THE MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT **-------**	**SOCIALIST REPUBLIC OF VIETNAM** **Independence - Freedom - Happiness** **----------**
No. 555/QD-BNN-TT	*Hanoi, January 26, 2021*

DECISION

APPROVING SCHEME FOR RESTRUCTURING OF VIETNAM'S RICE INDUSTRY BY 2025 AND 2030

MINISTER OF AGRICULTURE AND RURAL DEVELOPMENT

Pursuant to the Government's Decree No. 15/2017/ND-CP dated February 17, 2017 on functions, duties, powers and organizational structure of the Ministry of Agriculture and Rural Development;

Pursuant to Decision No. 748/QD-BNN-KH dated 11/3/2020 approving outline and cost estimate of assessment of implementation of rice industry restructuring scheme;

At the request of the Director General of the Department of Crop Production and Director General of Planning Department.

HEREBY DECIDES:

Article 1. Promulgated together with this Decision is the scheme for restructuring of Vietnam's rice industry by 2025 and 2030 (hereinafter referred to as "Scheme").

Article 2. This Decision takes effect from the date on which it is signed. This Decision supersedes Decision No. 1898/QD-BNN-TT dated 23/5/2016 approving scheme for restructuring of Vietnam's rice industry by 2020 with vision to 2030.

Article 3. Chief of Office of the Ministry of Agriculture and Rural Development, Director General of Department of Crop Production, Director General of Planning Department, heads of relevant affiliates of the Ministry of Agriculture and Rural Development; and Directors of Departments of Agriculture and Rural Development shall implement this Decision./.

P.P. THE MINISTER
THE DEPUTY MINISTER

Le Quoc Doanh

SCHEME

RESTRUCTURING OF VIETNAM'S RICE INDUSTRY BY 2025 AND 2030

(Promulgated together with Decision No. … / QD-BNN-TT dated … / … / 2021 by Minister of Agriculture and Rural Development)

I. VIEWPOINTS AND OBJECTIVES

1. Viewpoints

The rice industry plays a crucial role in agricultural and rural development, contributes to national food security, affects the life of the majority of farmers, social security and social stability and has ecological advantages in connection with cultural values and heritages of the time-honored rice civilization. However, the rice industry is facing challenges posed by low productivity, natural resource exploitation, environmental pollution and climate change, especially in key rice production deltas. In order to overcome these challenges, utilize advantages and maintain the important position of crop production, the rice industry needs to be restructured by 2025 and 2030 to meet new requirements of better and more sustainable development.

2. Objectives

a) General objectives

Continue to restructure the rice industry by improving productivity and facilitating sustainable development with the following objectives: (i) meet domestic demand, act as the core of national food security, (ii) improve quality and nutritional value, ensure food safety, (iii) establish and improve the rice chain value, (iv) adapt to and mitigate climate change, (v) utilize natural resources and protect the environment, (vi) increase farmer income and consumer benefits, and (vii) export high-quality and high-value rice.

b) Some specific objectives

i) Objectives by 2025

- Maintain paddy field area at 3,6-3,7 million ha, planting area at 7,0-7,2 million ha and rice yield at 40-41 million tonnes.

- Export approximately 5 million tonnes of rice with fragrant rice, specialty rice and japonica rice accounting for 40%, glutinous rice 20%, high-quality milled rice 20%,

medium- and low-quality rice 15% and rice products 5%; branded rice accounts for more than 20% of exported rice.

- Use certified seeds on more than 80% and high-quality seeds on more than 70% of planting area; reduce direct seeding (80 kg/ha on average) by 70%; apply advanced cultivation processes (ICM, IPM, SRP, SRI, 1P5G,...) and good production practices (VietGAP and equivalent, climate-smart rice cultivation, organic agriculture, etc.) on more than 60% and high technology and digital technology on 10% of planting area.

- Reduce use of chemical fertilizers and agrochemicals in rice production by at least 30%.

- Keep post-harvest loss under 8%.

- Rice production automation reaches 70% on average and more than 90% in the Mekong Delta.

- Increase planting area production upon which is connected with trade to more than 30%.

- More than 30% of profit go to farmers.

- Reduce greenhouse gas emission in rice production to 5%.

ii) Objectives by 2030

- Maintain paddy field area at 3,5 million ha, use planting area flexibly and ensure annual rice yield of at least 35 million tonnes.

- Export approximately 4 million tonnes of rice with fragrant rice, specialty rice and japonica rice accounting for 45%, glutinous rice 20%, high-quality milled rice 15%, medium- and low-quality rice 10% and rice products 10%; branded rice accounts for more than 40% of exported rice.

- Use certified seeds on more than 90% and high-quality seeds on more than 80% of planting area; reduce direct seeding (80 kg/ha on average) by 80%; apply advanced cultivation processes (ICM, IPM, SRP, SRI, 1P5G,...) and good production practices (VietGAP and equivalent, climate-smart rice cultivation, organic agriculture, etc.) on more than 70% and high technology and digital technology on 20% of planting area.

- Reduce use of chemical fertilizers and agrochemicals in rice production by at least 40%.

- Keep post-harvest loss under 5%.

- Rice production automation reaches 80% on average and more than 100% in the Mekong Delta.

- Increase planting area production upon which is connected with trade to more than 50%.

