

Processing Agricultural Product in Socio-economic Development of the Central Highlands Region

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Abstract: The Central Highlands has become one of the major agricultural production areas of the country with large-scale, high-proportion staple agricultural products, especially industrial crops and fruit trees. The Central Highlands is considered a region with great potential for developing the agricultural and forestry processing industry, especially the processing industry of short-term staple industrial crops. In recent years, the processing industry of short-term staple industrial crops has made positive contributions to the socio-economic development of the Central Highlands. However, the processing industry is still limited and has not developed commensurate with the potential and raw materials; agricultural products are mainly exported raw and semi-processed, businesses have encountered difficulties in quality raw materials, uneven quality of agricultural products, low quantity and not guaranteed to harvest on time, supply and demand do not meet because of factors such as the lack of driving enterprises; the underdeveloped processing mechanism; non-synchronized infrastructure; low quality of human resources; difficulties in identifying key products and planning raw material areas. Dealing well with these issues may help to foster socio-development of the Central Highlands region.

Keywords: Processing industry, agricultural products, economic development, Central Highlands.

Subject classification: Public policy.

1. Introduction

The Tây Nguyên (Central Highlands) region includes 5 provinces (Kon Tum, Gia Lai, Đắk Lắk, Đắk Nông and Lâm Đồng), with a natural area of 54.5 thousand

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km², accounting for 16.8% of the country's area; more than 5 million hectares of agricultural land, including 1.3 million hectares of red basalt soil; more than 2.6 million hectares of forest, the third largest in the country; with advantages in climate and soil suitable for many types of crops. These are favorable conditions for the Central Highlands to develop into a large agricultural commodity production region of the country with a rich variety of agricultural products, especially plants such as cassava and sugarcane, which are considered short-term staple crops of the region. Of which, the cassava area is about 150 thousand hectares with an average total output of over 400 thousand tons of products/year; the sugarcane area is about 60 thousand hectares with a total output of over 65 thousand tons of products/year (Phạm Xuân Hoàng, Phạm Thị Nhân Anh, 2023).

Since the 11th Party Congress, the Central Highlands has had positive changes in agricultural restructuring associated with production model transformation, high technology application, and strengthening linkages to create value chains associated with agricultural restructuring. The processing industry of agricultural products of the Central Highlands has gradually developed. However, many agricultural products of the Central Highlands are key exports but are still only at the production and preliminary processing stages with low added value in the global value chain. “These provinces of the Central Highland region need to invest further supports not only for agriculture, but also for industries likely fertilizer industry, agricultural product processing industry, logistics and other service” (Trần Bình Đà, Nguyễn Hữu Giáp, 2019: 65). It is necessary to develop the processing industry so that this industry becomes one of the important links in the agricultural value chain and is the driving force and lever to promote socio-economic development of the Central Highlands. Based on the guidelines and policies of the Party and the State on the development of the agricultural processing industry in the Central Highlands, this article collects secondary data to analyze the contributions and limitations of the agricultural processing industry in the socio-economic development of the Central Highlands.

2. Literature review

A number of studies focusing on processing agricultural product. Trần Bình Đà, Nguyễn Hữu Giáp (2019) studied how to diversify livelihood and build new rural areas in the Central Highland. They pointed out that one of the main goals was to modernize the production line in several industries, included agriculture processing. Phạm Văn Lang et al. (2020) deemed that the role of agricultural mechanization in the process of modernization of agriculture in Vietnam contributed agricultural engineering to production after years of conducting

renovation. Hồ Việt Hạnh, Hồ Kim Thúy (2022) believed that the key to success of the region, including its economy, was human resource in addition to technology and administrative reform. Minh Chi (2022) pointed out the lack of modern equipment beside the shrinking size of raw material areas worsened the situation of processing sugar industry. Đinh Thị Bích Liên (2023) explored the situation of the Central Highland economy and proposed several solutions to enhance its economy rapidly and sustainably. Meanwhile, one of the findings of Phạm Minh Đạt (2023) suggested that the success of exporting key agriculture products of Vietnam relies on how they were processed. Phạm Xuân Hoàng, Phạm Thị Nhân Anh (2023) revealed the close relation between socio-economic development and national defense and security assurance in the Central Highlands region, in which the modernization of the production line in processing agricultural products was of special importance. The research that Phạm Thi (2024) conducted regarding application of IoT in processing agriculture products saw the enhancement of crops when applying IoT.

