

# Hints In The Orientation Of Policy And Legal Framework Building For The Development Of Vietnam's Circular Agriculture

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## ABSTRACT

The circular economy in agriculture is a significant driving force contributing to the sustainable development of Vietnam's agriculture. To operate and develop a circular economy in the industry effectively, Vietnam must create and implement many solutions synchronously, in which policy and legal solutions are considered essential factors. Within the scope of the article, the author gives an overview of the current status of the circular economy operation in agriculture in Vietnam, thereby proposing some solutions to build an appropriate legal and policy framework for sustainable development to maintain this economic model in Vietnam in the coming time.

**Keywords:** Circular economy, circular agricultural economy, legal structure.

## INTRODUCTION

Vietnam is a country with strengths in agricultural development. Over the past years, the farm sector has made remarkable achievements; the average growth in 2016-2020 is estimated at 2.71 %/year <sup>1</sup>; agricultural production ensures and provides national food security. It also serves for export and contributes to generating revenue for the State budget. At the same time, the agricultural sector also creates jobs for millions of workers in rural and mountainous areas.

However, Vietnam's agricultural development still focuses on productivity and output but has not paid attention to taking advantage of wastes from the production process that waste resources (excess fertilisers, pesticides, plant protection, feed, loss and destruction in harvest, post-harvest and consumption) and environmental pollution. According to the Food and Agriculture Organisation of the United Nations (FAO) and the International Labor Organisation (ILO), during the second half of the twentieth century, phosphorus levels in freshwater systems increased by at least 75%, and emissions of Phosphorus released into the sea annually increases by about 10 million tons <sup>2</sup>. Shows that the disadvantages in traditional agricultural production (in linear economics) are: too long application of less or less efficient agricultural manipulations, change in the area of land used, increase in the number of inorganic fertilisers, increase in the number of chemical pesticides, increase CO<sub>2</sub> emissions and increase the use of fossil fuels. Besides, before the effects of climate change had been seriously affecting many fields on a global scale, natural resources were increasingly limited.

When operating and developing a circular economy model in agriculture, it creates more economic and welfare values, fewer input materials, and reduces the amount of waste released into the environment, pollution control and sustainable development. Therefore, the circular economy is considered an appropriate approach and an essential foundation to ensure the sustainable development of Vietnam's agricultural sector.

## METHODOLOGY

The research is based on the methodological basis of Marxism-Leninism and thoroughly grasping the Party's viewpoints and policies and the State's laws in the orientation of socio-economic development in Vietnam.

Besides, the article also uses several other methods, such as Methods of analysis and synthesis of secondary

data sources from many reports of prestigious domestic and international organisations such as the World Bank (WB), FAO, ILO, United Nations Industrial Development Organisations (UNIDO) about on issues related to the current situation in agricultural production in Vietnam. At the same time, the author combines comments and evaluation of opinions of experts published in leading scientific journals and international scientific conferences and seminars in Vietnam on the role of circular economy in agriculture. These insights are the theoretical framework to see the benefits and shortcomings when operating and developing circular agriculture in Vietnam in the past time.

## AIM

Learn about the benefits of the operation and development of circular agriculture in Vietnam in recent years. From there, propose oriented solutions for institutional planning managers and build a legal framework for circular agriculture towards an agricultural economy with green growth and sustainable development.

## RESEARCH OBJECT AND SUBJECT

- Systematise and clarify the theoretical content of the benefits of circular agriculture for the sustainable development of Vietnam's agricultural sector.
- Clarifying the advantages and disadvantages of developing circular agriculture in Vietnam over the past time. At the same time, indicate the limitations and causes of these difficulties.
- Proposing several oriented solutions for stakeholders in management, institutional planning, and building a legal framework to regulate circular agriculture in Vietnam.

## CONTRIBUTION

About scientific contributions: The study of the article aims to show the significance of circular agriculture to the requirements of sustainable agricultural development in Vietnam. At the same time, the report also generalises the difficulties and problems. It points out the causes of these difficulties in the process of circular agricultural operation of the Region over the past time. Thereby, the article proposes several groups of solutions with a general orientation, feasible for stakeholders in management, institutional planning, and building a legal framework to regulate circular agriculture in Vietnam.

About the application contribution: The article is a reliable reference source for students in research and study and a valuable reference source for researchers who want to understand circular agriculture in Vietnam in general. In addition, the article is also a reference source for policymakers and legislators when building a legal framework to regulate circular agriculture.

## OVERVIEW OF CIRCULAR AGRICULTURE

According to FAO and the WB, in the agricultural sector in the last five years, Vietnam has always been a deficit country in inorganic fertilisers and pesticides, with an estimated expenditure of billions of USD <sup>3</sup>. At the same time, in the report of the WB in 2013, it was estimated that air pollution alone caused a loss of 5.18% of GDP in Vietnam. Water pollution is forecast to cost Vietnam up to 3.5% of its GDP <sup>4</sup>. In addition to soil pollution and land degradation, the impacts of climate change have been seriously affecting agricultural production activities of the industries that play an essential role in the socio-economic development of Vietnam.

