

No: **3119** /QĐ-BNN-KHCN

Hanoi, date on 16 Dec. 2011

DECISION

**On approving programme of Green House Gas (GHG) emissions reduction in
the Agriculture and Rural Development sector up to 2020**

MINISTER OF AGRICULTURE AND RURAL DEVELOPMENT

Based on Decree N^o 01/2008/ND-CP issued on 03/01/2008 by the Prime Minister to regulate functions, tasks and organizing pattern of the Ministry of Agriculture and Rural Development and Decree No 75/2009/NĐ-CP issued on 10/9/2009 by the Prime Minister to correct the Article 3 of Decree No 01/2008/ND-CP;

Based on Decision N^o 1410/QĐ-TTg issued on 16/8/2011 by the Prime Minister approving the framework of third cycle policy matrix in 2011 under the Support Program to Respond to Climate Change (SP-RCC);

Based on Decision N^o 543/QĐ-BNN-KHCN issued on 23/3/2011 by the Minister of MARD approving the action plan to respond to climate change in the agriculture and rural development sector in the period 2011-2015 and vision to 2020;

Based on Decision N^o 2081/QĐ-BNN-KHCN issued on 9/9/2011 by the Minister of Agriculture and Rural Development assigning responsibilities to implement the Support Program to Respond to Climate Change (SP-RCC);

According to proposal by the Director General of the Department of Science, Technology and Environment,

DECISION

Article 1. Approving the programme of greenhouse gas (GHG) emission reduction in the agriculture and rural development sector up to 2020 with the following details:

1. Main of viewpoints

The integrated solutions of GHG emission reduction in agriculture and rural development sector needs:

- To satisfy the purposes of economic growth, food security assurance, industrialization and modernization in agriculture and rural areas, environmental protection and making a significant contribution to responding to climate change;

- To ensure the simplest, the most practical, obtain high socioeconomic and environmental effectiveness and to not cause disorder of agricultural and rural activities;

- To be able to expand, socialize and mobilize the various stakeholders' high potential to participate in carbon market to sustainably raise funds for emission reduction activities in agriculture and rural development;

- GHG emission reduction activities are high priority in sustainable agriculture development, it is not only national voluntary efforts but also needs active supports from the international community.

2. Objectives

- To promote green and safe agricultural production to produce, low emissions, sustainable development and ensuring national food security, contributing to poverty reduction and effectively responding to climate change;

- Up to 2020, to reduce by 20% the total GHG emission in agriculture and rural development sector (18.87 million ton CO₂e); and simultaneously ensure the growth target of agriculture and rural development, and reduce the poverty rate according to sectoral development strategy;

3. Tasks

The main activities to reduce GHG emission in the agriculture and rural development sector include:

3.1. Crop production

3.1.1. Main activities

To reduce 5.72 million ton CO₂e (equivalent to 10.03% of the forecast emissions from the crop production sector up to 2020), the following main activities will be implemented:

1. Apply improved cultivation techniques on rice production such as water irrigation and inputs saving (including system of rice intensification (SRI), three reduction and three gains (3G3T), one obligations and five reduction (1P5G), alternate wetting and drying (AWD), ...) to reduce GHG emissions;

- Scale: 3.2 million ha of rice cultivation areas to apply SRI, 3G3T, 1P5G, AWD up to 2020;

- Implementing location: active irrigated rice area, priority areas for intensive rice production (the Red River Delta (RRD), North Central Coastal (NCC) and the Mekong River Delta (MRD));

- Potential of GHG emission reduction: 4.18 million ton of CO₂e (equivalent to 7.33% of the total forecast GHG emission in the crop production sector up to 2020);

2. Collect and reuse rice straw to completely restrict its burnings and burying which increase GHG emission and environmental pollution;

- Scale: 100% of rice cultivated areas, approximate 7 million hectare of rice;
- Implementing location: main rice intensive regions;
- Potential of GHG emission reduction: 1.54 million ton of CO₂e (equivalent to 2.70% of the forecast total GHG emissions from the crop production sector up to 2020);

3.1.2. Other activities to support GHG emission reduction in crop production are encouraged:

1. Apply technical solutions to enhance effectiveness of nitrogen fertilizers to reduce N₂O emissions from paddy cultivation and other crops;

2. Transform a part of rice cultivation areas with low outputs to short duration industrial crops with low emission and higher economic revenue;

3. Transform one rice crop from land with 2-3 three rice harvests with low outputs along the rivers and seashore to aquaculture (shrimp, fish) to obtain higher economic value;

4. Apply solutions to save energy and fuel in land preparation, irrigation for industrial crops, develop and apply minimum tillage to reduce GHG emissions;

5. Develop and apply technology to treat and reuse crop residues from vegetable production, short duration and perennial industrial crops, sugar cane to reduce GHG emission from crop residue disintegration.

3.2. Livestock

3.2.1. Main activities

To reduce 6.30 million ton of CO₂e (equivalent to 25.84% of total forecasted GHG emission in the livestock sector up to 2020), the following main activities should be implemented:

1. Change the feed portions for animal and poultry raising to reduce GHG emission from livestock activities:

- Scale: 30% of total processed feed, equal to 3.5 million ton of feed;
- Implementing location: intensive animal raising regions are priority;
- Potential of GHG emission reduction: 0.91 million ton of CO₂e (equivalent to 3.73% of total forecast GHG emission from the livestock sector up to 2020).

