. As consumers become more informed about their dietary choices, there is an increasing recognition of cassava's role as a source of carbohydrates and dietary fiber. This shift towards healthier eating habits has prompted manufacturers to explore cassava's applications beyond traditional uses, leading to innovations in food products that highlight its nutritional profile.

Governmental support for cassava production is also instrumental in fostering market growth. Many countries recognize cassava's potential for enhancing food security and rural livelihoods, prompting initiatives that promote its cultivation and processing. Such support includes farmers' subsidies, research and development investment, and infrastructure improvements to enhance supply chains. These efforts boost local economies and facilitate increased production capacity to meet global demand.

The expanding applications of cassava across various industries further contribute to its market growth. Beyond food products, cassava is increasingly utilized in animal feed, biofuels, and bioplastics. The rise of eco-friendly packaging solutions has opened new avenues for cassava starch, positioning it as a sustainable alternative to petroleum-based plastics. This diversification into multiple sectors enhances its market resilience and attractiveness to investors.

Asia Pacific cassava market accounted for over 55% of the global market in 2023. The market growth in Asia is primarily driven by increasing demand for cassava-based products across various sectors, including food, pharmaceuticals, and textiles.

However, the cassava industry faces several challenges that hinder its growth and development, particularly in regions where it is a staple crop. One of the most significant issues is post-harvest losses. Cassava is a highly perishable crop; improper handling and storage can lead to substantial waste. In many producing countries, inadequate infrastructure for transportation and storage exacerbates this problem, resulting in a loss of both quantity and quality of the crop before it reaches consumers or processing facilities. This inefficiency affects food security and diminishes the income potential for farmers who rely on cassava as their primary source of livelihood. Another challenge is the limited access to markets for smallholder farmers. Many cassava producers operate on subsistence and lack the resources to engage in larger, more profitable markets. Marketing cassava can be particularly difficult due to its bulky nature and perishability, which increase transportation costs. In addition, small-scale farmers often receive a lower share of the market price due to the lack of organized marketing channels and bargaining power, which prevents them from maximizing their profits (Grand View Research, 2024).

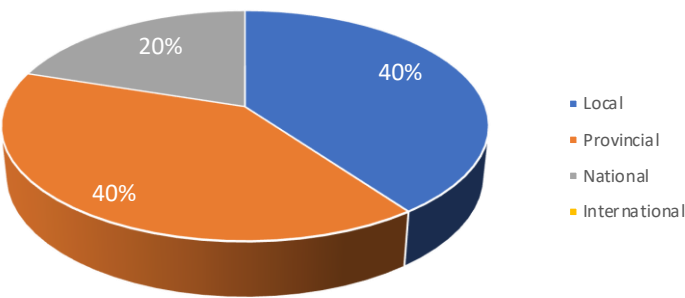
In order to assess the market positioning of the cassava value chain in the Ratanakiri province, the RESCO focus group analysed:

- The current markets
- The expected market goals

Currently cassava producers sell only on local market, and through intermediary. Nevertheless, they would appreciate to expand them, increasing by 40% both the provincial, and the national markets (see figure).

Figure 3. Positioning on desired markets of the Cassava value chain in the Ratanakiri Province
(Source. ILS LEDA RESCO Focus Group, 2024)

Desidered markets for the Cassava Producers



4.3 Cassava Value chain performance assessment

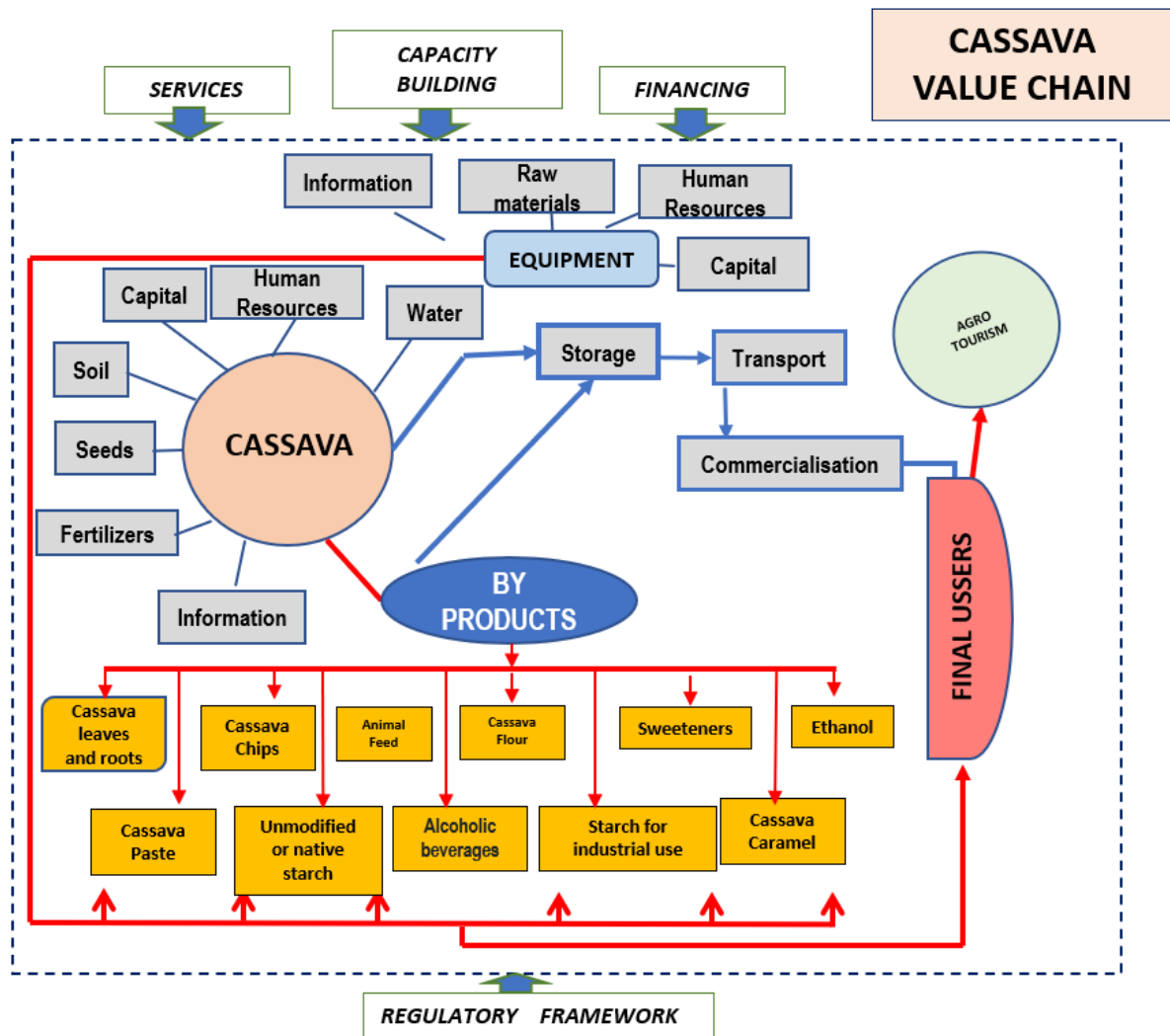
The RESCO focus group assessed needs for the main components of the cassava value chain, and they are:

- 1) Farming inputs
- 2) Infrastructures
- 3) Human resources

- 4) Financial resources
- 5) Information
- 6) Equipment
- 7) Services
- 8) By-products

Figure 4 shows the main components of the cassava value chain.

Figure 4. The Cassava Value components (Source. ILS LEDA)



The main results about the value chain performance regarding high level and medium level needs are the following ones:

Farming Inputs

They are easily available to farmers. They deal with seeds, fertilisers, pesticides, organic nutrients, and agrichemical supplies

Infrastructures

High level needs

- Storage (They have no storage points. Some farmers cannot afford to keep for a long time in case of falling prices or stocks.)
- Transportation
(On average they only have 1 or 2 hectares of production. They consider it not worth it, for similar quantities, to buy tractors and trucks and spend a large sum on transport, since the middlemen come directly to buy in the field)

Medium level needs

- Soil

Human resources

Generally, they are missing, because those, who can go, look for work elsewhere. They refer to:

- Product procurement and marketing responsible
- Saler
- Transporter
- Storing operator
- Operator of new digital and remote sensing technologies
- Technician specialized in robotics and automation
- Technician specialist in Artificial Intelligence (IA)

Financial Resources

Medium level

- Microfinance companies: financing is provided only by microfinance companies. The credit is requested at the beginning of production, then, at the time of harvest, they repay, but microfinance organizations complain of a very low profit margin
- Banks: have high requirements and excessive bureaucracy
- Government: there are no specific lines of credit

Information

- Information on market demand, and technology are not available. They don't anybody providing them

Equipment

Provided the technological level is very low, the RESCO focus group came out with the following needs

High Level

- Dryers
- Cassava cleaning and washing equipment
- Equipment for cassava processing: Cassava Crusher, Cassava Sieving Machine, Dewatering and Drying System, Cassava Peeling Machine, Cassava Grinding Machine, Cassava Chips Cutting Machine, etc.

Medium level

- Plows and harrows for soil preparation
- Tractors
- Cassava planter
- Equipment for post-planting, harvesting, post-harvest work
- Cassava harvester

- Cassava graters

Supplies

- Supplies for tools and machinery
- Supplies for packaging (boxes, bags)

Services

High level needs

- Technical, administrative, organisational services
- Marketing/Commercialisation
- Support in the development of Cooperatives, cooperation/networking
- Support in the development of alliances / associations
- Access to finance
- Soil quality monitoring
- Business start-up
- Services for introducing new technologies

In general, producers do not access to this type of service due to a lack of information about it: they do not know who the competent subjects are and what the process to follow. Some services, considering the weak development of the supply chain, are not even requested, because they are considered inapplicable to their economic-productive activities.

- Bio Certification

It is a long and excessively bureaucratic process. They have no information on how to carry out the process which is also very centralised, being in the hands of the government (but apparently free)

Someone has received some training, from NGOs and DoA (Department of Agriculture), but the number is very small and they would like the service to increase

- Organic pesticides/fertilisers

Additional components

There are neither fairs, nor festivals or Cultural events

By Products

The producers only know how to produce the basic product of the value chain, and don't know if they were be able to diversify their products, although the focus group considers it desirable.

They deal with products from leaves and roots, products from dried roots, products from cassava starch, and the most common ones are¹:

- Dried cassava leaves and roots
- Cassava chips
- Cassava paste
- Cassava flour
- Cassava animal feed
- Alcoholic beverages

¹ For more information about cassava by-products read "16 by-products from cassava" <https://www.nairaland.com/4798231/16-product-cassava-should-know#72236285>

- Unmodified or native starch
- Modified (physical, chemical, biological) starches for industrial purposes in the paper and textile industry, as well as an adhesive in glass, mineral wool and clay.
- Sweeteners, including high-fructose syrup and glucose (dextrin, monosodium glutamate, pharmaceuticals, etc.) for the making of a large variety of food items including ice cream, jellybeans, jams, sweets and gums.
- Cassava caramel which is used as colouring agent in food, confectioneries and liquor
- Ethanol for industrial uses: It can be mixed with petrol or used on its own as a transport fuel or utilized as industrial alcohol which is important in the pharmaceutical and cosmetic industry.

4.4 Sustainability

The Cassava focus groups assessed 4 types of sustainability:

1. The economic sustainability
2. The social sustainability
3. The institutional sustainability
4. The financial sustainability

Large space will be given to environmental sustainability and resilient economy in the next chapters.

The following tables show the results of this assessment.

Table 1. The sustainability of the Cassava value chain in the Ratanakiri Province

(Source. ILS LEDA RESCO Focus Group, 2024)

Economic sustainability			
Variable	Indicators Value		
	LOW	MEDIUM	HIGH
Factor B: Is the of sales of the local cassava value chain in the first 5 sold products of the area? (sign HIGH), Is it among the 5 least sold products in the area? (Sign Low), Sign Medium in the other cases			
Factor C: No. of Micro, Small, and medium enterprises in the value chain (collective and individual)			
Factor D: No. formal SMEs (collective and individual) in the value chain			
Number of employed people (formal + informal) (1)	<300	300-700	>700
Women employment share over total	<20%	20-50%	>50%
Formal employment share over total (2)	<30%	30-60%	>60%

- (1) They cannot pay much for labour, which is therefore in short supply because they choose to go and work elsewhere, where they can be paid more: on average 8-10 dollars a day, while they can only guarantee 6 dollars
- (2) The work is seasonal and is mainly informal. It engages producers 3 times a year: to plant, monitor the plantation and harvest. Some sublet these tasks to third groups of people, offering, for example, 100 euros in total to plant, harvest and complete the work. The indigenous groups make use of internal manpower, they do not contract third parties, taking turns and rotating, exchanging human resources with each other.

Social sustainability			
Ability to create jobs for individuals with different physical and mental abilities			
Ability to create jobs for people with low skill and training level			
Companies run by youth (persons under 35) / total number of companies			
Socially responsible enterprises that invest in the development of the social sphere			
Institutional sustainability			
Level of execution of government plans for the value chain development in the territory			
Level of attention of the official government for the development of the value chain in the territory/area			
Presence of specific financial mechanisms for the value chain (loans facilities etc.)			
Attention of government to social needs			
Financial sustainability			
Potential to secure loans for the business sector			
Availability of financing specific mechanisms for the value chain (credit lines, etc.)			
Availability of incentives/programmes supporting the livelihoods of specific groups in the community?			
Availability of incentives to citizens for the differentiated collection			
Potential to secure loans for the business sector			

In conclusion sustainability is a severe gap for the province economy, and strategies shall be addressed for responding to its need, the main one being

Economic sustainability:

- Increase the production and the sales of the local cassava value chain
- Strengthen and increase the number of formal micro, small, and medium enterprises
- Increase job requested by the value chain, with particular reference to women and decent jobs

Social sustainability

- Create jobs for individuals with different physical and mental abilities
- Enhance socially responsible in enterprises

Institutional sustainability

- Improve the execution of government plans
- Improve the level of attention of the official government for the development of the value chain in the territory/area

Financial sustainability

- Improve the secure system to loans for the business sector
- Push Government to realise financing specific mechanisms for the value chain (credit lines, etc.)

- Push Government to establish incentives/programmes supporting the livelihoods of specific groups in the community

4.5 Green economy

The focus group assessed the green economy associated to the cassava value chain, according to the following components

- Public Regulations
- Contamination
- Risks
- People and organization commitment
- Best practices
- Access to environmental resources

The following tables show the results

Table 2. Green economy aspects related to the Cassava value chain in the Ratanakiri Province

(Source. ILS LEDA RESCO Focus Group, 2024)

Public regulations					
Variable	Indicators for variable		Indicator for the variable effectiveness		
	NO	Yes	Low	Medium	High
Are environmental sustainability, the reduction of pollution, the limitation of gas emissions, and the polluting use of energy sources included in public policies and regulations?					
Are there State regulation for the protection of natural resources?					
Are there natural reserves and protected areas?					
Is the government implementing policies that favour the transition to a clean environment? Are they effective?					
Is the government working to achieve the United Nations Sustainable Development Goals?					
Is there an incentive system to stimulate the green economy and penalize the non-green economy?					
Are there organizations that monitor the efficiency of the use of water resources in the long term?					
Is there a pollution control system?					
Contamination and risks					
Variables	Indicators				
	Low	Medium	High		
How would you consider soil contamination in your territory?					

How would you consider water pollution in your territory?			
How would you consider air pollution in your territory?			
Do you think people are aware of the risks of pollution and climate change?			
Commitment of people			
Are there organizations and/or institutions committed to environmental sustainability and the green economy?			
Do you think people have consistent behaviors to safeguard the environment?			
Green economy practices			
Variables	Indicators		
	< 25%	26-50%	>50%
How many companies in the value chain practice solutions for environmentally friendly production?			
How many companies in the value chain provide recyclable material?			
Are there initiatives for promoting participation of people to protect the environment?			
Are there volunteer groups to protect the environment?			
Contamination caused by the value chain activities			
Emission Co2			
Use of diesel engine for energy			
Use of Waste management sustainable practices			
Audio noise			
Use of environment control devices			
Presence of enterprises for the solid waste recycling			
Presence of enterprises for the organic waste recycling			
Presence of enterprises for the liquid waste recycling			
Are the containers of liquid and powdered substances reused (refilling)?			
Access to environmental resources			
Variable	Easy	Not bad	Difficult
How is the access to water for the value chain actors?			
How is the access to electricity for the value chain actors?			
How is the access to public resources (like rivers, lands,...) for the value chain actors?			
How is the access to private resources (land properties) for the value chain actors?			

In conclusion, the assessment results suggest:

Public regulations:

- Make pressure on government for improving the effectiveness and efficiency of environmental sustainability (protection of natural resources, the transition to a clean environment, and the achievement of the Sustainable Development Goals)
- Work for establishing a monitoring system on pollution and use of water resources in the long term

Commitment of people and organizations

- Sensitise, realise capacity building, and other initiatives for increasing the commitment on environmental sustainability and the green economy. The population is aware but often still engages in behaviours that damage the environment.

Green economy practices

- Increase the number of enterprises that practice solutions for environmentally friendly production
- Increase and improve the initiatives for promoting participation of people to protect the environment
- Increase the number of volunteer groups to protect the environment. (Environmental cleaning campaigns are not enough, the involvement of local authorities is necessary, starting with the installation of an increasing number of dustbins and sanitary services.

Access to environmental resources

- Improve the access to water and electricity for the value chain actors. Especially to the water, since the water from the wells resides in very deep aquifers and there is not enough energy to pump it.

4.6 Circular economy

The focus group assessed circular economy needs for the cassava value chain, through the following components

- Waste management
- Services
- Business performance

Table 3. Circular economy needs related to the Cassava value chain in the Ratanakiri Province

(Source. ILS LEDA RESCO Focus Group, 2024)

Waste management			
Variables	Indicators		
	No	Weak	Yes
Are there companies that selectively collect waste for reuse it within the companies in the value chain? (1)			
Are there companies for the storage of this waste? (2)			
Are there companies that sell this waste?			
Are there companies in the value chain reuse wastewater to recycle it?			
Are there companies that sell recycled organic waste? (3)			

(1) In general, they only collect it but do not separate it and then burn it..

- (2) They throw everything together and burn it. The only thing they manage to separate is the can (mainly beer) which they sell to other private citizens
- (3) Some of them, but in a small, informal and domestic way, use the roots and leaves as natural fertilizer, while others burn production waste. It cannot be used as animal fodder, because it is poisonous.

Services			
Is there research to find innovative solutions for the circular economy of the cassava value chain?			
Are there university courses in the field of circular economy?			
Are there professional training courses in the field of circular economy?			
Business performance			
In your opinion, what is the cost of energy consumption over total production costs for company of the cassava value chain?			
In your opinion, how is the cost of water consumption compared to the total production costs for a company of the cassava value chain?			
In your opinion, what is the participation of renewable energies in the total energy consumption of companies in the value chain? (4)			
In your opinion, how many companies of the value chain adequately treat wastewater from renewable sources?			

- (4) Only solar panels, mainly for domestic use, the rest of renewable energy is not used because it is expensive to install and maintain and the government does not give incentives of this type.

In conclusion, circular economy practices are very much ignored in the province, with rare exceptions.

The Focus Group result accordingly relies on the following needs

Waste management

- Enhance the creation of companies that collect waste selectively, store it, and sell it
- Sensitise and support companies to recycle and reuse wastewater to recycle it

Services

- Stimulate the research to find innovative solutions for the circular economy
- Stimulate universities, and professional school to introduce education on circular economy

Business performance

- Stimulate and educate enterprises to make plans for reducing the energy, and the water consumption, and cost.
- Stimulate, educate, and support enterprises to increase renewables energies
- Stimulate, educate, and support enterprises to reuse renewables resources (specially water)

4.7 Resilient economy

The focus group assessed resilient economy opportunities and needs for the cassava value chain, through the following components

- Vulnerability risks
- Risk prevention
- Resilient recovery post catastrophe opportunities

- Long-term environmental sustainability opportunities (contribution to the mitigation of climate change impact)
- State Regulation about resilience and climate change

Vulnerability risks

- They are mainly risks of Floods, and Hurricanes/Storms/Typhoons/Tornados, that make at risk of
 - a) people left without job
 - b) damage to general productions, infrastructure, market, health care

Risk Prevention

Very little prevention regarding all the main variables, such as

- Effective information advice system (whatsapp, social, mobile cars, radio, TV, etc.)
- Previous tests on individual and collective behaviors
- Disposal of public funds for emergency situations
- Disposal of insurance mechanisms
- Organisation of mutual aid organisation
- Presence of civil protection voluntary trained ed equipped groups
- Disposal of Health Care emergency support
- Disposal of medicines
- Disposal of lodging, and temporary housing

Table 4. Resilience of the Cassava value chain in the Ratanakiri Province (Source. ILS LEDA RESCO Focus Group, 2024)

Resilient recovery post catastrophe opportunities from the cassava value chain			
Variables	Indicators		
	Little	So and So	I don't Know
Ability to produce goods needed in food emergencies after catastrophes			
Possibility of using workers to support other productions.			
Long-term environmental sustainability (contribution to the mitigation of climate change impact)			
Abating polluting waste (chemical products, products containing non-convertible waste)			
Reduction of energy from non-renewable sources and CO2 emissions			
Development of seeds to produce healthy cassava due to its ability to adapt to climate change			
Organic and agroecological cultivation models based on diversification			
Sustainable irrigation systems (microdams) during the dry season.			

The Focus Group result relies on the following needs and opportunities for facing catastrophes, in particular floods, and hurricanes/storms/typhoons/tornados, that make at risk jobs, and damage farms, and infrastructure.

Resilient recovery post catastrophe opportunities from the cassava value chain, that can provide

- Labor to support other productions (accountants, digital experts,)
- Produce goods needed in food emergencies after catastrophes The need for setting up measures for risk preventions, such as:

Long-term environmental sustainability measures for

- Reducing energy from non-renewable sources and CO2 emissions
- Development of seeds to produce healthy cassava
- Possibly Facilitating organic and agroecological cultivation, and sustainable irrigation

4.8 Gender equality

The focus group assessed gender equality needs for the cassava value chain, through the following components

- Equality in managerial position
- Access to resources
- State regulations

The following table show the result of this assessment

Table 5. Gender equality assessment in the cassava value chain (Source. ILS LEDA RESCO Focus Group meeting, 2024)

Gender equality in organizations			
Variable	Indicators		
	Less than 20% of the total number of employees	21-40%	40-60%
(A) How many women generally work in the value chain?			
(B) How many women have key position in local government with respect to the value chain development?			
(C) How many women are in leadership positions in the value chain?			
(D) How many women participate in representative bodies (e.g.: workers' groups, trade unions, etc.)			
(E) Last year, how many women were promoted in the value chain?			
F) In the past year, how many women have benefited from training in the value chain?			
Legislation and measures			
(A) Do you think the Gender Equality National Strategy /measures/services is being properly implemented			
(B) Do you think that sufficient measures for gender equality are taken at company level?			
C) Do you think that reconciliation measures and facilities between family and work responsibilities are properly implemented?			

D) Do you think that public care facilities for children and elderly are sufficient and covering the demand?			
E) Do you think that the issues of sexual harassment, abuse and exploitation at work are sufficiently taken into account in the value chain (understanding of the issue, support for victims, measures against perpetrators, etc.)?			
(F) Do you think that the violence suffered by women in the private sphere (e.g. domestic violence, forced marriages, etc.) is sufficiently taken into account in the value chain (understanding of the problem, care for victims, support in pursuit of the perpetrators...)?			
Access to assets			
Variables	YES	Partially	NO
(A) Is the access to labour in the value chain the same for men and women?			
(B) Is the access to finance in the value chain the same for men and women?			
(C) Is the access to business services in the value chain the same for men and women?			
(D) Within the framework of the value chain, is the access to the resources produced (and the choice on how to use of these resources) the same for men and women?			