Facing this situation, many countries around the world, including Vietnam, are making the transition from a linear economy to a circular economy. Over the past decades, this sustainable development trend has always interested the international community. In research by Stahel and Ready, “A circular economy is an economy with a completely closed product cycle that prioritises reuse, prioritising repair and remanufacturing of goods over the production of new goods will have a positive impact on job creation, economic competition, saving natural resources, and protecting the environment” <sup>5</sup>. The UNIDO evaluates the “circular economy” as a way to create value and towards the ultimate goal of prosperity; it works by extending the product life cycle through improved design and maintenance, transferring the waste from the end of the supply chain back to the beginning thereby, using resources more efficiently by using many times,

not just once <sup>6</sup>. In Vietnam, in terms of State management, “circular economy is an economic model in which design, production, consumption and service activities aim to reduce the exploitation of raw materials and materials, prolong the product life cycle, limit waste generation and minimise adverse impacts on the environment”<sup>7</sup>. This model is considered an appropriate solution in the context of implementing the goals of sustainable development (SDGs) and responding to climate change. The circular economy is associated with and supports SDGs goals related to the agricultural sector are SDG2-Hungry eradication, SDG12-Produce and consume responsibly, and SDG15-Sustainable land use <sup>8</sup>.

In agriculture, circular economy (also known as circular agriculture) is the process of agricultural production in a closed cycle by applying scientific and technical advances, biotechnology, and technology physical chemistry. At that time, the wastes and by-products of this process were input materials for other production processes <sup>9</sup>. As a result, agricultural production will exploit and use resources economically and efficiently, minimising waste and loss in the harvest. From there, creating safe, high-quality products, reducing and eliminating waste polluting the environment, and helping protect the ecosystem and human health. At the same time, circular agriculture also contributes to raising the awareness of agricultural producers about the reuse of by-products and waste products and environmental protection. Thus, when operating and developing a circular economy in agriculture, three SDGs will be achieved: (i) Responding to the depletion of input production materials; (ii) Overcoming environmental pollution in output development; (iii) Harmoniously combining economic growth and social development with environmental protection.

The main objective of the circular economy is to prolong the life of materials in production consumers while focusing on eliminating negative impacts on the environment towards sustainable development. To build appropriate business models that properly and fully meet the requirements of the circular economy, the following basic principles must be ensured: (i) Designed for reuse; (ii) Flexibility through diversity; (iii) Using energy from inexhaustible sources; (iv) Systems Thinking and (v) Bio-based <sup>10</sup>.

### **Benefits of operating and developing circular agriculture in Vietnam**

Circular agriculture helps restore and increase soil fertility through the (i) Increased use of nutrients produced using natural and sustainable methods (organic fertiliser products recycled from agricultural by-products, agricultural waste); (ii) Simultaneously diversified crop rotation by combining crops and livestock under a closed system.

In addition, this model also reduces the use of chemical pesticides and herbicides by using integrated pest control. In the report Overview of Agricultural Pollution in Vietnam: Crop Industry, in the Mekong Delta, farmers overuse fertilisers and chemicals in crop production is 360-160-120 (kg NPK/ha), the rate is relatively high compared to the Red River Delta at 100-60-90K (kg NPK/ha); On average, pesticides were applied 5.3 times/crop. An estimated 1,790 tons of molluscicides, 210 tons of herbicides, 1,224 tons of pesticides and 4,245 tons of fungicides are wasted each year from unnecessary and excessive use of rice production in the Mekong Delta <sup>3</sup>. This excess fertiliser will accumulate in soil and water, causing air, water and soil pollution. On the other hand, over-fertilising increases the cost of agricultural production and environmental protection; this will negatively affect the competitiveness of Vietnamese farm products in the world market <sup>11</sup>.

Circular agriculture can re-invest in the environment by restoring and maintaining soil fertility. Thereby helping to reduce soil erosion and chemical pollution in agriculture; increase the efficiency of water use by utilising the output wastewater of one acts as an input source for another after being treated or by applying optimal closed irrigation and cover crop cultivation techniques; reduce forest degradation; without loss of biodiversity and other impacts on land use. With a closed production cycle, making full use of by-products/waste of this stage as input materials for different locations reduces almost 0% of harmful waste to the environment. Moreover, circular agriculture can minimise greenhouse gas emissions or switch from a source of greenhouse gas emissions to a place of neutrality, even absorbing emissions when forest degradation has been reduced due to using 35% fresh water instead of 55% at present<sup>12</sup>. It is urgent for

agricultural production in the Mekong Delta because this area has suffered heavy damage from saline intrusion in recent years.

Circular agriculture helps to rationally use resources/input materials and minimise or no longer the cost of using chemical fertilisers or pesticides. For example, in the Red River Delta and the Mekong River Delta, an estimated 140,000 tons of Nito-82,000 tons of Photpho-66,000 tons of Kali each year are being wasted due to excessive use of fertilisers in rice farming, which is the equivalent of \$150 million wasted every year; coffee production costs about 110 million USD/year due to farming practices that use excessive amounts of fertilisers <sup>3</sup>.

Besides, when producing according to the circular agriculture model, agricultural by-products and wastes are recycled into valuable products to serve the industry or as raw materials for other industries or supporting industries, thereby generating additional income for producers. For example, shrimp shells and shrimp heads in aquaculture areas are used to produce Chitosan (a substance that helps prolong the shelf life of vegetables and meat; additives used in the processing of some beverages), SSE, with the potential to collect 4-5 billion USD/year. Rice straw by-products are used to grow mushrooms, corresponding to the amount of straw from one ha of rice, 250-300 kg of fresh mushrooms are obtained, with the selling price of one kg of fresh mushrooms from 25,000-27,000 VND, estimated one hectare of rice, in addition to money rice farmers, can earn from 6-8 million VND. Alternatively, produce microbial fertiliser in livestock (using all agricultural by-products combined with probiotics as a biological buffer for livestock, which is then used to produce organic fertiliser) with about 100 tons of microbial organic fertiliser, worth 300-500 million VND <sup>9</sup>.