- More than 30% of profit go to farmers.

- Reduce greenhouse gas emission in rice production to 10%.

II. RICE INDUSTRY RESTRUCTURING SOLUTIONS

1. Rice production restructuring

a) Conversion of paddy fields and rice planting areas

- Convert paddy fields having low productivity and frequently affected by saltwater intrusion, drought and flooding into other more efficient agricultural purposes. Avoid converting paddy fields with high soil fertility, high productivity or completed irrigation systems; end paddy field abandonment.

- Increase rice rotation (with vegetables and aquatic products) on rice planting areas flexibly to meet market demand.

b) Region-based rice production orientations

- The Mekong Delta is a key rice production region of the country that has advantages in rice production, contributes more than 50% to national rice yield, has sufficient rice for other markets and accounts for 90% of exported rice. However, this region is hardest hit by climate change with worsening saltwater intrusion and drought along with fresh water shortage due to building of hydropower plants in countries where the sources of the Mekong are located. In addition, low efficiency of the rice industry chain value hinders sustainable development in this region. Therefore, orientations for rice production in the Mekong Delta include adapting to climate change; improving value and efficiency by enhancing rice quality; expanding the production-trade connection; planting other plants or practicing aquaculture on unproductive paddy fields and increasing rice rotation with aquatic products (shrimp - rice, shrimp - fish) or vegetables.

- The Red River Delta is the granary of the North and a rice production region with high intensive farming capacity, high productivity, readily available water sources, good irrigation systems, stable two-crop rice production (spring season - off season) with key seasons being late spring and early off season, and partial crop rotation with winter plants. Rice production in the Red River Delta aims for the domestic market, primarily Hanoi and other cities in the region where demand for specialty rice and high-quality rice is on the rise. Challenges faced by the region comprise low automation and low labor productivity. Orientations for rice production in the Red River Delta include producing high-quality rice according to local demand, with planning for local specialty rice, glutinous rice and japonica rice production areas, and promoting automation and high technology.

- The Central Coast (North Central Coast - South Central Coast) has stable two-crop rice production in areas with readily available water sources and switches to other plants such as corn (including corn for biomass production), beans, sesame, grass for livestock feeding, etc. in areas with water shortage. Challenges facing this region are natural disasters and severe weather phenomena (storms, flooding and drought). Orientations for rice production in this region include adapting to adverse conditions, increasing rice yield in areas with readily available water, using rice varieties whose quality suits local demand, varieties suitable for processing and specialty varieties for tourists. Switch from unproductive rice crops to other plants such as vegetables, beans, corn (including corn used for biomass production, grass for livestock feeding, etc.).

- The Northern Highlands and Central Highlands shall focus on intensive farming to improve rice productivity in areas with readily available water sources, developing specialty rice, glutinous rice and japonica rice as well as promoting diversity of local agricultural development to ensure local food security. Protect heritages of rice production areas such as terraced paddy fields, local specialty rice production areas, etc. in connection with tourism development and biodiversity conservation.

c) Rice variety development

i) Variety structure orientations

Each rice production region and sub-region shall have their own rice variety structures. The agriculture sector in each region and sub-region shall identify the key varieties and additional varieties according to market demand to provide instructions for use to farmers and end excessive use of varieties in each locality.

For the Mekong Delta, its variety structure shall support high-value export and increasing domestic demand for good rice. Planting areas shall be divided as follows: 35% for fragrant rice and specialty rice, 40% for high-quality rice (long-grain soft milled rice), 15% for glutinous rice and japonica rice, and 10% for medium-quality rice. Besides quality, rice varieties need to be adaptive to each sub-region (saltwater intrusion, drought and flooding) and resistant to common pests and diseases (nilaparvata lugens and magnaporthe grisea).

For the Red River Delta, its variety structure shall aim for the domestic market with fragrant and high-quality rice. High-quality rice, including local specialty rice, fragrant rice, glutinous rice and japonica rice, shall account for approximately 60% of planting areas and high-yield varieties the remaining 40%. Use varieties having short growth period, suitable for both late spring season and early off season and resistant to common pests and diseases (nilaparvata lugens, xanthomonas oryzae pv. oryzae and magnaporthe grisea).

For the other regions, mainly use high-yield varieties resistant to pests and diseases and varieties with extremely short growth period (to avoid drought and flooding), and

consider using high-quality varieties, local specialty varieties, glutinous rice and japonica rice depending on their ecological features.

ii) Variety production and trade

Enterprises are encouraged to modernize their rice seed production - processing processes to provide sufficient certified seeds for production. Complete 4-level rice variety production system (authored seeds, super-prototypal seeds, prototypal seeds and certified seeds) to increase use of certified seeds in production. The state may negotiate to purchase copyright on some special varieties used for export or food security to enable all enterprises to produce these varieties.

d) Application of good production practices

Apply advanced cultivation processes (ICM, IPM, SRP, SRI, 1P5G,...), good production practices (VietGAP and equivalent, climate-smart rice cultivation, organic agriculture, etc.), high technology and digital technology. These processes help conserve input materials such as chemical fertilizers, agrochemicals, seeds and water but improve productivity and product quality, ensure food safety, protect the environment and ecosystems of rice production regions and mitigate climate change. Good practices should be adopted on a large scale and technical measures thereof may be selected or combined depending on local conditions.