2. Provide Molasses Urea Blocks (MUBs) as milk cow feed to reduce GHG emissions.

- Scale: 192,000 milk cows
- Implementing location: milk cow raising regions.

- Potential of GHG emission reduction: 0.37 million ton of CO₂e (equal to 1.51% of total forecasted GHG emission from livestock sector up to 2020).

3. Apply biogas to treat animal wastes and produce bio-fuel to replace fossil fuel:

- Scale: 500,000 biogas installations including underground tanks;

- Implementing location: all regions, especially in the high intensive animal raising areas.

- Potential of GHG emissions reduction: 1.46 million ton of CO₂e (equivalent to 5.99% of total forecasted GHG emission from livestock sector up to 2020).

4. Applying the compost technology to treat animal and poultry waste to reduce GHG emission.

- Scale: 40 million ton of animal and poultry wastes (including 20 million ton waste from pig raising and 20 million ton from poultry raising).

- Implementing location: animal and poultry raising households, especially in pig raising households;

- Potential of GHG emission reduction: 3.56 million ton of CO₂e (equal to 14.6% of total forecasted GHG emissions from the livestock sector up to 2020).

3.2.2. Other activities are:

1. Apply the VietGAP model (good agricultural practices) in livestock production

2. Replace partly raw foods by purified food and enhance quality of fermented feed for livestock production;

3. Enhance the immunity and biological control for animal and poultry production;

4. Apply and use antibiotic bacteria and intestine bacteria to reduce GHG emissions from livestock production;

5. Improve waste collection system in cattle barns, systems of storing and treat animal wastes.

3.3. Forestry

3.3.1. Main activities

To increase carbon sequestration and reduce GHG emissions in the forestry sector, the following main activities should be taken:

- 1. Strengthen forestry plantation, restore forestry, reforest, and enrich forest in planned areas according to the forestry development strategy for the period 2010 – 2020:*

- Scale: 2.6 million hectares plantation forest;

- Implementing location: forestry areas across the country
- Potential of GHG emissions reduction: sequestration of 702 million ton CO₂e.

2. Protect, develop and sustainably use forest to increase carbon sequestration and eliminate GHG emission from forestry:

- Scale: 13.8 million hectares
- Implementing location: forest areas across the country.
- Potential of GHG emission reduction: sequestration of 669 million ton of CO₂e;

3.3.2. Other activities are:

1. Strengthen communication campaign and capacity building on awareness to protect and sustainable forest utilization, forest fire prevention;
2. Strengthen international collaboration to promote carbon-credit market in forestry sector.

3.4. Fisheries

3.4.1. Main activities

To reduce GHG emissions from fisheries by 3 million ton CO₂e (equivalent to 23.32% of total forecasted GHG emissions from the fishery sector up to 2020), the following main activities should be implemented:

1. Adjust the unsuitable capacity of fishing boats with fishing ground; re-plan fishing routines and determine optimal regions to reduce GHG emission from fishing activities:

- Scale: stable maintain from 15,000-18,000 fishing boats.
- Implementing location: off shore fishing grounds and new fishing grounds
- Potential of GHG emission reduction: 0.69 million ton of CO₂e (about 5.32% of total forecasted GHG emission in the fishery sector up to 2020)

2. Improve fishing technique and technologies in fishing activities to reduce GHG emission:

- Scale: off shore fishing grounds.
- Implementing location: off shore fishing boats and new fishing grounds
- Potential of GHG emission reduction: 0.48 million ton of CO₂e (about 3.72% of total forecasted GHG emission in the fishery sector up to 2020).

3. Establish and improve models of fishing services, protect fishing grounds to reduce GHG emission because of fuel savings:

- Scale: off shore fishing grounds
- Implementing location: off shore fishing grounds and new fishing grounds

- Potential of GHG emission reduction: 0.21 million ton of CO₂e (about 1.59% of total forecasted GHG emission in the fishery sector up to 2020).

4. Renew offering services for aquaculture such as fish varieties, feed, medicine, chemical, fertilizer and equipment supplies to reduce GHG emissions.

- Scale: key aquacultural regions

- Implementing location: Mekong River Delta, South East, Central Coastal and Red River Delta regions;

- Potential of GHG emission reduction: 0.41 million ton of CO₂e (about 3.17% of total forecasted GHG emission in the fishery sector up to 2020).

5. Improve aquacultural technologies, techniques and waste management from aquaculture to reduce GHG emissions:

- Scale: 50% of aquacultural areas (equivalent to 0.55 million hectare).

- Implementing location: Mekong River Delta, South East, Central Coastal and Red River Delta Regions;

- Potential of GHG emission reduction: 1.21 million ton of CO₂e (about 9.52% of total forecasted GHG emissions in the fishery sector up to 2020).