In addition, circular agriculture helps to reduce spoilage and loss of food by expanding the methods and means of preserving agricultural products during and after harvest. According to FAO estimates, crop losses due to pests and losses in storage, distribution, and marketing at the level of individual households have reached almost 50% of human calories<sup>2</sup>. In Vietnam, the post-harvest loss rate of rice in the milling stage is still high, from 13%-14% in quantity and more than 12% in value; for other industries such as animal husbandry, fruit trees, fishing and seafood, from 20-25%. According to experts, reducing the post-harvest loss rate in the rice production chain to 5-6% will increase the value by 6% <sup>13</sup>.

## **Advantages and disadvantages of operating and developing Circular Agriculture in Vietnam**

### *Favourable*

Recognising the role and trend of the circular economy in the development of the agricultural sector in particular and the protection of natural resources and the environment, ensuring the sustainable socio-economic development of the country, the Party and the State have issued guidelines and policies that lay the foundation for the development of this economy model. From the first months of 1998, the Politburo issued Directive No. 36/CT-TW dated 25 June 1998, on strengthening environmental protection in the period of industrialisation and modernisation of the country clearly stated the need to “*promulgate tax and credit policies to support the application of clean technologies and the application of clean technologies with low waste, low consumption of raw materials and energy*” <sup>14</sup>. The Strategy for Socio-Economic Stability and Development up to 2000, adopted at the 7th Party Congress, emphasised that “economic growth must be associated with environmental protection”. It was followed by Resolution No. 41-NQ/TW dated 15 November 2004 of the Politburo on environmental protection in the period of accelerating industrialisation and modernisation of the country, which advocated “encouraging recycling and using recycled products”. Resolution No. 26-NQ/TW, dated 5 August 2008, of the Central Committee on Agriculture, Farmers and Rural Areas; Directive No. 29/CT-TW, dated 21 January 2009, further promoting Resolution No. 41-NQ/TW; Socio-economic development strategy for the period 2011-2020 at the XI Congress of the Party and Resolution No. 24/NQ-TW dated 3 June 2013, of the Central Committee on proactively responding to climate change, strengthen resource management and environmental protection, continue to emphasise and demand that “promote the transformation of growth model associated with economic restructuring towards green growth and sustainable development”.



Although the term “circular agriculture” is relatively new in Vietnam, the manifestations of this economic model have been established since the 1980s through different production models such as Garden-Pool-Cow (VAC), Garden-Pool-Biogas (VACB); Garden of Ponds and Forests (VACR) or Garden of Ponds (VAH). These are integrated agricultural production models, linking farming with livestock, minimising waste, and following nature. These models gradually develop in quantity and scale, becoming more flexible in many households, farms, cooperatives, businesses, and enormous economic corporations. For example, the low-carbon agriculture support project 2013-2019 (piloting new technology for separating livestock waste) of the Ministry of Agriculture and Rural Development was implemented in 10 provinces, including Lao Cai, Son La, and Phu Tho, Bac Giang, Nam Dinh, Ha Tinh, Binh Dinh, Tien Giang, Ben Tre, Soc Trang <sup>15</sup>. Recently, Vietnam's agricultural industry has developed many new production models under the circular economy, typically:

\*Model “growing rice-growing mushrooms-producing organic fertilisers-growing fruit trees”: This model's feature uses raw materials from rice straw by-products in rice cultivation to grow mushrooms; straw residues after harvesting mushrooms are utilised to fertilise crops. On fruit trees, significant by-products such as overhanging branches, weak branches, and plant residues are used by people as organic fertiliser to re-fertilise the tree (commonly applied on dragon fruit trees), not only saving costs buy fertilisers but also help to manage pests and diseases and protect the environment. One of the units successfully implementing this model is Co May company of Dong Thap province, with organic straw mushroom products grown in closed houses without using chemicals. In addition, straw mushrooms are processed into nutritional powder, vegetarian fish sauce, dried mushrooms, and fresh mushrooms <sup>16</sup>.

\*Model “production of organic fertiliser from agricultural waste”: This model is operated on the principle of using by-products from cultivation, domestic waste, and waste Livestock products (pig manure, chicken manure, quail manure, cow dung) through the composting process as organic fertiliser to care for and improve degraded and deficient soils nutrition, return soil fertility, organic and safe vegetable cultivation. Manure from livestock is also used to raise earthworms, which are harvested as food for chickens, ducks and fish. As a result, agricultural waste is reused as fertiliser stably while taking advantage of available raw materials to meet clean production requirements and reduce emissions and greenhouse gas emissions. One of the localities that successfully practised this model is Nam Dinh province (Yen Cuong commune, Y Yen district), which established a service group to produce organic fertiliser from agricultural by-products, domestic waste, chicken and pig manure, crawling with guidance from Japanese experts, enterprises, research centres. The amount of agricultural waste reused as fertiliser has reached over 100 tons/per year <sup>17</sup>.