Adopt high technology and digital technology production models in rice production, 4.0 large fields and precise farming, first in the Mekong Delta and Red River Delta.

Select special ecological areas for organic rice development such as rice - shrimp production areas along the coast of the Mekong Delta or local specialty rice production areas.

dd) Rice production automation

- Continue to boost rice production automation, especially in areas with low automation rate such as the Northern Highlands and Central Highlands, for steps with low automation rate such as transplanting/direct seeding and care (fertilization, agrochemical spraying). As for the Mekong Delta, which has high automation rate, strive for synchronized automation and gradual automation of some steps such as by using drones to spray agrochemicals or biological, laser field leveling, automated watering, etc.

- Complete policies on land assembly to facilitate automation and loan assistance policies with achievable conditions for farmers to improve their fields and buy machinery and equipment, provide training for farmers and technical workers, develop mechanic and machine repair services in rural areas and provide loans for enterprises to facilitate agricultural machinery trade and manufacturing and technological reform. The state shall formulate policies to support development of fields which are automated in a

synchronized manner and production upon which is connected with trade as well as large-scale development of rice production automation models.

e) Post-harvest, storage and processing

- Increase use of 2-stage dryers (fluidized bed dryer for stage 1 and columnar dryer for stage 2) to improve milling recovery and rice quality.

- Review rice and rice plant storage capacity of the whole country, narrow the gap between rice storage capacity and rice plant storage capacity in key production regions by building and upgrading rice plant storage with synchronized drying and cleaning systems and automated operations to improve storage quality; enable enterprises to store dried rice plants in silos.

- Apply the one-step hulling process to produce rice directly from dried rice plants with 14% humidity instead of the "backward" process where brown rice is produced from highly humid whole grain rice and then transported and stored in another location for hulling, polishing and drying, which results in high loss and poor quality. Apply advanced technology to cleaning, classification and color sorting to further enhance hulled rice quality; adopt automated rice packaging lines. Meet international rice processing standards.

- Tap into rice deep processing potential to boost efficiency of the value chain. Deep processing of mash and rice can create many high-value food, pharmaceutical and cosmetic products such as high-class cooking oil, mask wax, brown rice milk, products from rice flour, oryzanol essence, etc. Straw can be used to produce organic fertilizers, grow fungi, make paper or produce animal feeds. Hulls can be recycled into wood or used to produce biogas (rice hull gasification), clean construction materials, activated carbon, etc.

- The state shall continue to provide funding policies to enable enterprises to invest in technology development and application as well as establishing high-tech processing clusters connected with ingredient production areas to strengthen the connection between production, processing and market.

e) Quality control and food safety

- Regularly inspect input materials of rice production, mostly including rice varieties, fertilizers and agrochemicals, in production, import and trade; end use of counterfeit or poor-quality materials. Boost post-inspection sample collection for inspection of conformity to quality standards and chemical and agrochemical residue in rice. Proactively give warnings about risk to food safety to rice producers and traders.

- Expand application of good production practices to reduce direct seeding, chemical fertilizers and agrochemicals in rice production, increase use of organic fertilizers and biological plant protection preparations, apply advanced rice storage and processing

processes. Encourage rice production domestically or internationally certified to be conformable to sustainable rice production processes and origin tracing processes, and support organic rice production certification.

- Encourage production and use of organic fertilizers, microbial organic fertilizers and nano fertilizers in rice production to improve fertilization efficiency, reduce use of chemical fertilizers and enhance rice quality.

- Support services of inspection of conformity to quality and food safety standards of rice domestically sold and exported. Encourage investment in offices for inspection of rice meeting international standards in the Mekong Delta.

- Raise awareness of food safety in rice production, storage and processing; promote the quality and safety of Vietnam's rice to the world.

2. Production reform

- Continue to expand connection between rice production and trade to enhance efficiency of the rice value chain. The connection between farmers and enterprises is an indispensible pillar of the rice value chain.

- To expand rice planting areas with farmer - enterprise connection, properly implement state guidelines on collective economy and cooperative development and incentive policies for connection in production and trade of agricultural products that have been promulgated, including assistance for costs of connection establishment consultancy, infrastructures for connection, agricultural extension, training, rice varieties, materials and product packaging and labels.

- The greatest challenges to the connection between production and trade is that enterprises lack funding for this connection (requiring much funding and long-term loan) while farmers do not possess the conditions necessary for field improvement, automation and input materials. Thus, the banking sector's participation in funding enterprises and state assistance in upgrading infrastructures of production areas are two pillars of the sustainable connection between rice production and trade. Besides institutions, elements of the partnership culture such as trust and honoring trust between farmers and enterprises should be promoted.

3. Market development

a) Domestic market

- Rice production in regions besides the Mekong Delta primarily aims for the domestic market. Thus, development of the domestic rice market is of importance to the sustainable development of the rice industry. For the present and in the future, rice supply for the domestic market is secured but rice production efficiency needs to be improved by (i) expanding the rice supply chain to large trade centers, (ii) developing retail in rural

areas, ensuring that people living in remote and isolated areas have access to rice supply at all times, (iii) ensuring that all rice types meet food safety standards, and (iv) diversifying rice types to meet demand of each market segment.