3.4.2. Other activities are:

1. Enhance carbon, nitrogen sequestration and cycles through effective waste management, and development of models and suitable new practices;

2. Improve cold storage system to save fossil fuels to reduce GHG emission from fishing activities;

3. Improve and select suitable fishing equipments to enhance fishing capacity; fix boundary of fishing ground to reduce moving distance in fishing activities.

3.5. Irrigation

3.5.1. Main activities

To reduce 0.17 million ton of CO₂e from irrigation activities (about 20% of total forecasted GHG emission from irrigation activities up to 2020), the following main activities should be taken:

- 1. Enhance effectiveness of irrigated pumping system to save energy and reduce GHG emissions.*

- Scale: saving 100MWh of electricity for 10,000 water pumping stations

- Implementing location: regions irrigated by water pumping systems for rice cultivation

- Potential of GHG emission reduction: 0.075 million ton of CO₂e (about 9% of total forecasted GHG emission in irrigation sector up to 2020).

2. Enhance effectiveness of drained pumping system to save energy and reduce GHG emission.

- Scale: saving 120MWh of electricity for 10,000 water pumping stations
- Implementing location: regions drained by water pumping stations to cultivate rice

Potential of GHG emission reduction: 0.095 million ton of CO₂e (about 11% of total forecasted GHG emission in the irrigation sector up to 2020).

3.5.2. Other activities are:

1. Improve irrigated systems to prevent water losses and effectively manage and stabilize irrigation systems and explore autonomous water running system to and reduce losses and save irrigated water.

2. Effectively exploit and reservoirs and clean reservoirs before storing water in reservoirs.

3. Apply new technologies and equipment in constructing irrigation and drainage systems to save energy.

3.6. Rural activities and occupations:

3.6.1. Main activities

To reduce GHG emissions in villages and the and rural artisanal sector by 4.78 million ton of CO₂e (about 24.7% total forecasted GHG emissions from the villages and the rural artisanal sector up to 2020), the following main activities should be implemented:

1. Applying suitable models to collect and treat waste from human and artisanal activities in rural areas:

- Scale: completely treat about 50% total rural solid waste, equivalent to 12.51 million ton.

- Implementing location: high population density rural centres in the Red River Delta, South East and Mekong River Delta Regions;

- Potential of GHG emissions reduction: 1.87 million ton of CO₂e (about 9.7% of total forecasted GHG emissions in the rural sector up to 2020).

2. Partly change cooking fuel from coal and charcoal and firewood to biofuels and gas with low GHG emissions.

- Scale: 50% cooking fuel proportion in rural area, equal to 0.48 million ton oil equivalent (tOe)

- Implementing location: priority for high population density rural areas, livestock production areas.

- Potential of GHG emission reduction: 0.61 million ton of CO₂e (about 3.2% of total forecasted GHG emissions in the rural sector up to 2020).

3. Enhance energy saving practices from activities

- Scale: saving 20% electricity consumption in rural areas, equal to 3.06 million MWh.

- Implementing location: high population density rural areas, artisanal villages;

- Potential of GHG emission reduction: reducing 2.3 million ton of CO₂e (about 11.8% of total forecasted GHG emissions in rural activities and artisanal villages up to 2020).

3.6.2. Other activities are:

1. Saving electricity consumption from handicraft production and processing activities.

2. Develop and apply suitable equipment to use energy efficiently, bio-fuel, solar and other forms of renewable energy.

3. Select and develop new materials, techniques and equipment to enhance production effectiveness and save inputs and reduce emissions in artisanal villages and agriculture, forest and fish processing activities.

4. To transfer technologies for treatment and to reuse rural organic waste and waste from production in artisanal villages, food and wood processing, processing plants (sawdust, by-products), fish processing, mills, processing plants for sugar and coffee, etc.

5. Develop and apply clean technology to save inputs and reduce emissions from artisanal villages and food, fishery and forest processing activities.

4. Implementing solutions

4.1. Science and Technology

1. Research on improve GHG inventory methodology for cropping systems, agricultural land use practices, forestry, livestock, fishery, irrigation, rural activities and rural artisanal activities.

2. Research and develop improved crop, fish and animal varieties that have high input absorbability and productivity, improve and transfer processing activities which have high productivity and low emissions.

3. Research and develop new technologies to treat and reuse rural waste, crop and animal residues, agro-by-products from crop production, fisheries to reduce environmental pollution, increase economic returns and reduce GHG emissions.

4. Research and develop innovated technologies and techniques for various agriculture and rural development sub-sectors with orientation to enhance economic returns and reduce GHG emissions.

5. Build database and forecast GHG emission capacity in agriculture and rural development sub-sectors.

6. Research and select new materials, energy saving equipment for activities in fisheries, irrigation, handicraft and agriculture, forest and fisheries processing activities.

7. Develop integrated solutions to improve irrigation and drained systems to reduce water losses, automated irrigation systems, increase autonomous irrigated areas, stabilize irrigation and drained systems.

8. Research and develop integrated solutions to maintain carbon stocks, improve carbon cycle to reduce GHG emission from various subsectors of agriculture and rural development.

9. Improve procedure of bio-char production from various crop residues, rural wastes, apply bio-char for to increase use and reduce CO₂ emissions.

4.2. Legal, policies institutional and organizing solution

1. Review related documents and scientific papers to issue legal and technical documents, guidelines regarding to GHG inventory, monitoring of GHG emissions.

2. Revise and improve and develop new sanctions, policies, institutions to support activities to reduce GHG emissions in agriculture and rural development subsectors.

3. Promote, support and integrate GHG reduction activities in development programmes, in sub-sectors under the Ministry of Agriculture and Rural Development.

4. Enhance and expand agricultural extension and industrial extension services and integrate these activities into GHG emission reduction in all subsectors.

5. Integrate GHG emission inventory control and monitoring GHG emissions into monitoring and evaluation networks of subsectors.

4.3. Human resources training, awareness raising and capacity building

1. Conduct communication campaign and capacity building on impacts of climate change on agriculture, role and significant contributions of GHG emission reduction for research and development institutions, policy-makers and local authorities.

2. Train and educate on technical aspects of GHG emission inventory and mitigation options for research and development institutes, universities, local authorities under Ministry of Agriculture and Rural Development.

3. Regularly conduct communication on GHG emission reduction on public media and through agricultural extension activities to propagate GHG emission reduction to receivers.

4.4. International cooperation

1. Strengthen international collaboration with various stakeholders to share experiences, knowledge, joint trainings, advanced technology transfer and inform GHG reduction activities of agriculture and rural development in Vietnam.

2. Develop bilateral and multilateral cooperation with various international stakeholders and actively participate in regional and international forum, alliance and network of GHG emission reduction in the sector.

3. Seek the international donors to develop carbon credit market, connect domestic carbon into international carbon market through CDM.

4.5. Financial solutions

Mobilization and diversification of financial sources to implement GHG emission reduction activities in agriculture and rural development includes:

1. Government and provincial government provide fund to improve infrastructure, master planning of agricultural production regions, train for farmers, research and develop technologies and technical practices of GHG emission reduction, inform and disseminate to expand GHG emission reduction measures.

2. International NGOs, international organizations and governments support funds to conduct demonstrations and technical trains of trainers (TOT) and other research and development activities.

3. Industrial activities with high GHG emissions are requested to share responsibility to farmers who apply measures GHG emission reduction and mitigation.

5. Implementing progress and budget requirement

5.1. Implementing progress

5.1.1. Phase 2011-2015

1. Review and issue technical and legal documents, guidelines in regarding to GHG emissions reduction.

2. Implement communication campaign to introduce targets and main activities of GHG emission reduction theme under Ministry of Agriculture and Rural Development.

3. Conduct training activities, capacity building for human resources, enhance knowledge and awareness on GHG emission reduction in agriculture.

4. Strengthen research activities and technology transfer on high potential GHG mitigation in the agriculture and rural development sector.

5. Carry out pilot investment projects and demonstrations of GHG emission reduction in selected subsectors, forest plantation and reforestation.

5.1.2. Phase 2016-2020

1. Continuously implement investment projects, demonstrations and main activities of GHG emission reduction theme.

2. Monitor and evaluate (M&E), sum up all thematic activities, lesson learnt and plans for the period after 2020.

5.2. Budget

Total budget requirement for implementing priority projects, programs under this Program is 2,740 billion VND.

In which:

+ State budget sources: 540 billion VND

(Phase 2011-2015: 140 billion VND and Phase 2016-2020: 400 billion VND)

+ Financial sources from ODA: 2200 billion VND

6. Implementing allocation/organization

6.1. Department of Science, Technology and Environment

- To be in charge to coordinate to General Departments, Departments under MARD to issue legal and technical documents regarding to GHG emission reduction; arrange, appraise and evaluate results of projects of GHG emission reduction.

- Manage and monitor GHG inventory and disseminate information of GHG emission and mitigation.

- Prepare annual report of GHG emission reduction, evaluate implementing theme, review and update information to submit to Minister for revising and complementing indicators and activities for GHG emission reduction theme.

6.2. Department of Planning

- Balance financial sources from various sources to provide funds to conduct GHG emission reduction activities in agriculture and rural areas;

6.3. Department of Organization and Personnel

- Submit Minister to approve additional functions and tasks for GHG emission reduction for related institutions under MARD.

- Organize training activities and strengthen human resources for related institutions under MARD to conduct GHG emission reduction.

6.4. Department of Finance

- To be in charge and coordinate with Department of Science, Technology and Environment to appraise annual financial estimation liquidate and approve accounting balance sheets to conduct GHG emission reduction projects;

6.5. Department of International Cooperation

Strengthen international cooperation and seek for ODA and other financial supports for GHG emission reduction activities in agriculture and rural development.

6.6. General Departments, Sectoral Departments and Centres under MARD

- Propose and conduct GHG emission reduction activities in regarding assigned tasks.

6.7. R&D institutions, Universities and other institutions

- Propose and conduct GHG emission reduction activities in regarding assigned tasks and transfer GHG emission reduction practices to agricultural production.

6.8. Provincial Department of Agriculture and Rural Development

- To implement communication campaign and capacity building for local stakeholders, disseminate techniques of GHG emission reduction, integrate GHG emission reduction activities into agricultural and industrial extension programs.

- Organize to implement and report the results of GHG emission reduction activities in agriculture and rural development sector in local provinces.

Article 2. This decision becomes effective immediately upon signature.

Article 3. Director Generals of units under MARD, Directors of Provincial Department of Agriculture and Rural Development, related organizations and individuals bear responsibility to execute this decision./.

Received by:

- As Article 3;
- Prime Minister (to report)
- Vice Prime Minister Hoang Trung Hai (to report)
- Governmental Office;
- Ministries: MONRE, MPI, MoF
- Leaders of MARD
- Website of MARD
- MARD's office, Department of Science, Technology and Environment

**MINISTER OF AGRICULTURE
AND RURAL DEVELOPMENT**

Signed and sealed

Cao Duc Phat

LIST OF PRIOR PROJECTS AND PROGRAMS

(Enclosed Decision No 3119/QĐ-BNN-KHCN issued on 16/12/2011 by Minister of Agriculture and Rural Development)

No	Program/Project	Objective	Activities	Expected outputs	Implementing location	Imp. Year	Budget (M.VND)	Remark
I.	General project/ program						24.000	
1.	Review and issue legal and technical documents, national standard in regarding to GHG emission reduction; guidelines of environmental pollution classification in handicraft village to reduce GHG emission	Examined an revised legal and technical documents, policies, national standards on GHG emission reduction in agriculture and rural development sector	- Examine and revise legal and technical documents in regarding to GHG emission reduction - Issue national standard and guidelines on regarding to GHG emission reduction	- Institutional mechanism, active policy, legal and technical documents in regarding to GHG emission reduction - Issued national standards and technical guidelines in regarding to GHG emission reduction in agriculture and rural development	Sub-sectors: Crop production, livestock, forestry, Fisheries, Irrigation and Rural activities	2011-2015	2.000	
2.	Training for researchers, officers and agricultural extension workers on GHG inventory in agriculture and rural development sector	Strengthen human resources for GHG inventory in agriculture and rural development sector	- Trainings courses, education activities - Exchange and share experiences, knowledge	High skill human resources on GHG inventory	Sub-sectors: Crop production, livestock, forestry, Fisheries, Irrigation and Rural activities	2012-2015	5.000	
3.	Communication and capacity building, enhance knowledge and awareness for community on GHG emission and mitigation measures in	Enhance the knowledge and awareness on related GHG emission and mitigation,	Communication campaign to build capacity for community to conduct GHG emission reduction	Officers of MARD, Local officers and communication are strengthened to understand GHG mitigation and	Sub-sectors: Crop production, livestock, forestry, Fisheries,	2011-2015	5.000	

No	Program/Project	Objective	Activities	Expected outputs	Implementing location	Imp. Year	Budget (M.VND)	Remark
	agriculture and rural development sector	deploy approved policies in related GHG emission reduction	activities	deploy issued policies on related GHG reduction	Irrigation and Rural activities			
4.	Research and apply modelling to calculate GHG emission from monitoring data, improve methodology of GHG emission inventory and correct coefficients of basic GHG lines in agriculture and rural development sector	<ul style="list-style-type: none"> - Identified GHG emission coefficients of main agricultural production activities; - Improved methodology of GHG inventory in agriculture sector; - Identified the basic GHG emission line 	<ul style="list-style-type: none"> - Evaluate actual GHG emission from main agricultural activities - Research and improve methodologies of GHG emission inventory in agriculture sector - Identify basic GHG emission line in agriculture sector 	<ul style="list-style-type: none"> - Report on actual GHG emission from main agricultural productions - Coefficients of GHG emission from main agricultural activities - Suitable methodologies of GHG inventory in main agricultural activities - Basic GHG emission lines 	Sub-sectors: Crop production, livestock, forestry, Fisheries, Irrigation and Rural activities	2012-2015	12.000	
II.	Sub-sector							
2.1.	<i>Crop production</i>						40.000	
1	Research and develop cultivated systems with low GHG emission	Improved cultivated systems and transferred low GHG emission system to agricultural production	<ul style="list-style-type: none"> - Evaluate actual GHG emission from paddy cultivation; - Improve and transfer innovated cultivated systems with low GHG emission to agricultural 	<ul style="list-style-type: none"> - Reports of actual GHG emission from paddy cultivation - Guidelines for low GHG emission rice cultivation system (5-8 systems); - 10 	Key rice cultivated region	2011-2020	10.000	

No	Program/Project	Objective	Activities	Expected outputs	Implementing location	Imp. Year	Budget (M.VND)	Remark
			production	demonstrations (50 ha/demonstration) of rice cultivation with low GHG emission				
2.	Research and develop integrated technologies to reuse crop residues (bio-char, organic manure, mushroom and material production....)	Selected and transferred suitable technologies to reuse crop residues to reduce GHG emission	<ul style="list-style-type: none"> - Evaluate actual GHG emission from crop residue management; - Selected and examine suitable technologies to reuse crop residues - Conduct demonstrations of recycling crop residues - Trainings and education 	<ul style="list-style-type: none"> - Report of actual GHG emission from crop residue management; - Selected 3-5 technologies to reuse crop residues (microorganism, physical chemistry...) - 10-12 demonstrations at community field - Trained for 5000 learners 	All regions over country	2012-2020	10.000	
3.	Implement demonstrations, trainings and communication campaigns on low GHG emission cultivation system (SRI; IPM, ICM, 3G3T, 1P5G, minimum tillage)	Conducted demonstrations of low GHG emission crop cultivation systems	<ul style="list-style-type: none"> - Selected low GHG emission crop cultivated systems, - Trainings and educations 	<ul style="list-style-type: none"> - 10-20 demonstrations/crop cultivation system/region - Trained for 5000-6000 trainees 	All regions over country	2011-2015	20.000	
2.2	<i>Livestock</i>						2.312.000	
1.	Support infrastructure for applying high technology in livestock (ODA fund)	Applied high technology to develop animal and poultry raising to enhance quality	<ul style="list-style-type: none"> - Apply autonomous technology from food provision to waste collection, cooling and 	<ul style="list-style-type: none"> - 01 demonstration for milk cow/region - 10 demonstration for pig/region - 10 	All regions over country	2011-2015	600.000	ODA

No	Program/Project	Objective	Activities	Expected outputs	Implementing location	Imp. Year	Budget (M.VND)	Remark
		and quantity and reduce GHG emission	heating system for milk cow raising; - Apply autonomous technology from food provision to waste collection, cooling and heating system for pig raising and poultry raising	demonstrations for poultry/region				
2.	Support 50% investment for constructing and installing equipment for biogas tunnel (ODA fund)	Applied suitable equipments to use biogas energy to generate electricity in rural areas	- Research and select suitable equipments for biogas tunnel - Install suitable equipments to effectively use biogas energy - Evaluate effectiveness of biogas use and potential to produce fresh electricity from biogas fuel	- Report on suitable equipment selection for each type of biogas tunnel - Suitable and effective equipments to use biogas energy	All regions over country	2011-2015	1600.000	ODA
3.	Compensate for installing equipments to use product of biogas (ODA fund)	Compensated for installing equipments to use product of biogas (30% of households with biogas tunnel)	- Select and evaluate effectiveness of installing equipment; - Test and compensate for installing equipments	- 30% of households with biogas tunnels - Reports	All regions over country	2013-2020	80.000	ODA

No	Program/Project	Objective	Activities	Expected outputs	Implementing location	Imp. Year	Budget (M.VND)	Remark
4	Research and improve cattle systems for animal livestock	Improved cattle house and select suitable waste collection and treatment system to reduce GHG emission	<ul style="list-style-type: none"> - Research technologies to improve cattle house/facilities to effectively treat waste to reduce GHG emission - Apply suitable cattle house/facilities to effectively treat waste to reduce environmental pollution and GHG emission - Trainings and expansion of the demonstrations 	<ul style="list-style-type: none"> - Reports - Demonstrations - Training courses - Number of trainee 	All regions over country	2012-2020	6.000	
5.	Research on reuse residues after biogas to produce organic manure	Produced organic manure from biogas residues	<ul style="list-style-type: none"> - Evaluate quality and components of biogas residues - Research and develop technical procedure to reuse biogas residues to produce organic manure - Evaluate quality of organic manure 	<ul style="list-style-type: none"> - Evaluated report on quality of biogas residue - Technical procedure of organic manure production from biogas residue - Demonstrations of applied organic manure from biogas residue - Training courses, expanding demonstration 	All regions over country	2012-2015	5.000	
6.	Apply <i>Molasses Urea Block</i> (MUB) for cattle	Selected suitable MUB	- Research and apply MUB in	- Integrated solutions to apply	All regions over country	2011-2020	8.000	

No	Program/Project	Objective	Activities	Expected outputs	Implementing location	Imp. Year	Budget (M.VND)	Remark
	raising to enhance animal productivity and reduce GHG emission	for animal feedings to increase productivity and reduce GHG emission.	animal feedings to increase productivity and reduce GHG emission; - Demonstrations of MUB application - Trainings, transferring MUB to farmers	MUB in animal feedings - Effective demonstrations - Number of training course and trainees				
7.	Research and develop ecological feeds for animal raising to reduce GHG emission	- Produced effectively ecological feeds for animal raising to reduce GHG emission	- Research on technical procedure of ecological feed productions for animal raising; - Produce and apply ecological feeds for animal raising to reduce GHG emission	- Procedure of ecological feed production - Number of ecological feeds for animal feedings and transfer to farmers	All regions over country	2012-2020	8.000	
8.	Implement demonstrations, trainings and communication campaigns on using suitable feeds for animal raising and applying biological product to treat livestock wastes to reduce GHG emission	- Developed demonstrations of applying feeds for animal raising to reduce GHG emission - Developed demonstrations of applying biological products to treat livestock	- Develop suitable feed portion to reduce GHG emission for each animal - Develop suitable demonstrations of waste treatment to protect environment and reduce GHG emission	- Suitable feed portion to reduce GHG emission - Suitable demonstrations of waste treatments to protect environment and reduce GHG emission	All regions over country	2012-2015	5.000	

No	Program/Project	Objective	Activities	Expected outputs	Implementing location	Imp. Year	Budget (M.VND)	Remark
		wastes						
2.3.	<i>Fisheries</i>						34.000	
1.	Research on scientific foundation to adjust structure of fishing occupations to reduce GHG emission from fishing activities	Recommended integrated solutions to reduce 25% GHG emission up to 2020 in fishing activities	<ul style="list-style-type: none"> - Survey and collect data on fishing activities in Vietnam - Inventory and update GHG emission from fishing activities - Recommend integrated solutions to reduce 25% GHG emission from fishing activities 	<ul style="list-style-type: none"> - Related databases; - Reports - GHG report and prediction - Integrated solutions of GHG emission reduction 	All fishing grounds	2012-2020	10.000	
2.	Research and forecast fishing ground and recommend suitable organizing pattern of fishing activities to increase fishing quantity and reduce GHG emission	Forecasted fishing ground and recommended suitable fishing organization to reduce GHG emission	<ul style="list-style-type: none"> - Survey and forecast fishing grounds - Evaluate economic and environmental effectiveness, potential reduction of GHG emission - Demonstrations of fishing organizations 	<ul style="list-style-type: none"> - Actual and forecast reports; - Economic, environmental and GHG emission reports - Suitable organization pattern of fishing activities 	Fishing grounds, fishing organizations and individuals	2012-2020	3.000	
3.	Evaluate effectiveness and apply LED lamp in fishing activities	- Applied LED for some fishing activities to save energy and reduce GHG emission	<ul style="list-style-type: none"> - Evaluate effectiveness of LED for fishing activities - Integrated LED into some fishing activities to 	<ul style="list-style-type: none"> - Reports - Integrated solutions of LED application - Technical procedures of LED application 	Fishing grounds, fishing organizations and individuals	2012-2020	3.000	

No	Program/Project	Objective	Activities	Expected outputs	Implementing location	Imp. Year	Budget (M.VND)	Remark
			increase fishing productivities - Demonstrations and expendability	- Suitable demonstration				
4.	Research and develop integrated solutions of enhancing effectiveness of food and reducing GHG emission from aquaculture	Enhanced effectiveness of food use in aquaculture	- Research and develop additives to enhance effectiveness of food in shrimp and fish aquaculture - Research and select suitable components of feeds to enhance effectiveness of foods in shrimp and fish aquaculture - Research on integrated solutions to enhance effectiveness of food use for fresh fish aquaculture	- Suitable and effective additives - Suitable and effective components of aquacultural feeds - Integrated solutions of enhancing effectiveness of food in aquaculture	All regions over country	2012-2015	8.000	
5.	Implement aquacultural extension demonstrations, communication campaigns, trainings on effective use of feeds for aquaculture, LED in fishing activities	Enhanced effectiveness of feed uses for aquaculture and fishing productivities and reduce GHG emission in fishing activities	- Trial demonstrations - Trainings, education - Technological transfers	- Demonstration - Trainings for 3000 trainees	Fishing grounds, key aquaculture, fishing organizations and individuals	2013-2015	10.000	
2.4.	Forestry						120.000	
1.	Enhance quality of poor	- Improved	- Evaluate actual	- Report on actual	Northern	2011-	30.000	

No	Program/Project	Objective	Activities	Expected outputs	Implementing location	Imp. Year	Budget (M.VND)	Remark
	natural forest to reduce GHG emission and improve livelihood for local community	quality of poor natural forest, increased 30% carbon sequestration; - Increased about 20% income from forest for local community	quality of poor natural forest - Identify technical solutions and plant to improve quality of poor natural forest - Develop non-timber to increase income for local community - Apply integrated solution to enhance quality of poor natural forest	poor natural forest - Technical solutions and procedures, forest plant pattern - 2 million hectare of enriched forest from poor natural forest	Mountainous Region	2020		
2.	Reduced Emission from Deforestation and Forest Degradation (REDD)	- Identified legal documents and scientific foundation for implementing REED in Vietnam - Applied Payments of Environment Service for GHG emission reduction	- Identify basis GHG emission lines from forest - Identify potentials of GHG reduction - Issue legal documents to implement REDD - Apply payments of environmental service for REDD	- Basis GHG emission lines - Potential GHG emission reduction - Legal documents and guidelines for implementing REDD - Payments of Environmental Service for REDD - 2 million hectare through REDD	Northern Coastal Region	2011-2020	30.000	
3.	Plant forest to absorb carbon, protective and productive combination in watershed and coastal regions	- Plant 1 million hectare and absorb 500 million ton CO ₂ e up to 2020	- Identify foresting regions and forest plant - Identify the potential of carbon sequestration from	- Forested regions and suitable forest plants - Potential of carbon sequestration	Northern Mountains, Northern Coastal; Southern	2011-2020	30.000	

No	Program/Project	Objective	Activities	Expected outputs	Implementing location	Imp. Year	Budget (M.VND)	Remark
		- Strengthen capacity of protective from forest in watershed and coastal regions	forestation - Plant 1 million ha of forest	- 1 million hectare of forest	Coastal, Sought East and other coastal regions			
4.	Strengthen carbon containers in upland cultivation and agroforestry systems	Increased by 30% carbon reserves from different upland cultivation systems	- Evaluate actual GHG emission and potential carbon reserves from upland use - Apply integrated solutions to conserve and enhance carbon reserves from upland use to reduce GHG emission	- Report on actual GHG emission and carbon reserves from upland use - Guidelines of technical conserves and enhance carbon reserves from upland use - 50% areas of upland cultivation system	Northern Mountainous Region	2011-2020	30.000	
2.5.	Irrigation						90.000	
1.	Research and develop operating process of irrigation system to orient water and energy savings to reduce GHG emission	Developed suitable operating process of irrigation system to save energy and water and reduce GHG emission	- Evaluate capacity of existing irrigation system - Develop suitable operating process of irrigation system to save water and energy, reduce GHG emission - Introduce suitable demonstrations of water and energy savings	- Reports of existing irrigation system capacity - Suitable operating processes of irrigation system - Demonstrations of water and energy savings, reduce GHG emission	All regions over country	2012-2020	10.000	
2.	Apply integrate and suitable equipment to save	Enhanced effectiveness of	- Evaluate actual capacity of existing	- Integrated solutions of	All regions over country	2012-2020	50.000	

No	Program/Project	Objective	Activities	Expected outputs	Implementing location	Imp. Year	Budget (M.VND)	Remark
	energy for drained pumping system	drained pumping system to save 20% electricity and reduce GHG emission	drained pumping system: 1000m ³ /h, 4000m ³ /h, 8000m ³ /h, 11000m ³ /h. - Research and develop integrated solution to enhance pumping productivity, save fuel/electricity for equipments; - Research and install control equipments to improve pumping capacity of 1000m ³ /h, 4000m ³ /h, 8000m ³ /h, 11000m ³ /h. - Improve 4 pumping systems	installing control equipments to improve pumping capacity and save electricity and fuel consumption for 1000m ³ /h, 4000m ³ /h, 8000m ³ /h, 11000m ³ /h. - 4 pumping station with improved capacity				
3.	Conduct demonstrations, investment for improving interior field irrigation system for key intensive rice cultivation regions	Developed suitable irrigated operation in key intensive rice cultivation regions	- Conduct demonstrations - Evaluate and select suitable related demonstrations - Trainings and educations	- Effective demonstrations/ procedures - 3000 trainees on related technical procedures	Key intensive rice cultivation regions	2014-2017	30.000	
2.6.	<i>Rural activities and occupation</i>						120.000	
1.	Research and select suitable models of	Issued guidelines of	- Research on basis scientific	- Active master plan of handicraft	All rural areas	2012-2020	20.000	

No	Program/Project	Objective	Activities	Expected outputs	Implementing location	Imp. Year	Budget (M.VND)	Remark
	socialized waste classification and collections in rural areas and handicraft villages	waste classification and collection; - Identified and applied handicraft master plants oriented low carbon and low GHG emission	foundations and recommend active master plan for handicraft development oriented to reduce environmental pollutions and low GHG emission - Trial demonstration and conduct master plan of rural activities and sustainable handicraft production	development and rural activities - Integrated solutions to sustainable handicraft development and rural activities				
2.	Research and develop technologies to recycle organic wastes from rural activities	Selected suitable technologies to recycle organic wastes from rural activities	- Select, test and improve technologies to recycle organic wastes from rural activities - Conduct demonstrations of applying integrated technologies to recycle organic wastes from rural activities	- Technical procedures - Trainings and education courses	Key rural areas with high organic wastes	2013-2020	20.000	
3.	Research and develop cleaner technologies for rural activities	Applied and transferred cleaner production technologies	- Identify and select cleaner production technologies - Guidelines and	- Guidelines and legal documents to apply cleaner production technologies for	All regions over country	2012-2020	50.000	

No	Program/Project	Objective	Activities	Expected outputs	Implementing location	Imp. Year	Budget (M.VND)	Remark
		for rural occupations to save energy and reduce GHG emission	legal documents to apply cleaner production activities for rural occupations	rural occupations; - 20 demonstrations of cleaner production technologies				
4.	Research and develop integrated solution to alter fuel in rural areas	Recommended solutions to alter fuel in rural areas from fossil coal and wood fuel with high GHG emission by fresh fuel with low GHG emission	<ul style="list-style-type: none"> - Identify the suitable fuel structure in rural areas - Guidelines and apply low emission fuel sources in rural areas 	<ul style="list-style-type: none"> - Guidelines and legal documents of fuel use in rural areas - Trial and expended low emission fuel demonstration in rural areas 	All regions over country	2012-2020	10.000	
5.	Conduct demonstrations, communication campaigns and training offers on waste collection and treatments, cleaner production application and improve rural fuel consumption oriented low GHG emission	Strengthened capacity for farmers to handicraft productions and fuel consumption in rural areas	<ul style="list-style-type: none"> - Trial demonstrations - Support and compensate for treated equipments and technologies - Trainings and education offers 	<ul style="list-style-type: none"> - Waste collection and treatments models; - Cleaner production procedures - Demonstrations of fresh fuel consumption for rural activities - 3000 trainees on related technologies 	All rural areas	2013-2010	20.000	