\*Models of “clean, fragrant rice shrimp” and “fish-river-ponds”: In this modified model, the waste after shrimp and fish farming is a source of fertiliser to produce fragrant rice while combining the use of green mushrooms to control pests in organic aromatic rice cultivation. In the shrimp and fish farming areas associated with the processing plant, waste and by-products from shrimp and fish are utilised to increase the production value chain, minimising adverse impacts on the environment and ecosystem of the residential community. Currently, Dong Thap province has Vinafood and Vinh Hoan Joint Stock Company focusing on extracting valuable nutrients such as Chitosan, Peptides, and Omega-3 in shrimp head, shrimp shell, fish head, bones, fish fat into commercial products of high economic value <sup>18</sup>.

\*Model “biosafety farming 4F (Farm-Food-Feed-Fertiliser)”: This is considered the first accurate circular economy model in agriculture in Vietnam implemented by Guilin Group (cow farm High-quality breeds and beef cattle raised for meat at T&T159 Joint Stock Company in the Project of the Complex for the production of animal feed from agricultural by-products) in Yen Mong commune, Hoa Binh city. This model has used agricultural by-products and probiotics as natural livestock buffers. The entire buffer and the farm waste are collected and treated to produce microbial organic fertiliser for cultivation.

\*The “green cycle” model in dairy farms: The Vinamilk company builds and operates a dairy farm system of environmentally friendly dairy farms according to international (Global GAP) and European (E.U Organic) standards. Vinamilk implements a closed breeding process: from tilling, planting grass, and caring for cows to waste treatment to create a “green cycle”. Thanks to biogas technology, livestock waste is treated to continue fertilising pastures and improve soil, and another part is converted into methane gas used to heat water for farm operations.

### *Existence and difficulties when operating and developing circular agriculture*

#### *\*In planning and regulatory framework*

According to experts, in Vietnam, circular agriculture is still new from the point of view of approach, management organisation and legal aspects. Accordingly, many National Strategies on green growth and sustainable agricultural development; the farming economic development projects were issued quite early, but they do not have more synchronisation, leading to the construction and operation of circular agriculture in many localities, which is still spontaneous, failing to ensure the requirements and principles of green and sustainable development. These limitations are outlined in the following:

- Land use planning and zoning of the Regions: Land use planning and zoning are still flawed due to a lack of coordination and consistency between sectors and provinces/cities. In some cases, stakeholders' interests, such as businesses, local authorities, civil society organisations and others, have yet to be fully considered when developing plans. The observance of land use planning targets and plans in some localities has not been strict, and the situation of land allocation, land lease, and land use proper transfer is not by approved master plans and plans. For example, the conversion of a large amount of rice land to non-agricultural purposes in a short time without careful consideration of the long-term socio-environmental development efficiency; the current status of agricultural real estate investment in spontaneous eco-tourism areas or some places eager for industrial development, wanting to take advantage of attracting investors, has allowed land acquisition and levelling agriculture to establish industrial zones; Although the consolidation and exchange of plots have been successfully implemented in many localities, but have not been closely combined with the planning of field embellishment, agricultural land is still fragmentedly distributed over 70 million plots, causing obstacles to the process of agricultural production modernisation in the agricultural sector<sup>19</sup>. This weakens the necessary regulatory effect of land use planning and negatively affects agricultural production; the problem of ensuring livelihoods for farmers in the face of increasingly severe impacts of climate change also threatens the goal of ensuring national food security. After all, the ultimate goal of land use planning is not simply to improve the socio-economic-environmental efficiency of the land and protect the ecology and sustainability of the environment but also is a system of economic - technical - legal solutions to manage national land resources and assets in future socio-political orientations and policies.

- There is no separate regulation regulating circular agriculture: The construction and operation of the circular economy in general and circular agriculture in Vietnam in recent years have been carried out based on the Party's guidelines, policies and regulations strategy or from some unofficial provisions of specialised laws/decrees. For example, the 2020 Law on Environmental Protection only mentions the concept of circular economy (Clause 1, Article 142) without any additional regulations mentioning this economic model, including in Decree 88/2022 /ND-CP dated January 10, 2022 of the Government detailing some articles of the Law on Environmental Protection, there are only a few scattered articles of law mentioning the issue of "using livestock waste as compost machinery, water for crop irrigation or other purposes..." to ensure no environmental pollution or "Encourage circular economy" (Article 140). The two most recently promulgated legal documents that address many issues related to circular agriculture are Decision No. 150/QD-TTg dated January 28, 2022, on approving the Strategy for Sustainable Agriculture and Rural Development for the 2021-2023 period, with a vision to 2050 and Decision No. 687/QD-TTg dated June 7, 2022, the Prime Minister Approved the Project on Development of a Circular Economy in Vietnam, only stating the common development perspective in this economic model is "responsible agricultural production, modern, efficient and sustainable; developing ecological, organic, circular, low-carbon, environmentally friendly and climate-change-adapted agriculture". General, these regulations relating to circular agriculture are still scattered and integrated into the general rules on environmental protection, mainly stating the principle of ensuring sustainable development in the exploitation and use of natural resources and environmental protection, not directly mentioned nor covering the nature and requirements of circular agriculture. Up to now, there has yet to be any general standardisation of the circular economy and no criteria to identify, evaluate and guide the implementation of this economic model in agricultural production. Therefore, policies, support and encouragement of circular agriculture have yet to be able to promote synergy to build a legal corridor.