- Demand for specialty rice, high-quality and fragrant rice and organic rice as well as rice used for processing is on the rise. Therefore, regions producing rice for domestic trade must have suitable variety structures and use key varieties together with local specialty varieties in connection with geographical indications.

b) Export and exported rice brand development

- Continue to adopt the rice export market development strategy of Vietnam for the period of 2017-2020 with vision towards 2030 (Decision No. 942/QD-TTg dated 03/7/2017) and scheme for Vietnamese rice brand development by 2020 with vision towards 2030 (Decision No. 706/QD-TTg dated 21/05/2015).

- Create, select and develop more rice varieties according to the rice variety structure of export strategies, prioritizing fragrant and specialty varieties; develop variety-based production areas where production, trade and export are connected; strictly control the production process to obtain products with consistent quality and ensure satisfaction of food safety criteria, including maximum residue levels applicable to agrochemicals, and origin traceability; apply advanced post-harvest, storage and processing technologies to reduce loss and preserve rice quality and taste.

- Elaborate policies supporting exporters of rice branded and affixed with the Vietnam Rice label.

- Support establishment of Vietnamese rice promotion offices in key markets in connection with tourism promotion and other activities.

4. Enhancement of adaptability to climate change, adverse conditions and risks

a) Climate change adaptability

- Adapting measures: use rice varieties highly resistant to adverse conditions (saltwater intrusion, drought, heat and flooding) as well as pests and diseases, and having short growth period to avoid saltwater intrusion, drought and flooding; adjust planting seasons based on early warnings about hydrologic conditions, change production structure on paddy fields such as by rotating rice with shrimp in areas affected by saltwater intrusion and with fast-growing terrestrial plants in drought-stricken areas; grow protection forests, build and reinforce infrastructure, especially irrigation systems, river dikes and sea dikes. Complete saltwater intrusion, drought and flooding warning maps for key rice production regions, which will provide the basis for flexible changes to planting seasons and technical solutions for sustainable rice cultivation.

- Mitigating measures: reduce greenhouse gas emission in rice production; reduce use of nitrogenous fertilizers, fertilize by burying, use slow-release fertilizers; use and recycle all straw post-harvest, end straw burning; reduce water use (field leveling, watering alternatively).

- According to specific conditions, the abovementioned adapting or mitigating measures may be selected to create climate-smart rice production processes or add to good production practices such as “reduce 3 increase 3”, “1 must 5 reductions”, “1 must 6 reductions”, SRI, SRP, etc. In addition, encourage pilot of some high technologies and digital technologies suitable for rice production modernization and automation to apply on a wider scale.

- Formulate standards for certification of low-carbon rice and climate-smart rice cultivation to provide the basis for incorporating climate change adaptability value to rice value, aim for selling of carbon credits in rice production.

b) Risk management

- Develop information systems supporting early warnings (about flooding, saltwater intrusion and landslides), weather forecasting and prevention of natural disasters and epidemics; launch agricultural production insurance programs for rice (encourage farmers to buy the insurance and insurance companies to join the market).

- Provide rice farmers with funding, materials and techniques to facilitate production recovery and livelihood protection in the event of major disasters; promptly provide rice from the national reserve for people in affected areas and ensure that the national reserve has sufficient rice varieties for production recovery.

- Adopt production processes for rice highly resistant to adverse conditions, diversify production on paddy fields and farmer income; raise the community’s awareness of natural disaster prevention and control.

- Risk management is a highly social activity that requires rice farmers' understanding and participation of the whole community.

5. Efficient use of natural resources, environmental protection and preservation of rice-related cultural values

a) Efficient use of natural resources

(i) Water resources

- Continue to implement the Government’s Decree No. 77/2018/ND-CP dated 16/5/2018 on assistance for development of small irrigation systems, inter-farm irrigation systems and advanced water-efficient watering systems to finish upgrading inter-farm irrigation systems of all rice planting areas in consistency with field improvement, expand fields,

use electric pumps and carry out production automation. Build capacity for community water management on large fields, in cooperatives, etc. Apply water-efficient rice production processes such as field leveling, alternative watering, shrimp - rice or rice - terrestrial plant rotation, switching to drought-resistant rice varieties and adjusting rice planting seasons to minimize water use and avoid saltwater intrusion or end-of season drought.

- Have appropriate planning and implement policies on irrigation management between localities where river upstream and downstream areas are respectively located to regulate and share water, improve water use efficiency in a harmonious manner and reduce discharge of rice production wastewater into the environment.

- For the Mekong Delta, complete irrigation planning and apply irrigation management policies to regulate water use between localities where upstream and downstream areas are respectively located properly; build fresh water reservoirs with suitable volume, practice aquaculture in areas facing great water shortage due to drought and saltwater intrusion to improve water use efficiency and harmonize water sharing, especially between rice production and aquaculture. Promote international cooperation to mitigate the impacts of hydropower development in countries where the Mekong's sources are located upon the environment, agricultural production and livelihoods of people living downstream.

- For the Red River Delta, upgrade irrigation systems and pumping stations to ensure proactive watering and drainage; regulate discharge from hydropower structures supporting rice production properly.

- For Central, Southeast, Central Highlands and Northern Highlands provinces, review production areas facing water shortage and areas requiring water storage during dry season. In these areas, balance amounts of water used for rice and other plants to allocate land to rice cultivation and other agricultural production activities; prioritize upgrading and building of reservoirs to store fresh water during rainy season; develop small irrigation systems on small fields, valley fields and terraced paddy fields.