Regarding the development orientation of the Central Highlands region, there are a number of documents including: Resolution No. 10-NQ/TW dated January 18, 2002 of the Politburo on socio-economic development and ensuring national defense and security in the Central Highlands region for the period 2001-2010; Notice of Conclusion No. 148-TB/TW dated July 16, 2004 on comprehensive and sustainable development of the Central Highlands region and Conclusion No. 12-KL/TW dated October 24, 2011 on continuing to implement Resolution No. 10-NQ/TW on socio-economic development and ensuring national defense and security in the Central Highlands region for the period 2011-2020; Decision No. 936/QĐ-TTg of the Prime Minister dated July 18, 2012 approving the master plan for socio-economic development of the Central Highlands region to 2020.

In addition to long-term orientation policies and basic solutions for socio-economic development in the Central Highlands, the Prime Minister has issued many specific mechanisms to help the Central Highlands mobilize resources to build socio-economic infrastructure and promote production. Decision No. 168/2001/QĐ-TTg dated October 30, 2001 of the Prime Minister on basic solutions for socio-economic development in the Central Highlands in the 2001-2005 period; Decision No. 253/QĐ-TTg dated March 5, 2003 of the Prime Minister approving the scheme on a number of solutions to consolidate and perfect the grassroots government in the Central Highlands in the 2002-2010 period; Decision No. 25/2008/QĐ-TTg dated February 5, 2008 of the Prime Minister on promulgating a number of mechanisms and policies to support socio-economic development for the Central Highlands provinces until 2010; Decision No. 276/QĐ-TTg dated February 18, 2014 of the Prime Minister on the plan to implement Conclusion No. 12-KL/TW dated October 24, 2011 of the Politburo on continuing to implement Resolution No. 10-KL/TW of the Politburo (9th tenure) on developing the Central Highlands in the 2011-2020 period.

3. Policies and strategies for developing agricultural processing industry in the Central Highlands region

With the goal of turning the Central Highlands into a center for production and deep processing of a number of key agricultural products with high competitiveness domestically and internationally, developing agricultural production associated with rural tourism, recently, the Party and Government have had many major policies and guidelines for the economic development of the Central Highlands in general and the agricultural processing industry in particular (Phạm Xuân Hoàng, Phạm Thị Nhâm Anh, 2023).

Regarding the processing industry, it is specified in documents of the Government and related ministries and branches, including: Decision No. 899/QĐ-TTg dated June 10, 2013 of the Prime Minister approving the project to restructure the agricultural sector to grow towards increasing added value and sustainable development; Decision No. 6448/QĐ-BCT dated June 26, 2015 of the Ministry of Industry and Trade approving the planning for industrial and commercial development in the Central Highlands region to 2025, with a vision to 2035. In which, the orientation for the development of the processing industry in the Central Highlands region focuses on two tasks: i) Accelerating the process of restructuring industries towards increasing the proportion of processing and manufacturing industries, industries with added value and high technology content; ii) Increasing in-depth investment in processing industries to effectively exploit the potential and advantages of raw materials in the region and in the Vietnam - Laos - Cambodia Development Triangle such as rubber, cashew, coffee, cotton, macadamia and other agricultural products processing industry, livestock product processing... By 2035, the Central Highlands will have become the processing and trade center of the Indochina region for advantageous agricultural and forestry products. The proportion of production value of processing and manufacturing industries in the total industrial production value of the Central Highlands would reach about 75-77% in 2020 and 85-87% in 2025.

It is necessary to increase in-depth investment in processing industries to effectively exploit the potential and advantages of raw materials in the region and in the Vietnam - Laos - Cambodia Development Triangle such as rubber, cashew, coffee, cotton, macadamia and other agricultural products processing industry (Ministry of Industry and Trade, 2023); Resolution No. 152/NQ-CP of the Government dated November 15, 2022, promulgating the Government's Action Program to implement Resolution No. 23-NQ/TW dated October 6, 2022 of the Politburo on the direction of socio-economic development and ensuring national defense and security in the Central Highlands region by 2030, with a vision to 2045, with the following specific contents: building and developing the Central Highlands