- The agriculture regulations have yet to be developed and issue sufficient guidelines on criteria, standards and regulations related to the collection, transportation and reuse of agricultural by-products and

wastes. At the same time, there are no regulations on the quantification of indicators in circular agriculture, stipulated conditions, assessment of environmental impacts and control and management systems on the environment in agricultural production according to the circular economy. In general, up to now, the monitoring according to the environmental impact assessment framework and the issuance of environmental practice certificates to agricultural enterprises, especially small-scale enterprises and farm households, has not been effective and has yet to be implemented synchronously due to many different reasons. Therefore, it leads to confusion when implementing and applying circular agriculture to the producer and the management agency.

- The spontaneous situation of the “farm stay” model when combining tourism development with agricultural activities: The recent massive farm stay in Vietnam has caused two problems: (i) Management and control of environmental protection (treatment of agricultural waste, domestic waste) from cultivation, animal husbandry activities and enjoyment of local agricultural products by tourists in the “farm stay”; (ii) Real estate investment, especially agricultural real estate near the “farm stay” tourist area/spot (resort, motel, hotel) has potential risks in land fund planning Agriculture and Forestry. The cause of this risk is the limitation and overlap between relevant regulations on the use and planning of agro-forestry land for tourism “farm stay in the Land Law and regulations on Agricultural real estate transactions, Forestry Law, Planning Law, Housing Law, and Environmental Protection Law.

- Assess, monitor and control the use of pesticides and fertilisers; monitor food hygiene and safety standards; sanctions for environmental violations: There are too many specialised agencies to evaluate and monitor each segment, but coordination and cooperation between these agencies is limited. For example, in Vietnam currently, the maximum residue level (MRL) of pesticides is managed by two ministries: (i) The Ministry of Agriculture and Rural Development manages the List of pesticides prohibited and allows use in the agricultural sector in Vietnam; (ii) The Ministry of Health stipulates the types of pesticides that are allowed to be used and the RML of pesticides that can be left in agricultural products. However, there is still no legal document that uniformly stipulates the principles of formulating and issuing MRLs for pesticides (scope of Circular No. 24/2019/TT-BYT dated August 30, 2019, is the MRL for food additives without adjusting the MRL for pesticides and other active ingredients). According to the guidance of Vietnamese Standard No. TCVN 5139:2008, the recommended method of sampling to determine pesticide residues is consistent with the maximum residue limits announced by the Ministry of Science and Technology; the basis for promulgating a pesticide MRL is based on the results obtained from the experimental method; in addition, there are no other guidelines in principle to determine how the MRL is suitable for the protection target producer and consumer health, plant and animal protection, and harmonisation with common international standards (Section 4.1 TCVN 5139:2008 has only a simple guide to Codex reference on taking samples and sample analysis method).

In addition, the process of testing pesticides in Vietnam is carried out according to common world standards, but when the Ministry of Agriculture and Rural Development approves an application to register a particular type of pesticide, to include in the List of pesticides used in Vietnam, this agency does not at the same time regulate the pesticide MRL of that type of pesticide but only has instructions on the content and dosage used, date of pre-harvest isolation. At the same time, there are no regulations on the registration process to establish specific MRLs for licensed drugs (Related to establishing MRLs for plant protection products; it is only specified in Clause 2, Article 38 of Decree No. 15 /2018/ND-CP stipulates that the Ministry of Agriculture and Rural Development is responsible for developing and sending to the Ministry of Health to promulgate regulations on safety limits for product groups in Appendix III issued with this Decree. However, up to now, there is still no document guiding specific procedures on setting safety limits for food and products and the coordination and responsibility of the Ministry of Agriculture and Agricultural Development with the Ministry of Health on this content).

On the other hand, the inconsistency in registering the use of pesticides and establishing MRLs also leads to difficulty in implementing the provisions of the 2015 Penal Code that was amended and supplemented in 2017 on the “Crime of violating food safety regulations”. For example, the two substances Ethylene Oxide and 2-chloroethane contained in some batches of instant noodles of Acecook Vietnam Company and dry noodles with beef and chicken flavour from Thien Huong Company have been detected by the Irish Food Safety Authority and the Police System European Rapid Report on Food and Animal Feed

(RASFF) in August 2021. Because the above two substances are not on the List of pesticides used in Vietnam, they will not be approved by competent authorities authority to establish the MRL. Therefore, it will be difficult for Vietnamese authorities to handle criminal liability; instead, at most, they can only sanction administrative violations for "Using pesticides not listed in the List of Pesticides allowed to be used in Vietnam" with a fine of from 1,000,000 VND to 2,000,000 VND for individual violators, for organisations that violate, the fine is doubled <sup>20</sup>.

- Regulations supporting capital, science and technology for developing circular agriculture and agricultural insurance policies: Over the years, The Government has focused on boosting investment capital for agricultural development, creating a driving force to attract many credit institutions to implement this credit package. The Bank for Agriculture and Rural Development, the Bank for Social Policies are the leading banks providing credit for agricultural development investment. Bank for Agriculture and Rural Development soon promoted lending under Decision 63/2010/QD-TTg dated October 15, 2010, Decision 65/2011/QD-TTg dated December 2, 2011, Decision 68/2013/QD-TTg dated November 14, 2013 on support policies to reduce losses in agriculture with outstanding loans of more than 437 billion VND with 3,448 customers; loans to replant coffee with outstanding loans of more than 156 billion VND with 285 customers; loans for fisheries development policies under Decree 67/2018/ND-CP dated May 15, 2018, with outstanding loans of more than VND 816 billion with 188 customers. By the end of 2022, the total credit balance of the Bank for Agriculture and Rural Development will be more than 1.4 million billion VND. For the first time, loans to agriculture and rural areas surpassed VND 1 million billion, accounting for 71.49% of the total outstanding loans of the Bank for Agriculture and Rural Development, and provides unsecured credit to over 3 million farming households <sup>21</sup>.