- Impose water use fees to raise awareness of economical water use; transfer funding for irrigation to funding for construction, maintenance and repair of irrigation structures.

- Limit use of chemical fertilizers and pesticides, increase use of organic fertilizers and biological pesticides to reduce water pollution in rice production.

- Plant and protect forests as per the law to preserve water sources.

(ii) Land resources

- Adopt paddy field planning in close connection with assurance of national food security. Convert paddy fields as prescribed by law.

- Take measures to improve soil fertility and quality of paddy fields and prevent soil degradation, erosion, washaway, desertification and acidification, including (i) developing paddy field quality databases for fields in ecological areas to provide orientations for use efficiency improvement, (ii) adding organic substances to soil to reduce use of chemical fertilizers, using nutrients from organic substances and inorganic fertilizers in a balanced manner as suitable for each type of paddy field, and switching to organic cultivation, (iii) reduce use of agrochemicals by applying IPM and biological plant protection preparations to enrich biodiversity, especially beneficial microorganisms, and (iv) applying new fertilizer advancements such as slow-release fertilizers, need-based fertilization, precise fertilization, etc.

- On mountainous, hilly or sloped land, adopt technical measures to protect paddy fields, reduce erosion and washaway (preserve watershed forests, make terraced paddy fields, plant windbreaks, etc.), conserve biodiversity, embellish landscapes; in coastal areas, prevent salinization by structural and non-structural solutions (plant protection forests along the coast).

- Raise awareness of the harm done by misuse of chemical fertilizers and agrochemicals to paddy field health and further educate on fertilization in rice production.

(iii) Biodiversity protection solutions

- Protect diversity of rice genetic resources by collecting, assessing and conserving rice genetic resources in the national plant genetic resource bank for long-term use and enrichment of genetic diversity of rice varieties used in production via variety creation and selection, pure variety selection and production of local specialty varieties with high commercial value. Establish some natural genetic resource conservation areas and landscapes in some special rice production areas (Red River Delta, Mekong Delta, Northern Highlands, etc.).

- Protect biodiversity in the wet rice field ecosystem by mitigating the impacts of intensive farming upon beneficial organisms in paddy fields, adopt solutions for growing natural enemy populations in paddy fields, tap into value of flora and fauna in paddy fields.

b) Environmental protection

- Provide farmers with instructions on use of fertilizers and agrochemicals as well as application of good production practices (IPM, 3G3T, 1P5G, SRI, SRP, VietGAP,...) to reduce use of chemical fertilizers and agrochemicals, increase use of organic fertilizers, microbial fertilizers and biological plant protection preparations in rice production, prevent chemical misuse in production or advertising or trade of input materials against regulations on use.

- Create sustainable landscapes in rice production areas in compliance with rules of smart and good production practices, climate change adaptation, and environmental and natural resource protection.

- Formulate regulations on prevention of pollution in rice production and supervise compliance therewith; enhance state management of agricultural material quality, prevent trade and use of materials that are toxic or have unclear origin and are not included in lists of permitted materials; prevent industrial wastes from penetrating paddy fields in production areas near cities and industrial parks.

c) Heritages and cultural values

- Maintain and promote landscape value of special rice production areas; tap into and enhance spiritual values in rice production, including tangible values related to rice production such as architectural structures, rice cultivation tools, etc. and intangible values such as cuisine, music, festivals, etc.

- Establish tourist attractions connected with rice heritages such as terraced paddy fields in the Northern Highlands, wild rice in Dong Thap Muoi, organic shrimp - rice areas in Ca Mau, and production areas of local specialty rice and local rice products; encourage participation of the local community in conservation of rice heritages.

- Promote local rice products and, concurrently, develop ecotourism to generate more income for communities; build rice museums at agritourism attractions and in rice research centers.

6. Human resource development

- Focus on farmer training via agricultural extension activities concerning new rice production technologies and knowledge about food safety and markets. Launch vocational training programs for young farmers, especially about high technology application and automation, to nurture a generation of professional, skilled and knowledgeable young farmers for modernization of the rice industry.

- Build capacity of agricultural extension officials and experts, especially grassroots-level agricultural extension and agricultural extension in enterprises. Support youth entrepreneurship in the rice industry; boost investment in domestic and international in-depth training about rice for science officials and properly employ officials having undergone training in public units.

- Provide farmers with local non-agricultural vocational training to create job opportunities and generate more income for rice farmers.

7. Gender issues in rice production

Boost automation to reduce women's hard labor in rice production, especially for planting, harvesting and rice plant drying. Facilitate promotion of women's role in making decisions concerning rice production, capital borrowing and rice trade in the family and choosing techniques such as variety selection; enhance women's role in production diversification in connection with family nutrition security and increase in income. Encourage women to participate in agricultural extension classes, developing demonstrations of technological advancements and local non-agricultural vocational programs to take on more work besides rice production and earn more income.

8. International cooperation

- Implement free trade agreements (FTAs) in an effective manner to develop rice export markets, including penetration into high-class and high-value rice segments; support international promotion of Vietnamese rice, organize Vietnamese rice festivals abroad and join international rice forums.