region by 2030 into a fast-growing, sustainable region based on a green, circular economy; rich in national cultural identity, unique destinations, attracting domestic and international tourists. Developing highly efficient agricultural economy, based on science - technology, innovation, digital transformation; forming a number of large-scale agricultural products with international brands associated with processing centers. Fundamentally forming important transport infrastructure, digital infrastructure (Government, 2022); Decision No. 371/QĐ-TTg dated May 4, 2024 of the Prime Minister approving the Central Highlands Regional Planning for the period 2021-2030, with a vision to 2050. It clearly states that the Central Highlands prioritizes the strong development of processing and manufacturing industries, industries with added value and technology content, environmentally friendly associated with the advantages of raw materials in the region. Forming deep-processing industrial zones and clusters, industry clusters associated with central urban areas and economic corridors; effectively linked with the industries of the Central Middle, South Central and Southeast sub-regions (Prime Minister, 2024).

These are important legal corridors for the Central Highlands to accelerate the process of restructuring industries towards increasing proportions, increasing in-depth investment in processing industries to exploit the advantages of raw materials in the region, creating conditions for the short-term key agricultural product processing industry to develop and make positive contributions to the socio-economic development of the Central Highlands.

4. Contribution of agricultural product processing industry to the socio-economic development of the Central Highlands region

4.1. Economic restructuring

After more than 20 years of implementing the Resolution and Conclusion of the 9th and 11th Politburo, the Central Highlands has better exploited its potentialities and advantages. The economic structure of the region has shifted in a positive direction and is consistent with the economic growth model, focusing on developing high-tech agriculture, hydropower, mining, construction materials, and processing agricultural products for export. In particular, the proportion of industry tends to increase, becoming the main growth driver of the region. The economic scale of the region has expanded and increased rapidly. The scale of GRDP in 2020, at current prices, of the Central Highlands reached 287 trillion VND, 14.1 times higher than in 2002 and increased by nearly 8%/year, the growth rate of economic sectors is the highest compared to other regions. GRDP per capita in 2020 reached

over 48 million VND, 10.6 times higher than in 2002. The Central Highlands has become a region producing a number of key agricultural products on a large scale, accounting for a high proportion, especially industrial crops and fruit trees. The production value of the processing and manufacturing industry accounts for 68.6% of the entire industry (according to the 2015 value) (Đinh Thị Bích Liên, 2023). The processing industry has contributed greatly to the overall growth of industrial production in particular and the restructuring of the local economy in general.

The sugarcane, cassava and cassava starch processing industries are making many contributions to the localities. In Đắk Nông, the contribution to local output growth from processed products includes industrial alcohol estimated at 4,700 tons, up 9.6%; cassava starch estimated at 20,100 tons, up 42.5% (Đắk Nông Provincial People's Committee, 2022). In Kon Tum province, the industrial production index is estimated to increase by 8.91% over the previous year, of which the processing and manufacturing industry increased by 6.72%, cassava starch reached 279,419 tons, and RE sugar reached 12,255 tons. Regarding cassava, Kon Tum province has 04 enterprises and a number of factories directly exporting products mainly to the Chinese market. In 2022, cassava starch exports reached 25.96 million USD, up 10% over the same period; In 2023, it will reach 29.72 million USD, an increase of 14.5% over the same period (Department of Industry and Trade of Kon Tum province, 2024). In Gia Lai province, the value of processing and manufacturing industry production will reach more than 15 trillion VND. Gia Lai is developing the agricultural processing industry, focusing on key industries, accounting for more than 80% of export turnover.

Some agricultural products such as sugarcane, cashew nuts, rubber, and cassava have a high processing rate. Currently, the province has nearly 400 agricultural and forestry production and processing establishments, including two refined sugar processing factories with a capacity of 24,000 tons of sugarcane/day; refined sugar processing in 2020 is estimated at 209,249 tons; cassava starch processing in 2020 is estimated at 228,124 tons (Gia Lai Provincial Department of Industry and Trade, 2020). Five starch and ethanol processing factories have come into operation with a total capacity of 1,000 tons of finished products/day. The processing rate from cassava raw materials in the province is 49.8% (about 205,000 tons/year). Cassava exports in 2020 reached 8,000 tons, worth 41.4 billion VND, accounting for 0.3% of total export value (Gia Lai Provincial People's Committee, 2022). The remainder was sliced, dried for export, processed into animal feed and some other products.