In terms of State management, although there have been many documents regulating policies credit for agricultural and rural development, especially regulations on loans without collateral (Decree No. 41/2010/ND-CP dated April 12, 2010; Decree No. 55/2015/ND-CP dated June 9, 2015; Decree No. 116/2018/ND-CP dated September 7, 2018 and Circulars and Directives of the State Bank of Vietnam guiding implementation); but currently there is a lack of clear legal regulations (or just a list of priorities) about credit sources for investment in technology and equipment when operating this agricultural model, especially in the Mekong Delta, the capital is still short of more than 20% of the demand <sup>22</sup>; the proportion of green credit in the period 2017-2021 is still very modest, green credit outstanding only accounts for 4.32% of the total outstanding loans of the whole economy, of which green credit loans in the green agriculture sector accounting for about approx forty six% <sup>23</sup>. Besides, the implementation of agricultural insurance in Vietnam has so far been ineffective - this is one of the solutions contributing to overcoming production losses due to the climate change pandemic's impact, helping farmers recover production soon, stabilise life and develop agricultural production <sup>24</sup>.

\*In the current situation of circular agriculture operation

- The awareness of state management agencies, businesses, farmers and consumers, and the propaganda on circular agriculture is not enough: In our country, several agricultural production models follow the direction of the Circular economy that has appeared since the early 80s of the twentieth century. However, generally, the standards and regulations related to circular agriculture have yet to be officially mentioned. The Law on Environmental Protection, 2020 has been in effect for nearly two years; however, it only says the concept of the circular economy (Clause 1, Article 142) or regulations on green credit granted to *"investment projects that effectively use natural resources; respond to climate change; waste management; pollution treatment, environmental quality improvement; restore natural ecosystems; conservation of nature and biodiversity; create other environmental benefits"* (Article 149) without any further provisions to refer to this economic model, including Decree 88/2022/ND-CP dated January 10, 2022, also, only a few laws have been developed that generally address the issue of *"using livestock waste as organic fertiliser, water for crop irrigation or other purposes..."* to ensure that it does not pollute the environment or *"Encourage business circular economy"* (Article 140). Therefore, the circular economy's role, nature, content, and satisfactory evaluation criteria are unknown/unavailable.

On the other hand, the dissemination and provision of information on issues related to circular agriculture to agricultural producers have not brought about extensive effectiveness; the organisation is not synchronised,



and there is no coordination or close cooperation from stakeholders. It is one of the reasons leading to the limited awareness of circular agriculture among most Vietnamese agricultural producers, especially farmers.

Besides, the consciousness and behaviour of consumers play a decisive role in the industry's sustainable development. The concept of green consumption, green agriculture, and circular agriculture is still relatively new, so it is challenging to change production and consumption habits immediately. Some consumers are still unaware of the negative impact of their consumption behaviour on the environment. For example, use plastic bags and disposable plastic products instead of fully recyclable and reusable materials and products.

- Agricultural production still abuses inorganic fertilisers and pesticides in cultivation: Increasing the output of agricultural products, especially in farming activities, entails the excessive use of chemical fertilisers, pesticides and other plant protection chemicals. The report by the World Bank's Regional Agricultural Pollution Research Group shows that in 2013, rice output increased by consuming about 1.5 million tons of Nito-1.6 million tons of Photpho; about 0.260,000 tons of Nito-0.4 million tons of Photpho-0.17 million tons of Kali to have 0.22 million tons of coffee; Corn consumes about 0.34 million tons of Nito-0.16 million tons of Photpho-0.05 million tons of Kali <sup>3</sup>. Every year, Vietnam consumes about 11 million tons of fertiliser, of which inorganic fertiliser accounts for 90%, the average amount of fertiliser used is 195–200 NPK kg/ha <sup>25</sup>. Also, according to the assessment of the Plant Protection Department, pesticide residues on agricultural products are still high: pesticide residues on plants are 10–26% more than the maximum allowed level in Hanoi (the maximum allowed is 10.2% in 2010). Of the pesticides used, nearly 20% are classified by the World Health Organisation (WHO) as extremely dangerous; it is estimated that each year, about 69,238 kg and 43,574 litres of pesticides and 69,640kg of chemicals are introduced into the surrounding environment without proper handling <sup>3</sup>. The direct consequence of this abuse is the cause of serious environmental problems, especially soil, surface and groundwater pollution.

- The capacity to recycle and reuse agricultural by-products and waste products is still limited: Vietnam still lacks businesses capable of recycling and reusing used products and materials. Most agricultural enterprises are small and medium-sized, and capital limitations have made it difficult to invest in technological innovation. The staff team researching, applying, and transferring technology for treating waste, waste, and by-products in agriculture cannot meet actual requirements. On the other hand, the scale of agricultural production is small and odd. Hence, the collection and classification of agricultural waste and waste and investment in recycling technology have yet to be paid attention. Many localities have not paid attention to waste management or technical training and guidance for production facilities. Therefore, only about 10% of crop residues are used as local fuel, 5% as industrial fuel, and 3% as animal feed. Over 80% are unused and discharged directly into the environment or burned, causing environmental pollution <sup>16</sup>.

A farmhouse production model is slow to innovate; regional connectivity is still limited: The main form of agricultural production organisation in the Mekong Delta is mainly farmer households, accounting for more than 80% of the total agricultural production area, the average agricultural land area per household is less than 3 hectares <sup>3</sup>. Most of the farmers in Vietnam, in general, have yet to focus on investing in improving the value of agricultural products; there is no close association in production. Production methods are still backwards, so they have yet to respond to market fluctuations' significant impacts, such as the recent COVID-19 pandemic.

## DISCUSSION

\*Group of solutions on policy and regulatory framework

- Reviewing planning and zoning land use: The Government and ministries subjectively need to study, review and re-evaluate land use zoning plans in critical regions with stable economic development to suit the natural, economic and social conditions of each locality, especially in the context of the impacts of climate change. The assessment and development of agricultural land use planning help to build a development plan suitable to the land potential, natural conditions of each region and the land use needs of each sector (cultivation, forestry, animal husbandry), promoting the process of accumulation and concentration of agricultural land, creating a land fund to meet the requirements of sustainable agricultural economic development. From there, contribute to exploiting and promoting competitive advantages in agricultural production of each locality; at the same time, strengthen industry linkages, facilitate technology transfer,

apply science and technology to circular agriculture, and at the same time help exploit and use land resources more rationally and effectively. It is required that the authorities of each province and city have a high degree of coordination, association and consensus. At the same time, the Government should soon develop and complete policies on protecting and developing agricultural land funds in the Land Law.

- The Government should take the initiative and strengthen the direction to review, amend, supplement and perfect relevant institutions, policies and regulations to develop the circular economy in general. Legal guidelines and rules Clearer laws will help businesses and people implement circular agriculture more systematically, synchronously and effectively. This issue includes the following:

- + Carefully research when formulating and planning the development of circular agriculture according to the region's characteristics, with an appropriate roadmap. Especially the issue of exploitation and use of natural resources and environmental protection for large-scale foreign-invested production.

- + Promulgate preferential policies on land, tax, and credit to mobilise resources for investment in large-scale farms that meet regional/international standards, mainly focusing on developing credit policies suitable, especially green credit for the production model of households, small and medium enterprises, on creating conditions for this group of subjects to expand their production scale. In that parallel, enlisting financial and technical support from the international community and the private sector would be best. On the other hand, continuing to reform regulations on administrative procedures promotes e-administration in the context of digital transformation.

- + There should be coordination between the Ministry of Agriculture and Rural Development with the Ministry of Planning and Investment, the Ministry of Culture, Sports and Tourism, and the Ministry of Construction to organise practical research on the model "farm stay" in localities and amend, supplement and complete relevant legal policies, create a legal corridor for this type of economy to develop by the law but still meet the requirements about a land fund for agricultural and forestry development, environmental protection issues.

- + For land policies and regulations, it is necessary to continue studying land classification, planning and planning on mixed land use on agro-forestry land, the problem of "land accumulation" serving large-scale farms. Accordingly, it is necessary to study and consider amending and supplementing the regulations on filling deadlines in the Land Law; this content should be done according to the roadmap. Continue to improve rules on leasing, transferring and contributing capital with land use rights among households or between groups of families and enterprises to expand production scale. In addition, adjusting regulations for agricultural real estate in the Law on Real Estate Business, the Law on Land, the Law on Housing and related documents are added.

- Promulgating regulations to regulate the circular economy in general and circular agriculture: This is a specific economic model directly related to and affects many fields, such as the environment, natural resources, environmental conditions, and local/regional ecology. Therefore, when promulgating regulations to regulate circular agriculture, it can be done in the direction of promulgating a Decree. When developing and promulgating rules related to the development of this model, it should be quantified, such as allowable carbon emissions, national standards and regulations for the identification and assessment of circular agriculture. Specific, interdisciplinary environmental protection assessment indicators such as agricultural supporting industries and related services should be included for actors involved in circular agrarian production. It is necessary to continue researching and depending on each group of industries, products, raw materials and agricultural production scale and interdisciplinary with other fields to issue legal regulations. Accordingly, the Ministry of Agriculture and Rural Development, the Ministry of Natural Resources and Environment, and the Ministry of Science and Technology need to actively and actively coordinate to advise the Government on the plan to develop the Decree on circular agriculture.

- Defining a vision of circular agriculture towards green agriculture: The Government should prioritise key regions with strengths in agricultural economic development based on the planning and agricultural land use plan to determine the key areas and support zones in different stages. From there, invest in infrastructure, capital, qualified human resources and technological qualifications. In this strategy, the sector's development goals must be integrated to protect natural resources and the environment; green agriculture - rural development goals must be consistent with the development goals of other sectors.

- Building a strategic, operational management system of circular economy in agriculture and clearly

defining the role of central and local policies: It is necessary to develop and support high-level and multi-sectoral, synchronous policies to implement this economic model development strategy, meeting the national green agricultural growth requirements. At the same time, it soon set up a specialised focal agency to manage, guide and provide timely support to production subjects according to the circular agriculture model.

**\*Group of other solutions**

- Improve the effectiveness and efficiency of state management of agricultural models in a circular economy: Management and supervision should be carried out throughout the farm production process from exploitation and use of natural resources; carry out a quantitative environmental impact assessment; equipment and technology in the production process (collection, classification and recycling of agricultural by-products and waste, quality control of output agricultural products). In addition, because this is a related industry and affects many different sectors and fields, there needs to be synchronous coordination between management agencies. Accordingly, depending on the different levels of involvement, to determine the specific tasks and implementation progress for each industry, each field, and the responsibilities of several agencies and organisations that play a crucial role in specialised management.