- Cooperate with other countries in rice-related matters such as sharing information, transferring technologies, exchanging genetic resources, training and trade development; cooperate with countries where sources of the Mekong and the Red River are located in protecting and using common water resources properly. Elevate Vietnam's role in ASEAN in developing a regional emergency rice reserve.

- Promote scientific and technological cooperation with international research and development organizations. Transfer rice production and processing experience and technology to other countries, especially Africa, within the framework of bilateral or multilateral cooperation.

9. State management of rice industry

- Finish developing national technical regulations and standards concerning rice in consistency with international standards; stipulate certification of products in conformity to regulations and standards.

- Finish formulating policies and institutions enabling farmers and enterprises to develop a highly efficient rice chain value, prioritizing resolution of difficulties in relation to land assembly, production - trade connection and science and technology application; develop production, processing and product quality standards suitable for international integration.

- Provide orientations and mobilize resources for scientific research and technology transfer concerning rice; ensure intellectual property rights over inventions, new rice variety selection, etc. in support of rice industry development.

- Properly manage quality of agricultural materials used in rice production, prevent production, trade and use of poor-quality or counterfeit essential materials such as fertilizers, agrochemicals and seeds.

- Publish information on rice export and rice markets; enable rice exporters to trade according to the market mechanism.

- Ensure sufficient rice and rice varieties in the national reserve for timely provision to the people in case of natural disasters and risky situations.

III. PRIORITIZED SOLUTIONS

1. Implementation, completion and renovation of policies and mechanisms

a) Policies and mechanisms concerning paddy fields

- The Government shall promulgate a Decree encouraging land assembly for agricultural production to enable paddy field assembly, increase in the scale of rice production in farming households and enterprises to invest in large-scale rice production.

- Assess and review results of implementation of paddy field conversion policies according to the Government's Decree No. 35/2015/ND-CP dated 13/4/2015 on management and use of paddy land and the Government's Decree No. 62/2019/ND-CP dated 11/7/2019 on amendments to Decree No. 35/2015/ND-CP. As each region has a different balance between rice supply and demand and multiple regions have yet to ensure a sustainable supply and demand balance, it is necessary to provide policies stipulating paddy field conversion throughout the country to maintain the large supply and demand balance in regions without excess rice yield. For key rice production regions (high commodification, fertile soil, completed irrigation systems, etc.), in order to encourage farmers to keep their paddy fields to preserve the core of food security, the State shall provide specific policies such as prioritizing paddy field assembly, investing in infrastructure, modernizing production, developing the value chain, improving efficiency of the rice industry and increasing farmer's income; transfer assistance based on rice planting area to key rice production regions and areas where rice is rotated with vegetables or aquatic products.

b) Some main policies and mechanisms concerning rice industry

i) Production - trade connection

Continue to implement incentive policies for development of rice production and trade connection according to the Government's Decree No. 98/2018/ND-CP dated 05/7/2018 on incentive policy for development of linkages in production and consumption of agricultural products. According to this Decree, incentive policies include assistance for costs of connection establishment consultancy; assistance for infrastructures for connection; and assistance for agricultural extension, training, rice varieties, materials and product packaging and labels. For the rice industry, besides the abovementioned types of assistance, it is necessary to provide enterprises with sufficiently large loan and long loan term to enable rice trade connection and rice reserve with the participation of the banking sector in providing loans based on the value chain.

ii) Agricultural automation

To meet requirements of boosting synchronized agricultural automation by 2025 and 2030, it is necessary to formulate and promulgate a Decree on policies boosting synchronized agricultural automation, which supersedes the Prime Minister's Decision No. 68/2013/QD-TTg dated 14/11/2013 on supportive policies on reduction of losses in agriculture. Reform of automation policies will enable the rice industry to automate not only production steps but also the whole value chain in a synchronized manner.

iii) Agricultural credit

Continue to implement the Government's Decree No. 55/2015/ND-CP dated 9/6/2015 on credit policy for agricultural and rural development and the Government's Decree No. 116/2018/ND-CP dated 7/9/2018 amending a number of Articles of Decree No. 55/2015/ND-CP. In agricultural credit policies, specific credit programs that assist enterprises and people with investing in some key agricultural products of Vietnam such as rice must be completed in a manner that promotes land assembly, development of production - trade connection chain, high technology application, branded product export and strong connection between lending programs and insurance based on the rice value chain.

iv) Agricultural insurance

Assess results of implementation of the Government's Decree No. 58/2018/ND-CP dated 18/4/2018 on agricultural insurance and the Prime Minister's Decision No. 22/2019/QD-TTg on agricultural insurance assistance policies (in which assistance for rice insurance is provided for the following 7 provinces: Thai Binh, Nam Dinh, Nghe An, Ha Tinh, Binh Thuan, An Giang and Dong Thap); complete agricultural insurance policies for rice, extend insurance assistance policies for centralized rice production areas, and develop insurance products according to productivity indicators and by applying remote sensing technology to reduce costs and time and increase transparency as well as accuracy.

v) Investment of enterprises in agriculture

Adopt policies encouraging enterprises to invest in rice production and trade according to the Government's Decree No. 57/2018/ND-CP dated 17/4/2018 (hereinafter referred to as "Decree No. 57") on incentive policies for enterprises investing in agriculture and rural development sector; prioritize enterprises having production - trade connection, applying high technology, exporting branded rice and/or engaging in deep processing. Promote active participation of local governments in facilitating implementation of Decree No. 57 for the rice industry, especially land assembly mechanisms and list of rice production - processing projects investment in which is encouraged of each locality.