In conclusion women are quite discriminated, and they need

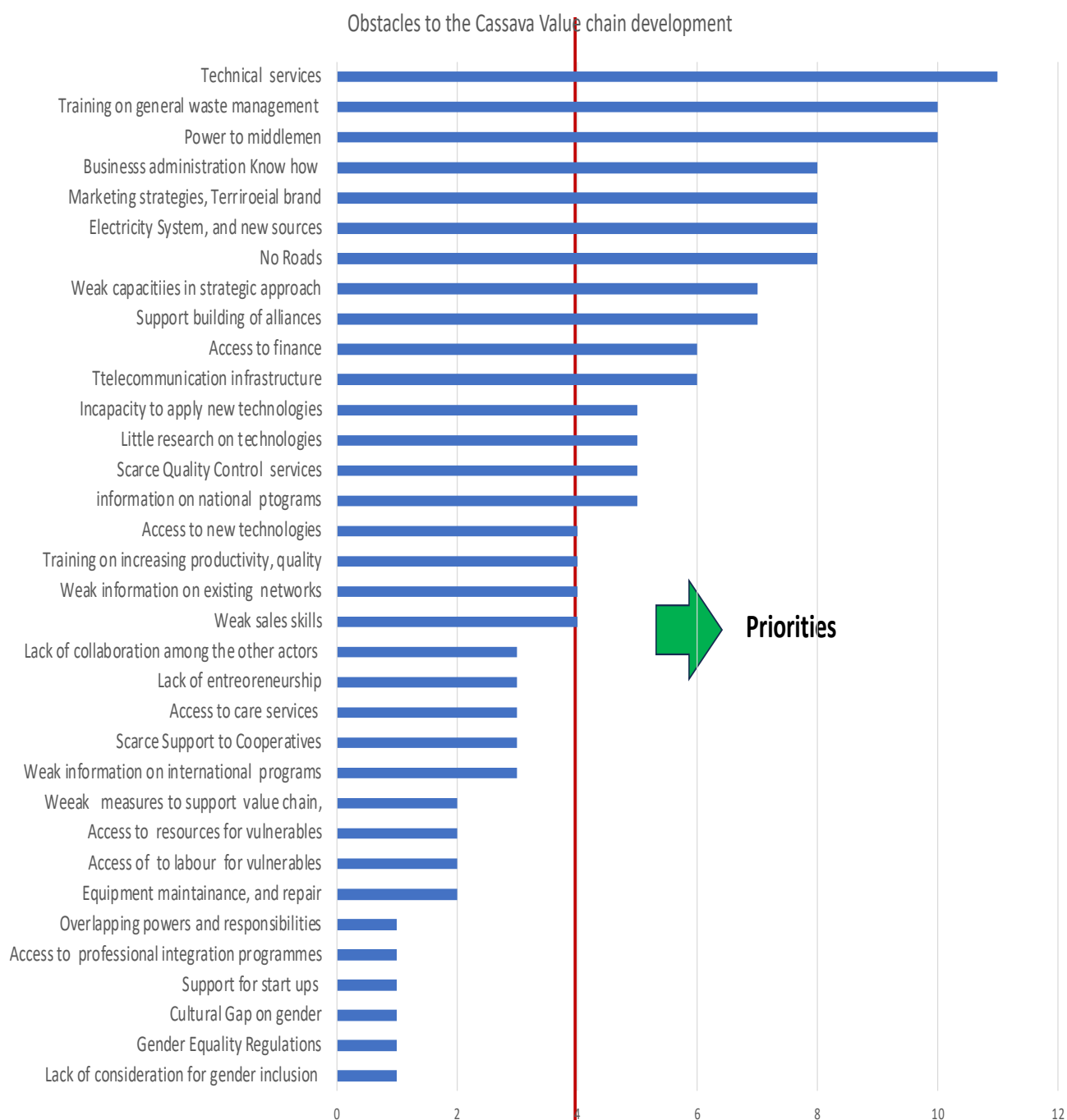
- Strong support for accessing to key position in production, and organisations and institutions, including public ones.
- Some support for accessing to the value chain new opportunities, above farming, finance, and services
- Sensitisation and cultural campaigns against the violence against women

4.9 Obstacles

The RESCO Group analysed the obstacles to the value chain development, as subdivided in the following categories:

- Infrastructure
- Access to information
- Business Services
- Commercial services
- Gender Equality
- Access to knowledge
- Access to technology
- Social Inclusion
- Regulatory Framework

Figure 5. Obstacles to the cassava value chain in Ratanakiri, Cambodia (Source. ILS LEDA RESCO Focus Group meeting, 2024)



In conclusion, the result of the RESCO Focus group assessment prioritized the following obstacles, for which to provide strategic responses:

- Weak sales skills
- Weak information on existing networks
- Incapacity of increasing productivity, quality, and need for training
- Access to new technologies
- information on national programs

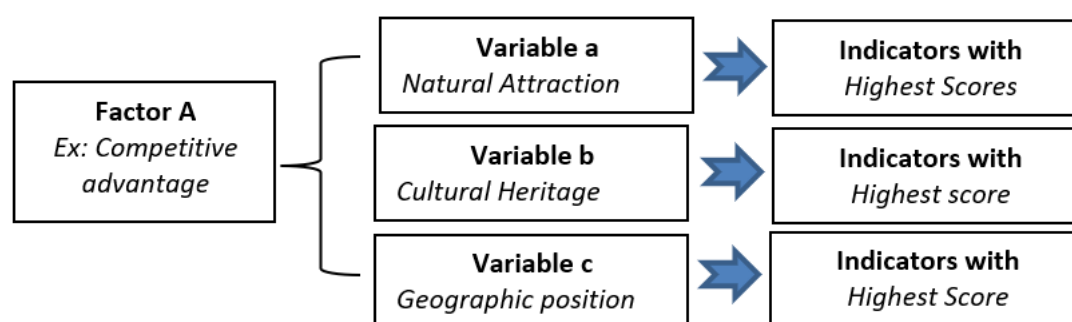
- Scarce Quality Control services
- Little research on technologies
- Incapacity to apply new technologies
- Telecommunication infrastructure
- Access to finance
- Support building of alliances
- Weak capacities in strategic approach
- Gap in the roads (Lack and obsolescence)
- Electricity System, and need for alternative sources
- Marketing strategies, Territorial brand
- Business administration Know how
- Power to middlemen
- Training on general waste management
- Technical services

Chapter 5. THE STRATEGIC GUIDELINES FOR COMPETITIVE AND INCLUSIVE DEVELOPMENT

5.1. The methodology for the elaboration of the Strategic Guidelines for the cassava value chain development

The RESCO methodology for the elaboration of the Strategic Guidelines for the beef and dairy cattle value chain development uses the inputs proceeding from the RESCO assessment (interviews), from the analysis of the secondary literature, and from the consultations with experts, and classifies all these findings in a number of fields of intervention.

The inputs refer to the impact indicators of each variable corresponding to each factor either if it is positive (points of strengths), or negative (points of weaknesses), as illustrated in the following example.



The correspondent strategic actions should be addressed in order to:

- Maintain the points of strengths in the long term;
- Remove the points of weaknesses, as they represent obstacles to the development of the value chain.

RESCO, finally, uses a simple algorithm for deriving the strategic actions for each one of the “variables” corresponding to the different “factors”.