In addition, it is necessary to clearly define the principles and levels of consumer health protection, plant and animal health and environmental protection when developing management regulations for pesticides and MRLs pesticides. Due to Vietnam's socio-economic development conditions, it is not possible to immediately apply too high standards in this regard; Therefore, when developing principles for pesticide management and pesticide MRLs, it is possible to continue to refer to US regulations to set the level deemed necessary to protect public health while considering the need for an adequate, safe and economical food supply <sup>26</sup>. At the same time, it is necessary to amend and supplement Decree No. 31/2016/ND-CP regulating the handling of administrative violations in the field of plant protection and quarantine in the direction of increasing the level of penalties and specifying each the level of violation will have a corresponding fine, mandatory recall or destruction of goods that violate regulations on the use of pesticides and regulations on MRLs of pesticides. Consider amending and supplementing Article 317 of the Penal Code on the "Crime of violating food safety regulations" in the direction of increasing sanctions for violations, adding regulations on framing penalties based on price shipments that violate food safety regulations, directly referring to Codex standards in cases where the pesticide under consideration does not have MRL regulations as a basis for determining the violation threshold <sup>27</sup>.

- In the management and supervision of capital to support the development of circular agriculture: The Government should give priority but must have a monitoring mechanism to ensure the efficiency of capital investment and funding for research and scientific and technical development in circular agricultural production. Accordingly, the governing bodies need to summarise reports on the use/investment of scientific and technological development capital in agriculture over the past time to assess the effectiveness and see the shortcomings and problems in using/investing money to develop this economic sector. At the same time, it is necessary to have comprehensive evaluation studies and a circular agricultural development environment system, which is the basis for further supplementation and improvement when developing capital allocation plans; invest in developing a circular agricultural model to suit the actual agricultural conditions of each region.

- Application of science and technology in the operation and development of circular agriculture: It is necessary to promote research and the application of technological advances, directly or indirectly, to support the transition from traditional agricultural production systems to circular agriculture. In each period, each local government must prioritise support for research and application of scientific and technological advances appropriately and synchronously for the entire agricultural production process. Applying science and high technology in circular agriculture contributes to expanding export markets and increasing the competitiveness of Vietnamese farm products in the world market. In addition, in the context of climate change and resource depletion, the application of technology also helps the agricultural industry to be less dependent on the changing conditions of nature, reduces risks in production, and helps exploit rational, efficient and economic land use and water resources.

- Developing qualified human resources to approach and learn from countries around the world in the

operation and development of circular agriculture: The governing body is the Ministry of Agriculture and Rural Development, the Ministry of Science and Technology will soon proactively coordinate with other ministries, branches, centres/institutes and educational institutions to prioritise resources for planning, focus on training high-quality human resources, and promote the development of circular economic models in general, especially market research for the output of circular agricultural products. In addition, promoting socialisation and encouraging enterprises to participate in human resource training for the circular economy transformation in agriculture focus on training local technical staff to promptly support and guide farmers in operating this economic model.

- Promote regional linkages, build electronic agricultural product markets and promote participation in regional and global agricultural product value chains: It is required to continue strengthening ties between producers from within the country region to link out of the area, Focusing on investing in building and developing an electronic agricultural product market is an essential solution to increase the industry's resilience and flexibility in production in the face of significant changes in weather, climate and markets. Accordingly, the level of government in each locality needs to improve and improve the efficiency in linking the “between houses” to suit the conditions of each Region. Focus on building a system of modern agricultural product supply centres with each specific model different in size and function, meeting international standards. The current agricultural product supply system needs to be implemented according to the principles of a digital supply network, multi-channel market access, and logistics for the export value chain of agricultural products based on an e-commerce platform across the border.

- Raising awareness about circular agriculture: From a long-term perspective, only when producers/consumers realise that it brings tangible benefits to themselves, their families, and society will this production model develop sustainably. Therefore, creating a communication strategy for the circular economy is necessary, including the following contents: role, benefits, nature, scope, criteria, and implementation method. Accordingly, promoting propaganda through the mass media and integrating it into high school and university training programs. Besides, through the role of local government, agricultural enterprises and social organisations such as Agricultural Cooperatives, Agricultural Extension Association, Farmers' Association, and Vietnam Consumer Association organise field visits to typical agricultural circular economy models at home/abroad to apply them appropriately and effectively to the natural conditions of each Region.

## CONCLUSION

Vietnam is one of the countries facing climate change, depletion of natural resources and environmental pollution. These challenges have been and will seriously threaten the country's agriculture. To solve these problems, the trend of agricultural development following the circular economy model is urgent. Developing circular agriculture is the optimal solution to rationally use natural resources, protect the environment, change the structure of production and consumption, bring high economic efficiency, and maintain sustainable green agriculture. However, for this economic model to operate and develop effectively in the coming time, it is required that our State soon build a system of direct, complete, clear and appropriate legal regulations.

## LIST OF ABBREVIATIONS

**FAO:** Food and Agriculture Organisation of the United Nations.

**ILO:** International Labor Organisation.

**MRL:** The maximum residue level.

**SDGs:** Sustainable Development Goals.

**UNIDO:** The United Nations Industrial Development Organisation.

**WB:** World Bank.

**WHO:** World Health Organisation

**WTO:** World Trade Organisation

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