4.2. Improving competitive performance

For exporting key agricultural products in the Central Highlands, sugarcane and cassava starch exporting enterprises are constantly investing in traceability

systems and agricultural product exploitation management. Many agricultural enterprises have begun the process of innovation to adapt to the new context, helping to improve the competitiveness of short-term agricultural products in the Central Highlands.

After 15 years of implementing Resolution No. 26-NQ/TW dated 5 August, 2008 of the 10th Party Central Committee on agriculture, farmers and rural areas, the agricultural sector has developed in both scale and production level, maintaining high growth. Economic components and types of agricultural enterprises have developed diversely, achieving positive results. Agricultural production has been constantly innovated, gradually adapting to the socialist-oriented market economy. Farmers have better promoted their role as subjects, participating in cooperation, association, transforming production structure, and economic development.

Agricultural products such as sugarcane, sugar, and cassava in the Central Highlands have been continuously improved in both quantity and quality. The competitiveness of the agricultural sector has increased rapidly thanks to the gradual shift from increasing output to increasing value - creating higher added value per unit of agricultural land area through combining agriculture with the processing industry and agricultural trade services. The agricultural processing industry has made significant progress, and the production and processing chains have continuously improved their design capacity. Support services such as the logistics system for agricultural production and trading have been increasingly improved, contributing to improving the quality of agricultural products, significantly reducing post-harvest losses, shortening transportation time, and reducing intermediary costs.

The formation of a production chain between farmers and processing enterprises is increasingly expanding, contributing to improving the competitiveness of agricultural products. Đắk Lắk province currently has the second largest sugarcane raw material area in the Central Highlands with an area of over 20,000 hectares. The average annual sugarcane yield is 67 tons/ha. Sugarcane companies in Đắk Lắk are proactively linking themselves with farmers, building stable raw material areas, developing post-sugar products, and increasing income for sugarcane growers. Đắk Lắk Sugarcane Factory has signed a contract to purchase 5,000 hectares of raw sugarcane in Ea Sup and Buôn Đôn districts and neighboring areas. Sugarcane growers are also invested by the company in fertilizers and pesticides equivalent to 30 million VND/ha for newly planted crops, 15 million VND/ha for retained stumps, support of 10 million VND for each drilled well, and a contract to purchase all raw sugarcane for farmers (Minh Chi, 2022). From these orientations for investing in raw material areas, these processing enterprises have initially contributed to improving competitiveness and ensuring the quality of exported agricultural products is consistent and stable, meeting the

demand for the proportion of agricultural products produced according to sustainable standards and green standards according to the increasingly strict requirements of importing countries.

The proactive capacity, market forecasting and negotiation ability in international trade of export enterprises; the information management capacity of local authorities to meet the demand for production expansion are also enhanced in parallel. The commercial, logistics and transportation infrastructure in the direction of production specialization and the development needs of processing enterprises are also increasingly improved and synchronized to meet the demand for domestic transportation.

4.3. Dealing with employment

The Central Highlands has an abundant labor force, being a place that has all the conditions and capabilities to distribute and develop processing industries, which use a lot of labor. During the process of formation and development, processing enterprises have helped solve labor and employment, training a team of highly skilled and technical workers to meet the needs of modern industries, requiring high technology and intellectual content in products.

Although the number of workers working in processing and manufacturing enterprises (currently accounting for 9.4% of the total number of enterprises in the Central Highlands) is still low, processing and manufacturing enterprises have created jobs for 36,271 workers, of which Lâm Đồng accounts for the highest proportion - 42.3% of the workers. On average, each enterprise creates jobs for 29 workers (compared to the national average of 90 workers/enterprise) (General Statistics Office, 2023).

The speed of industrial restructuring towards industrialization and modernization in the Central Highlands is still slow, because the current economic type is mainly agricultural, lacking specialized areas for high-quality agricultural products. However, as a driving force in the economy, the processing industry in the time to come will attract more labor resources for production to meet the requirements of increasing both the scale of skilled labor and the quality of skills training, comprehensively innovating human resource development; reducing the gap and backwardness of the Central Highlands human resources compared to the whole country through creating a favorable environment for accessing training, improving the quality of training in terms of knowledge, skills, behavior, and attitude to meet the needs of businesses.

The activities of processing enterprises have expanded the employment environment, attracted workers, and solved a number of social problems. The

Central Highlands has a relatively high proportion of agricultural laborers. However, with the increasingly high level of science and technology required in cultivation, production, and agricultural product development, especially with sugarcane, agricultural production activities need to be improved and use more machinery and equipment. Therefore, the development of processing enterprises, represented by sugarcane enterprises, opens up the problem of supporting and linking with farmers in production and helping these linked households to improve techniques as well as improve product quality and solve unemployment in agriculture. If localities such as Đắk Lắk, Gia Lai, and Kon Tum develop in accordance with the planning direction of raw material areas, the surplus labor resources during the off-season will be utilized for planting, caring for, and harvesting work at sugarcane factories.

4.4. Facilitating social security

According to local managers, the construction of cassava and sugarcane starch production and processing factories has helped promote socio-economic development in disadvantaged areas. Cassava and sugarcane raw material areas are concentrated in mountainous districts, border districts, arid land, mostly rocky land. People's lives here largely depend on the production of these monoculture crops, so the increase and decrease in raw material prices greatly affect people's lives. The current good purchase price of sugarcane and cassava not only creates favorable conditions for the construction of sustainable raw material areas for processing enterprises, but also increases people's income. Raw material areas and processing enterprises with focused investment and development such as the Southeast of Gia Lai province and the Southwest of Đắk Lắk province have greatly contributed to social security for these particularly disadvantaged areas.

In Gia Lai province, the orientation of forming a large sugarcane field of 150 hectares in Kông Long Khong commune, Kbang district has helped to promote social security support for the Bana ethnic minority. Thanks to the application of advanced technology, mechanization, and production linkage with An Khê Sugar Factory through land improvement support, providing sugarcane seeds, techniques, and product purchase commitments since 2017, the Bana people have had higher incomes to stabilize their lives. Not only does it bring economic benefits to the people, but it also contributes to sustainable agricultural development. The raw material area of An Khê Sugar Factory currently has over 100 large fields with more than 3,000 hectares in four districts: An Khê, Kbang, Đắk Pơ, Kông Chro (Department of Industry and Trade of Gia Lai province, 2020). The production connection with the factory has created opportunities to promote changes in thinking and production practices of ethnic minorities, contributing to improving their lives and reducing poverty.

In Đắk Lắk province, the sugarcane growing area (mainly KK3, K95-84 sugarcane varieties) in M'Đrăk district accounts for more than 80% of the agricultural land area in the area, with 6,347 hectares in harvest period. Of which, Ea Pil commune has 2,730 hectares, Cư Prao 2,000 hectares, Krông Jing 600 hectares, Krông Á 525 hectares, Ea Lai 240 hectares, Cư M'ta 140 hectares, Ea Trang 110 hectares. It can be said that sugarcane is a means to sustainably reduce poverty. Hundreds of hectares of hilly land in Ea Trang and Ea Pil communes that were previously abandoned have been converted to land for sugarcane. The linkage in production between ethnic minority households and enterprises has been stabilized. Households sign direct contracts with sugar factories such as 333 Sugarcane Joint Stock Company (Đắk Lắk), Cư Jút Sugar Factory (Đắk Nông), Biên Hòa - Ninh Hòa Sugarcane Joint Stock Company to divide areas, invest in building infrastructure, roads, irrigation works, guide intensive technical processes, advance capital, sugarcane seeds, fertilizers, pesticides, product consumption... Ethnic minority households in concentrated sugarcane growing areas of M'Đrăk district have an income of 70 million to 100 million VND/year (Minh Chi, 2022). Recognizing that effectiveness, M'Đrăk district has oriented the area of sugarcane raw material areas to grow new sugarcane varieties with high yield and quality for mass planting to contribute to increasing income and ensuring social security for ethnic minorities. In the raw sugarcane growing areas, the change in people's lives is an indispensable contribution of sugarcane enterprises located locally.

5. Some limitations of agricultural processing industry on socio-economic development of the Central Highlands region

First, the lack of driving enterprises

Attracting investment from private economic sectors and large enterprises in agricultural development and agricultural processing industry in the Central Highlands localities still faces many difficulties: policies to attract and encourage investment are still slow to be implemented; there have not been many large-scale enterprises organizing production linkages and purchasing and consuming products so that people can feel secure in investing in production development. "Vietnam is still basically an agricultural country, so the export of agricultural products plays a special role, creating social stability and improving the quality of life for farmers, contributing to the country's economic development" (Phạm Minh Đạt, 2023). Enterprises currently operating are often small- and medium-sized, mainly purchasing and processing raw materials, so the value of products is not high. The application of technology in production is still limited, with few enterprises participating in deep investment in the agricultural processing industry, only

focusing on participation in a very short link in the supply chain instead. The reason is that policies, mechanisms and procedures on land still have many shortcomings, many enterprises often have to spend several years to have land to invest in production. Capital mobilization is difficult. Local authorities have not yet had policies to connect businesses and farmers, and have not yet formed a value chain for agricultural and forestry products between localities, regions and the whole country. Another problem is that investment in the agricultural economy has unforeseen risks, so it lacks attractiveness. Many businesses have encountered difficulties in quality raw materials, uneven quality of agricultural products, low quantity, not guaranteed to harvest on time, with supply and demand not meeting each other.

Second, deep processing is underdeveloped

The processing and consumption of agricultural products have not been completed and still mainly rely on traders. It is believed that “smart farming techniques using IoT [Internet of Things] lead to higher crop yields by ensuring optimal growth conditions and timely pest and disease management” (Phạm Thi, 2024), however, the agricultural processing industry, especially the technology of harvesting, preserving and post-harvest processing, develops slowly, mainly in raw processing. Most enterprises are small- and medium-sized, with low capacity and unsynchronized equipment lines, so the product quality is not high and the content of refined products is still low. The products are mainly consumed domestically, or exported in raw form or provided as raw materials for processing factories in Bình Dương, Đồng Nai. This leads to the situation where products from the Central Highlands are sold elsewhere at low value, but after being processed into animal feed, the refined products are returned to the local consumption at much higher prices than when they were not processed. When economic efficiency is not high and does not bring significant profits, enterprises easily fall into a state of lack of capital to reinvest in modern industrial equipment, causing difficulties for the development of the processing industry. “Businesses need to pay attention to product quality, traceability, and packaging to comply with regulations and standards of key importing countries of Vietnam’s agricultural products” (Phạm Minh Đạt, 2023).

Third, infrastructure is not synchronized

The economic infrastructure of the Central Highlands is not yet synchronous, does not meet the demand and does not create the driving force for economic growth. The main transportation system is roads with a length of about 32,220 km, of which the national highway has a total length of over 2,100 km, including two axes along the Hồ Chí Minh Trail, and national highway 14C running along the border. The cross-roads include national highways 19, 20, 24, 25, 26, 27, 28, 29, 40, 40B and national highway 55. Regarding aviation, there are three ports including

Liên Khương (Lâm Đồng), Buôn Ma Thuột (Đắk Lắk), Pleiku (Gia Lai). Due to the mountainous terrain and lack of sea, transportation is not convenient compared to other raw material areas. The electricity and telecommunications network, warehouse logistics services, finance, payment... serving the activities of enterprises in the Central Highlands are not as good as in other regions. “Agricultural products are heterogeneous, the production is not in accordance with technical processes, and the application of technology is still limited while agricultural infrastructure is insufficient and inadequate. Domestic raw materials are poor in quantity and quality, seasonality and uncertainty” (Hồ Việt Hạnh, Hồ Kim Thúy, 2022: 32). The mountainous terrain and steep slopes are not favorable for transportation, and investment in infrastructure and factories is also very costly; local budget resources are limited, so the Central Highlands region has not had a breakthrough policy to support investors, and the administrative apparatus is slow to reform. “The amount of machinery and equipment applied for sowing, aqua-feed processing, combine harvesting is of at low level” Phạm Văn Lang et al. (2020: 4). This not only limits sustainable development but also affects transportation as well as attracting investors and can become a bottleneck hindering growth.

Fourth, low quality of human resources

Due to limitations in education level, farming practices, labor force, especially ethnic minority labor force, mobilizing human resources to meet the requirements of developing large-scale processing enterprises, operating modern machinery and equipment, applying science to production and processing... is a difficult problem for the Central Highlands. Although the quality of human resources in the Central Highlands has been gradually improved, it is still generally lower than the national average, the labor structure according to training level is still unreasonable, not meeting the development needs. The number of people with expertise and techniques has increased, but in terms of labor force structure, the rate of labor with expertise and techniques has increased very slowly. The rate of trained labor in the Central Highlands is lower than the national average and other regions. Farmers mainly cultivate spontaneously, invest according to trends, and when demand drops, prices decrease, and efficiency is not high, they switch to other crops, affecting production and costs of investors. In addition, the techniques of tending plants and preventing pests and diseases for them have not been carefully studied, and there is no tending process, which has resulted in low quality and efficiency; the linkages of farmers and cooperatives are still small, with low financial potential, and still dependent on bank loans, so they rarely invest or link to expand production. Recommended is “the adaptation and customization of IoT solutions to suit local farming practices and environmental conditions across different regions of Vietnam” (Phạm Thi, 2024).

Fifth, difficulties in identifying key products and planning raw material areas

Due to favorable land and climate conditions, the Central Highlands region specializes in growing many different types of crops, but strategic crops and suitable development scales have not been clearly identified to ensure output and promote farming advantages. Planning work, especially planning for raw material areas of sugarcane and cassava, has not been implemented promptly and is still patchy. Sugarcane and cassava production and cultivation still depend too much on natural conditions, especially when facing severe and prolonged droughts, causing great losses for growers, and industrial processing facilities also lack raw materials for production. Notably, unstable agricultural prices and large fluctuations... make raw material sources unsustainable and unstable.

In Đắk Lắk, “333” Sugarcane Joint Stock Company has a factory with a capacity of 3,500 tons of sugarcane per day, with a sugarcane area of more than 8,000 hectares in Ea Kar and M’Đrăk districts. To meet the factory's production needs, the company's sugarcane area must be stable at 7,000-7,500 hectares. However, the factory is always short of about 100,000-150,000 tons of sugarcane per year. Due to the lack of raw materials, the unit has to shorten the pressing season and operate at only 70% of its capacity. The company said the reason for the lack of raw materials is that in recent years, sugarcane prices have been low, so people have switched to other crops. Moreover, in the eastern part of the province, there are many sugar factories from other provinces coming to buy sugarcane, leading to competition for raw materials. Đắk Lắk Sugarcane Joint Stock Company has a factory with a capacity of 2,500 tons/day, currently has 2,800 hectares of raw sugarcane in districts of Ea Súp and Buôn Đôn (Đắk Lắk) and Cư Prông (Gia Lai). However, the factory is short of 100,000 tons of sugarcane each year. Every year, the company plans to expand the sugarcane area but it is difficult to compete with rice and some other short-term crops (Minh Chi, 2022). In addition, care, fertilization, pesticide spraying, as well as management and protection are not good, and losses during harvest still account for a high percentage. The drying and processing stages still have many shortcomings, leading to low quality of agricultural products, not meeting the requirements of processing enterprises. Inadequacies in planning the development of key crops have limited the investment and development capabilities of processing enterprises, building brands for key products of the region, creating linkages in the production - processing chain to overcome the situation where farmers are always uncertain about the products they make.

6. Conclusion

The Central Highlands has great potential and advantages in the production and development of industrial crops, including short-term industrial crops. This is a

favorable condition and a large space for the agricultural processing industry. However, these potentialities are still mainly in the form of comparative advantages rather than competitive advantages. Since the 11th Party Congress, the Central Highlands has better exploited its potential and advantages, focusing on developing high-tech agriculture associated with the processing industry, including the processing industry of short-term key agricultural products. “This helps to exploit potentialities in investment of equipment and machinery from economic-sectors and attract investors from foreign countries that, in turn, provide favorable conditions for the agriculture sector to develop much more mechanization models appropriate to regional production conditions” (Phạm Văn Lang et al., 2020:5). Although it has achieved encouraging results in recent years, the Central Highlands still faces many difficulties and limitations in the development process. Solving the problem of developing the short-term key agricultural product processing industry of the Central Highlands will improve competitiveness, create jobs for a large part of the population, and contribute to ensuring social security. On that basis, the short-term agricultural processing industry will be an important driving force and lever for the socio-economic development of the Central Highlands region.

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