In particular, the formula is, as follows:

$$Sa = f(V_{ij}, Fa_n)$$

Sa = Strategic Actions

V_{ij} = Variable “i” of the Component “j”

Fa_n = Factor “n”

5.2. From potential and needs to action

The main potential and needs referred to each factor and correspondent variable were illustrated in chapter 5.

The process from addressing strategic action to the abovementioned needs foresaw:

- Identifying individual action for each variable

2. Clustering complementary actions
3. Eliminating duplications
4. Including each action in correspondence of “strategic fields”
5. Accordingly, the RESCO assessment has also provided at least three strategic fields of action, such as
 - a) Governance
 - b) Service System
 - c) Capacity Building

Considering the priorities emerged from the analysis of the cassava value chain status and potential, and the CLESIDRA Project goals, these strategic actions are clustered according to three levels of priorities:

- **Priority N° 1:** *Actions correspondent to the objectives and proposals of the CLESIDRA Project Work Plan (See Box 1), and, at the same time, correspondent to the “High Priorities (HP)” indicated by the RESCO group*
- **Priority N° 2:** *Actions correspondent to the “High Priorities (HP)” indicated by the RESCO group, but not explicitly foreseen by the CLESIDRA Project, and that will orientate the three years plans of the dialogue platforms (Plased, Value Chain Committees, and Coss)*
- **Priority N° 3:** *Actions correspondent to the “Medium Priorities (MP)” indicated by the RESCO group*

BOX 1. CLESIDRA WORKPLAN

WP1 - Improving the skills of CSOs, producers and LAs on multi-stakeholder dialogue, integrated socio-economic development A1.1 Capacity building workshops for CSOs on active participation in decision-making processes and multi-stakeholder dialogue. A1.2 Capacity building workshops on inclusive socio-economic development and value chain competitiveness and sustainability. A1.3 Capacity building workshops and support to upgrade CSOs’ organisational capacity (internal governance, impact, human and financial resource management, advocacy, project formulation and management) A1.4 Capacity building workshops and technical assistance to CSOs on sustainable production techniques/methods, preservation of natural resources and security of smallholder farmers (incl. rights to tenure) WP2 - Establishment of the multi-stakeholder PLASED platform A2.1: Delivery of technical assistance in the PLASED platform’s design and start-up A2.2: Inception of the PLASED platform and implementation of strategic actions A2.3: Development, publication and circulation of a booklet on the PLASED experience WP3 - Participatory elaboration of the Strategies (STRAT) for the competitive, inclusive, sustainable and resilient value chains’ development WP4 - Establishment of a Comprehensive Service System (COSS) A4.1 Mapping and analysis of the service providers/infrastructure in the Ratanakiri Province A4.2 Technical assistance for designing the COSS A4.3 Capacity building and technical assistance to the COSS start up A4.4 Capacity building workshops to improve skills of the single service providers and address service system gaps A4.5 COSS start up and provision of financial support to selected COSS users (Financial support to Third Parties)
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The first result of the RESCO assessment is the identification of a Strategic Vision for the Cassava Value Chain development to be achieved in 2030 and consists in “**Increasing cassava production and increase sales on provincial and national markets by 40%, providing jobs mainly to the most disadvantaged people, and counting to its competitive advantage**, consisting in its unique typicality and abundant production. As matter of fact the Ratanakiri casava can be presented as a product with unique appreciated characteristics, and capable to furnish the most exigent clients with its abundance.

5.3. The Strategic Guidelines and Action Plans in details

The strategic guidelines for action are described with reference to:

- ⊗ the priorities, as previously defined,
- ⊗ the strategic field: Governance, Services, and Capacity Building

and they are divided into:

- ⊗ Actions at multi value chain level (AM), which includes actions that are common to all the value chains
- ⊗ Actions at Value Chain level, that are specific of the CASSAVA value chain

PRIORITY No. 1

AM MULTI LEVEL VALUE CHAINS

AM1.1: GOVERNANCE

AM1.11: Establish a PLASED (Platform for Sustainable Development), a mechanism for enhancing social dialogue and maintaining competitive advantage and creating jobs, through

- (a) Delivering technical assistance in the PLASED platform’s design and start-up
- (b) Supporting priority actions, such as
 - b1: drafting a territorial marketing strategy
 - b2: Lobby with government for improving the execution of government plans, and supporting Smmes which want to growth, and be formal
- (c) Support building of alliances with other relevant national and international actors

This Activity corresponds to the CLESIDRA actions of the work plan WP2 (A.2.2)

AM1.12: Publication and circulation of a booklet on the PLASED experience

This Activity corresponds to the CLESIDRA actions of the work plan WP2 (A.2.3)

AM1.2: SERVICES

AM1.21 Establish a COSS (Coordinates Service system) for delivering socio-economic services in a effective and efficient way, through:

- (a) Mapping and analysis of the service providers/infrastructure in the Ratanakiri Province

- (b) Technical assistance for designing the COSS
- (c) Capacity building and technical assistance to the COSS start up
- (d) COSS start up and provision of financial support to selected COSS users (Financial support to Third Parties)

This Activity corresponds to the CLESIDRA actions of the work plan WP4 (A.4.3)

AM1.22: Improve business services, and access to them, with priority to the following ones:

- Technical, administrative, organisational services
- Marketing/Commercialisation
- Support in the development of Cooperatives, cooperation/networking
- Support in the development of alliances / associations

This Activity corresponds to the CLESIDRA actions of the work plan WP4 (A4.4)

AM1.3: CAPACITY BUILDING

AM1.31: Build capacities on business administration, and plans, useful also for addressing request of funds and credit

This Activity corresponds to the CLESIDRA the actions of the work plan WP1 (A14)

CASSAVA VALUE CHAIN

A1.1 GOVERNANCE

A1.1: Establish a Cassava Development Committee, on the base of the focus group participants, and as a PLASED sub-groups, with the following tasks:

- (a) Facilitating cooperation among the producers, for increasing production (critical mass of sales)
- (b) Establishing an agreement for collective purchasing of inputs, and/or sharing equipment, and collective sales (for reducing power to middlemen)
- (c) Improving access to information on national programs
- (d) Realising a campaign for raising the attention of the government on the importance and the advantages of supporting cassava value chain
- (e) Lobbying towards National Government for strengthening the regulations and plan in favor of the environmental protection (protection of natural resources, the transition to a clean environment, and the achievement of the Sustainable Development Goals), and incentive for whom to realise correspondent businesses and initiatives