vi) Development of systems of good production practices

Systems of good production practices are the start of sustainable and efficient development of the rice industry and the core of establishment of ingredient production areas meeting food safety and quality standards. Thus, it is necessary to provide policies facilitating application of systems of good production practices, adaption to climate change, greenhouse gas emission reduction and certification of conformity to good production practices.

vii) Rice export

- Properly implement the Government's Decree No. 107/2018/ND-CP dated 15/8/2018 (hereinafter referred to as "Decree No. 107") on rice export business; formulate and promulgate some specific policies in the spirit of Decree No. 107, including (i) incentive policies and mechanisms for traders investing in hi-tech rice production and processing as well as production and trade of clean rice, organic rice and rice with high quality and/or value added or processing of scrap and by-products from rice, (ii) incentive policies for establishment of ingredient production areas and rice production and trade connection; build capacity of farmer representative organizations.

- Continue to properly implement the scheme for Vietnamese rice brand development, rice export market development strategy and the Government's Decree No. 103/2020/ND-CP dated 04/9/2020 on certification of fragrant rice varieties exported to the European Union.

viii) Food security assurance

- Rice is the core of food security. Therefore, food security policies shall first enable farmers, localities and enterprises engaging in rice production to produce and trade rice efficiently and earn high income.

- The State shall develop mechanisms and policies ensuring sufficient rice production for national demand in all situations; concurrently, support rice distribution to remote and isolated areas and forestry production areas to enable access to rice supply at all time; locate national rice reserve storage in some areas facing food shortage. The State shall promptly provide rice for disadvantaged areas during transition periods between rice crops or when natural disasters strike.

- Encourage diversification of production and income sources of farmers to reduce rice consumption per capita and increase consumption of highly nutritious food.

- Develop systems for national nutrition security and food security surveillance, forecasting of rice production - trade situation and forecasting of risks to domestic and global food security to take early and remote response measures.

- Develop mechanisms for cooperation in and management of on-market rice stockpiling and national rice stockpiling to ensure rice supply for emergencies.

2. Enhancement of science and technology research and application

a) Develop and launch a national rice research program for 2021-2030 with a focus on the following matters:

i) Rice variety selection and development

- Enhance collection, conservation and use of rice genetic resources to obtain genetic resources for long-term use; modernize infrastructures for national plant genetic resource conservation and digitalize data on rice genetic resources; formulate regulations facilitating use of genetic resources for rice variety research and development by state-owned research organizations and Vietnamese enterprises.

- Boost research on and selection and production of new rice varieties meeting requirements of domestic and export markets, prioritizing selection and production of varieties of fragrant specialty rice, rice with nutritional value and rice used as herbal ingredients; combine high quality with resistance to climate change and common pests and diseases. Apply modern technology (biological technology and computer science) to rice variety selection and production. Carry out basic research on rice heredity and genes to provide the basis for variety selection and production. The State shall encourage and facilitate new rice variety protection.

- Conserve, select pure lines (restore) and maintain production of local specialty varieties in connection with geographical indications.

ii) Research on and development of systems of climate change mitigation and adaption and good production practices

Research and develop systems of measures for sustainable rice production and climate change mitigation and adaption, in which, besides completing predetermined measures, it is necessary to research new measures that apply high technology, digital technology and automation to add them to the systems and develop precise rice cultivation systems.

iii) Research on automation and improvement of rice value chain

Focus on researching synchronized automation of rice production suitable for each area, and synchronized automation of drying lines, storage and processing systems; aim for modernization of the whole rice value chain, in which, prioritize key rice production regions. Research domestic manufacturing of equipment whose technology is compatible to imported technology. Develop and apply technologies for deep processing of rice products.

iv) Research on efficient use and protection of natural resources

- The natural resources that are fundamental to rice production include soil, water and biodiversity. As natural resources are losing both quantity and quality, it is necessary to

focus on researching solutions for economical and efficient use of land and water resources as well as biodiversity protection; concurrently, recover and improve paddy field fertility, protect water sources, prevent landslides and enhance biodiversity (fauna, flora and microorganisms) of ecosystems of rice production areas. Research integrated systems for use of natural resources to develop the landscapes of rice production areas in a productive and sustainable manner.

- Apply information technology and 4.0 technology in research on use and protection of natural resources in rice production.

v) Research on rice trade, markets, policies and institutions

Research and analyze the impacts of policies related to the rice industry and propose amendments to mechanisms and policies; research and forecast rice markets and trade, especially forecasts about the global rice market in the medium term and long term.

b) Application of science and technology

- Renovate agricultural extension and technology transfer according to the rice value chain, develop highly efficient production - trade connection examples, promote agricultural extension concerning application of high technology and digital technology in rice production and about production organization and management. Connect agricultural extension activities with training and developing professional and highly skilled rice farmers.

- Develop agricultural extension consultancy services concerning information technology application to provide information on techniques, markets, weather forecasts and weather for farmers.

c) Mobilization of resources for science and technology research and application

- Develop connections in rice-related technology research and transfer between Vietnamese organizations (institutes, schools, enterprises, organizations and individuals). Encourage the society's participation, especially enterprises, in agricultural extension concerning rice development.