This Activity corresponds to the CLESIDRA the actions of the work plan WP2 (A2.2)

A1.2: SERVICES

A1.21: Improve business services, and access to them, especially the following ones:

- Quality control services
- Soil quality monitoring
- Transportation services

This Activity corresponds to the CLESIDRA the actions of the work plan WP4 (A44)

A1.22: Support to the production of sub-products, such as:

- Dried cassava leaves and roots
- Cassava chips
- Cassava paste
- Cassava flour
- Cassava as animal feed
- Alcoholic beverages
- Unmodified or native starch
- Modified (physical, chemical, biological) starches for industrial purposes in the paper and textile industry, as well as an adhesive in glass, mineral wool and clay. Sweeteners, including high-fructose syrup and glucose (dextrin, monosodium glutamate, pharmaceuticals, etc.) for the making of a large variety of food items including ice cream, jelly beans, jams, sweets and gums.
- Cassava caramel which is used as colouring agent in food, confectioneries and liquor
- Ethanol for industrial uses: It can be mixed with petrol or used on its own as a transport fuel or utilized as industrial alcohol which is important in the pharmaceutical and cosmetic industry.

This Activity corresponds to the CLESIDRA the actions of the work plan WP4 (A45)

A13: CAPACITY BUILDING

A1.31: Build capacities for increasing production, productivity, commercialization, and quality

This Activity corresponds to the CLESIDRA the actions of the work plan WP1 (A14)

A1.32: Build capacities for producing by-products, as indicated in A122, and organic and agroecological cultivation, and sustainable irrigation

This Activity corresponds to the CLESIDRA the actions of the work plan WP1 (A14)

PRIORITY No. 2

AM MULTI LEVEL VALUE CHAINS

AM2.2: SERVICES

AM2.21: Realise a service facilitating matching between labour demand and supply

CASAVA VALUE CHAINS

A2.1: GOVERNANCE

A2.11: Lobby with government for:

- realising intelligent infrastructures: Storages, Transportation, roads, telecommunication, roads (Lack and obsolescence), Electricity System, and need for alternative sources, water collection and distribution
- realising financing specific mechanisms for the value chain (credit lines, etc.)
- increasing research on new technologies
- adopting incentives for businesses that increase jobs

A2.12: : Enhance environmental sustainability and reducing the climate change impact, through

- stimulating universities, and professional school to introduce education on circular economy
- establishing a monitoring system on pollution and use of water resources in the long term

A2.2: SERVICES

A2.21: Improve services, for Business start-up

A2.22 Improve services for environmental sustainability and reducing the climate change impact, *with priority to:*

- the creation of companies that collect waste selectively, store it,
- the support to companies that recycle and reuse wastewater to recycle it

A2.23: Facilitating access to loans, through:

- an agreement with micro-finance Institutions
- an agreement with some bank for establishing kind of guarantee fund, or revolving credit with collective guarantee, etc.
- Improving the secure system to loans for the business sector

A2.3: CAPACITY BUILDING

A2.31: Improve capacities of the local actors to get information on market demand trends

A2.32: Sensitise farmers in formalising their activities

A2.33: Build capacities on protecting the environment and reducing the climate change impact, through:

- Sensitising, realising capacity building, and other initiatives for increasing the commitment on environmental sustainability and the green economy: water and electricity efficiency and cost reduction; CO2 emissions; waste management; increase the products life; use of recycled material, etc.

- Exposing the value chain actors to best practices on commitment of people on environmental sustainability and the green economy

A2.34: Capacity building in “how to manage cooperation among producers”

A2.35: Provide capacity building for professional skills required by the cassava development, with particular reference to

- Product procurement and marketing responsible
- Saler
- Transporter
- Storing operator
- Operator of new digital and remote sensing technologies
- Technician specialized in robotics and automation
- Technician specialist in Artificial Intelligence (IA)

PRIORITY No. 3

CASSAVA VALUE CHAINS

A3.1: GOVERNANCE

A31.1: Stimulate the research to find innovative solutions for the circular economy

A31.2: Realise a contingency plan to be carried on in emergency situation, and consisting in valorising the resilience characteristics of cassava (production of goods, labour force), through enhancing: reduction of CO2 emissions, development of seeds, diffusion of organic and agroecological cultivation, and sustainable irrigation

A3.13: Enhance social sustainability, through lobbying with Government for facilitating inclusion of individuals with different physical and mental abilities

A32: SERVICES

A3.21: Improve services for introducing new technologies with particular priority to:

- Dryers
- Cassava cleaning and washing equipment
- Equipment for cassava processing: Cassava Crusher, Cassava Sieving Machine, Dewatering and Drying System, Cassava Peeling Machine, Cassava Grinding Machine, Cassava Chips Cutting Machine, etc.
- Plows and harrows for soil preparation
- Tractors
- Cassava planter
- Equipment for post-planting, harvesting, post-harvest work
- Cassava harvester
- Cassava graters
- Supplies for tools and machinery
- Supplies for packaging (boxes, bags)

A3.22: Enhance social sustainability, through supporting enterprise in applying CSR

A3.23: Strengthen services for environmental protection, through

- implementing a system for prediction and prevention of risks of anthropic origin, and natural origin,
- Providing services for Bio-certification
- Providing services for using organic pesticides and fertilisers

A3.3 CAPACITY BUILDING

A3.31: Build capacities on social sustainability, with particular reference to

- Individuals with different physical and mental abilities, for using the job opportunities
- Capacities on the corporate social responsibility (CSR)
- Women for accessing to key position in production, and organisations and institutions, including public ones.

A3.32: Realise sensitisation and cultural campaigns against the violence against women

A3.33: Sensitising and building capacities of farmers and SMMEs on the advantages of applying solutions for environment protection

Chapter 6. CONCLUSIONS

Two important conclusions may be drafted:

- 1) Articulation of the governance mechanism for local economic development in Ratanakiri
- 2) The synthesis of main strategic guidelines

Articulation of the governance mechanism for local economic development in Ratanakiri

The governance mechanism for local economic development in Ratanakiri is articulated in three components (see figure below)

- A. The main management body, which is the Platform of Local Actors for Sustainable Economic Development (PLASED)
- B. The functional subgroups, which are the VALUE CHAIN COMMITTEE (VAC)
- C. The executive body, which is the Coordinated Service System (COSS)

The main tasks of the PLASED are

- Drafting a territorial marketing strategy
- Lobbying with government for improving the execution of government plans, regarding the Ratanakiri development
- Facilitating access to financial resources, through project financing, participation to tenders, use of companies' social responsibility, crowdfunding, etc.
- Support building of alliances with other relevant national and international actors

The VAC's main tasks are:

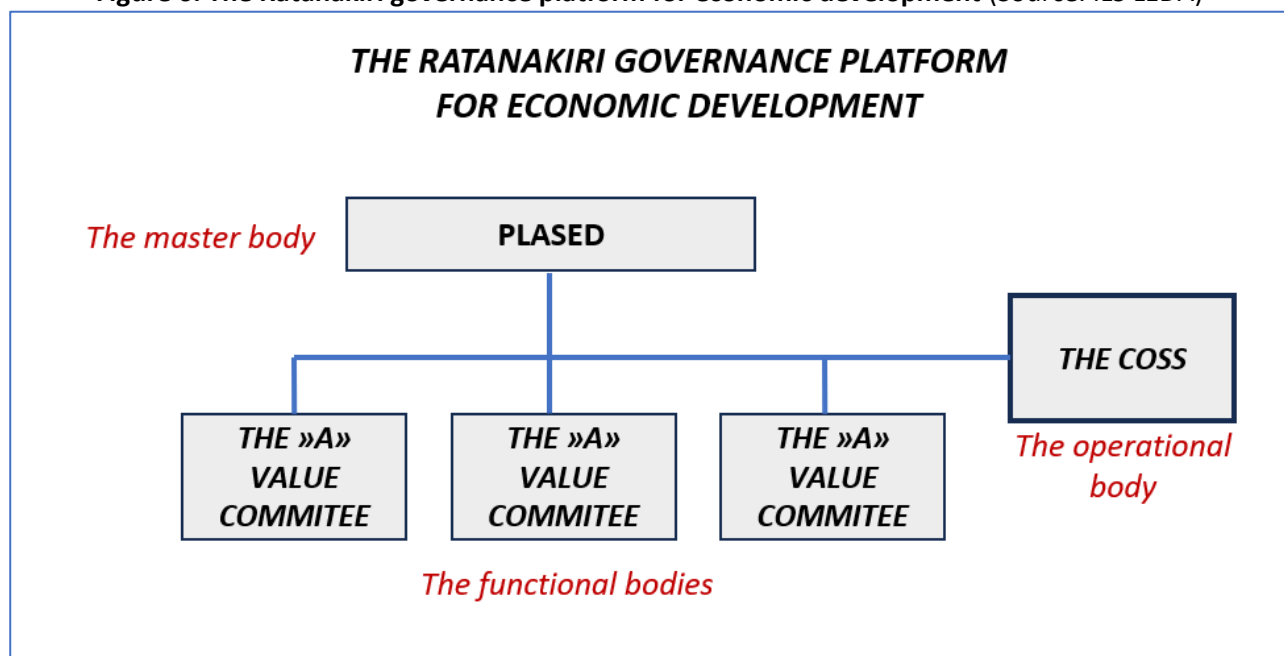
- Taking all the common initiatives, useful to the competitive, inclusive, sustainable and resilient value chain development
- Facilitating commercialization (possibly through outsourcing a specialised co-operative) through a brand policy, and advertising, promoting collective purchase and use of expensive machinery to reduce costs (washing, boiling, skinning etc.); negotiating capacity with wholesalers, shops, marketplaces, supermarkets, commercial chains, etc.
- Lobbying with local and national authorities for realising an accessible information system on the national measures in favour of the value chain and introducing national incentives or measures to support the value chain with particular reference to business startup, and specific financing mechanisms
- Linking the actors of the cassava value chain with international similar networks related to technologies for exposure to new technologies

The COSS main tasks are:

- Improve business services, and access to them, with priority to the following ones:
- Technical, administrative, organisational services
- Marketing/Commercialisation
- Support in the development of Cooperatives, cooperation/networking

- Support in the development of alliances / associations
- support related to new technologies
- Services for environmental sustainability and reducing the climate change impact, *with priority to those related to circular economy*
- Facilitating access to loans

Figure 6. The Ratanakiri governance platform for economic development (Source. ILS LEDA)



Synthesis of the main strategic guidelines

The following box illustrated the synthesis of the Cassava value chain development strategic guidelines for **priority 1**

Box 2. Synthesis of the Cassava value chain development guidelines for priority 1 (Source. ILS LEDA)

	MULTI-VALUE LEVEL	VALUE CHAIN LEVEL
GOVERNANCE	Establish a PLASED (Platform for Sustainable Development), a mechanism for enhancing social dialogue and maintaining competitive advantage and creating jobs	Establish a Cassava Development Committee, on the base of the focus group participants, and as a PLASED sub-group
SERVICES	Establish a COSS (Coordinates Service system) for delivering socio-economic services in effective and efficient way	Improve business services, and access to them, especially quality control services, Soil quality monitoring, and transportation services
	Improve business services, and access to them	Support to the production of sub-products
CAPACITY BUILDING	Build capacities on business administration, and plans, useful also for addressing request of funds and credit	Build capacities for increasing production, productivity, commercialization, and quality
		Build capacities for producing by-products

The following box illustrated the synthesis of the Cassava value chain development strategic guidelines for **priority 2**

Box 3. Synthesis of the Cassava value chain development guidelines for priority 2 (Source. ILS LEDA)

	MULTI-VALUE LEVEL	VALUE CHAIN LEVEL
GOVERNANCE	Realise a service facilitating matching between labor demand and supply	Lobby with government for realising intelligent infrastructures: facilitating access to fund, increasing research on new technologies, and adopting incentives for businesses that increase jobs
		Enhance environmental sustainability and reducing the climate change impact
SERVICES	Improve services, for business start-up	Improve business services, and access to them, especially quality control services, Soil quality monitoring, and transportation services
	Improve services for environmental sustainability and reducing the climate change impact (circular economy)	Support to the production of sub-products
	Facilitating access to loans	
CAPACITY BUILDING		Improve capacities of the local actors to get information on market demand trends
		Sensitise farmers in formalising their activities
		Build capacities on protecting the environment and reducing the climate change impact, also through exposure to best practices
		Build capacities on “how to manage cooperation among producers”
		Build capacities for professional skills required by the cassava development

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