- Strengthen cooperation with International Rice Research Institute (IRRI) and international organizations such as Food and Agriculture Organization of the United Nations (FAO) in rice research and development, especially in basic research and training of highly skilled science workforce.

Encourage development of public - private cooperation, including with foreign privately-owned organizations, in rice research and development.

d) Increase in investment in science and technology research and application

- Increase funding for scientific research, technology transfer and agricultural extension from state budget and contributions from enterprises and international cooperation in rice-related matters.

- Upgrade Cuu Long Delta Rice Research Institute to international level, and upgrade Plant Resources Center and institutes in charge of rice research for ecological areas. Enhance professional capacity of state-owned agricultural extension organizations from central to local levels and agricultural extension organizations of enterprises.

- Assist enterprises with resources for building research capacity and developing technology related to rice; provide farmers with necessary resources to utilize their ideas in rice production in order to complete and develop technology, utilize local experience in sustainable rice production and protect biodiversity.

- Invest in training of officials in charge of domestic and overseas in-depth research on rice.

3. Investment in infrastructure

- Focus on completing irrigation systems to ensure sufficient water for two-crop rice production; increase investment in irrigation structures for areas facing water problems; and flood prevention, flood reduction, saltwater prevention, fresh water storage and landslide prevention structures; reinforce and upgrade sea and river dikes. Develop and upgrade inter-farm irrigation systems in connection with field improvement.

- Develop transport systems (roads, waterways, railways, inland clearance depots and export ports) in a synchronized manner, especially for the Mekong Delta, which supplies large rice quantity for other domestic markets and export.

- Support building of power systems supporting production for centralized rice production areas. Encourage use of renewable energy in rice production and processing.

- Support enterprises in building dried rice plant storages to ensure quality of rice plants in storage in centralized rice production areas; build bonded warehouses in some key markets.

- Build technical infrastructure for development of information systems concerning markets, infectious diseases, weather, production techniques, etc. to provide information for the people and enterprises.

- Support upgrade of transport systems, irrigation systems and field improvement for rice production areas having cultural heritages in connection with tourism.

- Apply digital technology to operation of logistics services. Shorten the time necessary to complete customs procedures. Ensure transparent information on rice trade - export.

Develop systems automatically providing information on rice import and export of Vietnam's market and global market and connecting relevant organizations.

IV. IMPLEMENTATION

1. Affiliates of Ministry of Agriculture and Rural Development

a) Department of Crop Production shall:

- Formulate action plans to adopt solutions for implementation of the Scheme by 2025 and 2030, submit annual reports on implementation progress and results to the Ministry; propose amendments to the Scheme where necessary.

- Take charge and cooperate with relevant General Departments, Departments and Institutes in developing and carrying out specific programs, projects and tasks for Scheme implementation.

- Take charge and cooperate with relevant units in researching and proposing amendments to policies supporting the Scheme to competent authorities for promulgation.

- Cooperate with relevant units in reviewing and amending plans for conversion of plant structure on paddy fields as appropriate.

b) Directorate of Fisheries shall:

- Take charge and cooperate with relevant units in directing inspection and construction of irrigation systems supporting rice production, first in two-crop rice production areas; build irrigation systems suitable for plants planted on paddy fields.

- Research and popularize economical watering models for rice production.

- Review and propose amendments to irrigation management policies to improve water use efficiency and harmonize water use objectives.

c) Agro Processing and Market Development Authority shall:

Take charge and cooperate with relevant units in researching and proposing amendments to policies related to storage, processing, trade promotion, market development and Vietnamese rice brand development to competent authorities for promulgation.

d) Planning Department shall:

- Take charge and cooperate with relevant units in drawing up lists of investment projects by 2025 and for 2025-2030 for Scheme implementation; balance and allocate funding for listed projects.

- Research and propose mechanisms and policies for mobilizing resources for Scheme implementation.

dd) Department of Science Technology and Environment shall:

- Take charge and cooperate with relevant units in reviewing and amending technical standards and regulations on food quality and safety applicable to rice in consistency with international and regional standards or formulating new ones.

- Provide organizations and individuals with guidelines on proposing lists of research topics and projects on new rice variety development and technological solutions to enhance efficiency of rice production according to the Scheme.

dd) Other units shall:

Cooperate with authorities in performing tasks of the Scheme as assigned.

2. Ministries and central authorities

- Cooperate with the Ministry of Agriculture and Rural Development and local governments in formulating and proposing policies supporting the Scheme's tasks to competent authorities for promulgation.

- Exercise governmental authority during implementation of the Scheme.

3. Departments of Agriculture and Rural Development

Advise the People's Committees of their provinces/cities on performance of the Scheme's tasks; propose mechanisms and policies for implementation in their provinces/cities; submit periodic reports on implementation results to the Ministry of Agriculture and Rural Development, which will submit a consolidated report to the Prime Minister and relevant ministries and central authorities.

4. Vietnam Food Association

Provide its members with instructions on how to implement state guidelines and policies related to rice production and trade; and cooperate with affiliates of the Ministry of Agriculture and Rural Development and Departments of Agriculture and Rural Development in adopting the Scheme./.

MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT