



Land degradation and solutions for desertification prevention, improving land quality, climate change adaptation in Vietnam

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World Environment Day (June 5th, 2024) and the World Day to Combat Desertification and Drought (June 17th, 2024) both have themes related to a global issue that affects the ecological security of the planet, poverty reduction, socio-economic stability, and sustainable development. The themes are “Restoring land, Combating drought and desertification” and “Managing and using land sustainably, Our heritage - Our future”. It shows the concern of humanity about the environmental challenges, which are warned to be the greatest of all time, impacting all aspects of social life, livelihoods, and the environment.

1. INTRODUCTION

Vietnam's land is at risk of decreasing both in quantity and quality due to the conversion of agricultural land to other purposes due to industrialization, urbanization, socio-economic development, national defense and security, new rural development, as well as land degradation. Many fertile areas are experiencing declining quality due to erosion, reduced soil fertility, drought, desertification, compaction, laterite formation, salinization, and acidification. The process and degradation are occurring

in most natural geographic and economic regions of the country, both in agricultural and forestry lands. The area of degradation from low to high accounts for up to 15.07% of the total natural area, concentrated in the Midlands and Northern Mountains, North Central Coast, and Central Coast regions. Enhancing organic matter, controlling land use changes, sustainable land and water management are the strategies for combating desertification in Vietnam.

Many countries, including Vietnam, have developed national action program to combat desertification. On September 2nd, 2006, the Prime Minister issued Decision No. 204/2006/QĐ-TTg on the Promulgation of the National Action Program to Combat Desertification for the period 2006 - 2010 and orientation to 2020, in order to implement the UN Convention to Combat Desertification and concretize the orientation of the Sustainable Development Strategy in Vietnam (Vietnam's Agenda 21). Accordingly, the Ministry of



▲ Poster of World Environment Day 2024



Agriculture and Rural Development is the lead agency for the National Action Program to Combat Desertification for the period 2006 - 2010 and orientation to 2020.

According to the Convention, desertification is land degradation in arid, semi-arid, and dry sub-humid areas due to various factors, including climate change and human activities. Land degradation is the process of reducing or losing the biological productivity and the ability to provide economic benefits of the land. Arid, semi-arid, and dry sub-humid areas are regions with an evaporation to precipitation ratio of about 0.05 to 0.60. In Vietnam, combating desertification means preventing the risk of land degradation, limiting the process of land degradation in semi-arid, arid, and dry sub-humid areas; restoring and rehabilitating degraded and wasteland by enhancing the role and responsibility of government agencies, along with promoting socialization so that households, enterprises, and social organizations participate in protecting and sustainably developing land, forest resources, preventing salinization, acidification, and mobile sand, and developing irrigation to improve livelihoods for people affected by desertification [3]. Initially, the Convention was only concerned with arid regions, but later it expanded its activities to prevent and combat land degradation.

According to Decree No. 204/2006/QĐ-TTg, the guiding principles for combating desertification include: (1) Combating desertification is a particularly important task, contributing to the sustainable management of natural resources, water resources and land, gradually increasing the income of the people, eradicating hunger, reducing poverty, and firmly resolving the task of resettlement and sedentarization. (2) The fight against desertification must be carried out in a scientific and effective manner, based on a unified and coherent system of state policies and laws, with a sense of succession and under the centralized and synchronous guidance of the Government; concretized through projects implemented by ministries, sectors, political-social organizations, and local People's Committees affected by desertification, mobilizing the attention and contribution of the whole society. (3) Expanding, diversifying, and multilateralizing international relations, but with a focus on concentrating investment and attracting investment from all economic sectors both domestic and foreign, strengthening the staff and absorbing modern technology, and inheriting suitable traditional experiences, contributing to the effective implementation of the National Action Program to Combat Desertification and multilateral environmental commitments (MEAs). (4) Closely combining economic development, social development, and environmental protection, ensuring national defense, security, and social safety and order, linking the National Environmental Protection Action Program as well as other national strategies and programs with the implementation of the United Nations Millennium Development Goals (MDGs).

2. CURRENT STATUS OF AGRICULTURAL LAND DEGRADATION IN VIETNAM

2.1. Current status of agricultural land in 2022

The data in Table 1 shows that forestry land and agricultural production land are the two main types of agricultural land, in which natural protection, special-use, and production forests account for 35.6% of the total agricultural land area. In agricultural production land, rice cultivation land and perennial crop land are the main types, with an area of 3,930,351 ha, accounting for 14.04%, and 4,919,721 ha, accounting for 17.57% of the total agricultural land area, respectively; these are the types of land that are crucial to the food security and livelihoods of rural people in both the delta and midland/mountainous regions. Meanwhile, the risk of desertification is emerging even in areas that were previously considered fertile, but due to unsustainable farming practices, land degradation has occurred.

2.2 Status of agricultural land degradation

2.2.1 Area of degradation

According to the General Department of Land Administration (2020), the agricultural land in Vietnam is mainly assessed as having a mild to moderate level of degradation, with the area of severe degradation only accounting for 4.14% of the total surveyed area and 3.64% of the total natural area. The areas with severe degradation are mainly located in Northern Midlands and Mountains (619,000 ha) and North Central Coast and Central Coast (455,000 ha). The area of moderately degraded land is mainly distributed in Northern Midlands and Mountains (1,839,000 ha) and North Central Coast and Central Coast (889,000 ha).

The severely degraded land is mainly found on the following types of land: 800,000 ha of unused land (accounting for 2.42% of the total natural land area), 293,000 ha of forestry land (accounting for 0.88% of the total natural land area), and 114,000 ha of agricultural production land (accounting for 0.34% of the total natural land area). The moderately degraded land is mainly found on the



following types of land: 1,655,000 ha of agricultural production land (accounting for 5.00% of the total natural land area), 1,367,000 ha of forestry land (accounting for 4.13% of the total natural land area), and 753,000 ha of unused land (accounting for 2.27% of the total natural land area).

The severely degraded forestry land is mainly found in the hilly and mountainous areas, which are predominantly affected by erosion, leaching, and a decline in soil fertility due to poor vegetation cover. These are the areas where the forests have been significantly degraded.

The degradation of aquaculture land is primarily due to saltwater intrusion in the coastal specialized farming areas, and in some areas, it is also caused by the unplanned conversion of rice cultivation land to brackish and saline aquaculture.

Table 1: Current status of agricultural land nationwide in 2022

Order	Land type	Code	Area (ha)	Percentage (%)
	Total agricultural land area	NNP	28.002.574	100
1	Agricultural production land	SXN	11.673.357	41,69
1.1	Land for annual crop cultivation	CHN	6.753.636	24,12
1.1.1	Rice cultivation land	LUA	3.930.351	14,04
1.1.1.1	Land dedicated to wet rice cultivation	LUC	3.190.965	11,40
1.1.1.2	Remaining land for wet rice cultivation	LUK	639.490	2,28
1.1.1.3	Upland rice cultivation land	LUN	99.895	0,36
1.1.2	Land for cultivation of other annual crops	HNK	2.823.285	10,08
1.1.2.1	Flat land for cultivation of other annual crops	BHK	1.053.522	3,76
1.1.2.2	Upland land for cultivation of other annual crops	NHK	1.769.763	6,32
1.2	Land for perennial crops	CLN	4.919.721	17,57
2	Forestry land	LNP	15.467.658	55,24
2.1	Production forest land	RSX	8.025.301	28,66
2.1.1	Production forest land is natural forest	RSN	3.868.691	13,82
2.1.2	Production forest land is planted forest	RST	3.210.013	11,46
2.1.3	Land being used for Conservation and Sustainable Use (RAX)	RSM	946.598	3,38
2.2	Protective forest land	RPH	5.123.285	18,30
2.2.1	Protective forest land is natural forest	RPN	4.016.676	14,34
2.2.2	Protective forest land is planted forest	RPT	599.697	2,14
2.2.3	Land being used for protection and development of protective forest	RPM	506.911	1,81
2.3	Forest land with special-use forest designation	RDD	2.319.072	8,28
2.3.1	Forest land with special-use forest designation is natural forest	RDN	2.083.974	7,44
2.3.2	Forest land with special-use forest designation is planted forest	RDT	104.658	0,37
2.3.3	Land being used for protection and development of RDM	RDM	130.439	0,47
3	Land for aquaculture farming	NTS	783.930	2,80
4	Land for salt production	LMU	15.373	0,05
5	Other agricultural land	NKH	62.256	0,22

Source: MONRE, 2022

2.2.2. Processes of land degradation

The land degradation processes across the country are not uniform, but rather depend on the characteristics of each region. They can be primarily categorized into 5 main degradation processes. Among these, degradation due to the processes of drought, desertification, and a decline in soil fertility are the most prominent.

Table 2. Current status of agricultural land degradation in 2020

Order	Degree of degradation	Area (ha)	Percentage (%)	Compared to the surveyed area (%)	Compared to the natural area (%)
1	Severe degradation	1.207.000	10,20	4,14	3,64
2	Moderate degradation	3.787.000	31,99	13,00	11,43
3	Mild degradation	6.844.000	57,81	23,49	20,66
	Total	11.838.000	100,00	40,63	35,73

Source: General Department of Land Administration, 2020



3. CAUSES AND SOLUTIONS FOR COMBATING DESERTIFICATION IN VIETNAM

3.1. Main causes of land degradation

Firstly, decline in soil fertility due to monoculture, intensive cultivation, and overuse of chemical fertilizers and pesticides, especially in concentrated, large-scale production areas with limited use of organic and microbial fertilizers, leading to soil acidification, loss of organic matter, and nutrient depletion.

Secondly, conversion of land use in coastal areas from rice fields and annual crops to aquaculture, leading to salinization and acidification in the Mekong Delta, especially in the provinces of Ca Mau, Bac Lieu, Soc Trang, and Tra Vinh.

Thirdly, shift cultivation practices (swidden agriculture) of ethnic minority groups leading to soil erosion and loss.

Fourthly, degradation and fragmentation of irrigation systems in the delta regions due to urbanization, industrialization, and new rural development.

Fifthly, in forestry, widespread deforestation, unsustainable logging practices (clear-cutting), and agricultural production on forestland, leading to soil erosion, deterioration of forest soil properties, and desertification, especially in Central Highlands and Northwest regions.



▲ The Forest Department (Ministry of Agriculture and Rural Development) in coordination with the University of Forestry organized a rally and launched a tree planting campaign to respond to World Day to combat desertification and drought.

3.2. Solutions to prevent desertification

Firstly, increase the application of organic fertilizers, utilize organic materials after harvesting to supplement soil organic matter, intercrop or rotate with leguminous crops and other nitrogen-fixing plants to improve soil health.

Secondly, strictly control land use changes in coastal areas, protect and plant mangrove forests along the coast in combination with investment in dyke systems, irrigation, and hydraulic structures to limit saline intrusion, leach acidic salts, and shift crop structures appropriately. Research saline-tolerant and climate-adaptive crop varieties.

Thirdly, strengthen inspection and monitoring in forest management, protection, and development, protect water resources, especially in Northwest

Table 3. Current status of degradation by land use type

Order	Land type	Area (ha)	Percentage (%)	Compared to the natural area (%)
1	Agricultural production land	5.077.000	23,21	15,33
1.1	- Severe degradation	114.000	0,52	0,99
1.2	- Moderate degradation	1.655.000	7,56	14,36
1.3	- Mild degradation	3.308.000	15,12	28,71
2	Forest land	4.969.000	22,71	15,00
2.1	- Severe degradation	293.000	1,34	1,97
2.2	- Moderate degradation	1.367.000	6,25	9,19
2.3	- Mild degradation	3.309.000	15,12	22,25
3	Aquaculture land	93.000	0,43	0,28
4	Unused land	1.693.000	7,74	5,11
	Total	21.785.000	100,00	

Source: General Department of Land Administration, 2020



and Central Highlands regions. Continue to apply support mechanisms and policies for people engaged in forestry through programs like payments for forest environmental services and carbon credit trading. Promote and guide techniques for sustainable cultivation of sloping lands such as terracing, agro-forestry, home gardens, and fixed shifting cultivation depending on slope levels to ensure sustainability.

Fourthly, invest in the development of high-tech agriculture, e c o - a g r i c u l t u r e , organic agriculture, experimental agriculture models, agri-tourism, and community-based agricultural learning on concentrated agricultural lands or interspersed in new urban areas, non-industrial, in association with new rural development to increase incomes and promote sustainable development.

Fifthly, survey, demarcate, and issue land use right certificates for forest land and land originated from state-owned farms and plantations to be allocated to ethnic minority groups lacking land. Establish agricultural land databases, develop digital maps of soil organic carbon in Vietnam, soil quality maps, and land degradation maps to monitor changes in soil organic matter content, soil quality, and land degradation ■

Table 4. Processes of land degradation

Order	Erosion process	Area (ha)	Percentage (%)	Compared to the natural area (%)
1	<i>Washout process</i>	13.358.000	29,67	40,33
2	<i>Process of soil fertility decline</i>	13.417.000	29,80	40,51
2.1	Severe decline	1526000	3,39	4,61
2.2	Moderate decline	4.409.000	9,79	13,31
2.3	Mild decline	7481000	16,61	22,58
3	<i>Process of drought and desertification</i>	16.773.000	37,25	50,64
3.1	Severe decline	1.449.000	3,22	
3.2	Moderate decline		0,00	
3.3	Mild decline		0,00	
4	<i>Process of conglomeration and lateritization</i>	1156000	2,57	3,97
4.1	Severe conglomeration	194.000	0,43	0,58
4.2	Moderate conglomeration	369.000	0,82	1,11
4.3	Mild conglomeration	594.000	1,32	1,79
5	<i>Process of salinization</i>	197.000	0,44	0,59
5.1	Severe salinization	47.000	0,10	1,14
5.2	Moderate salinization	43.000	0,10	0,13
5.3	Mild salinization	107.000	0,24	0,32
6	<i>Process of acidification</i>	125.000	0,28	0,38
6.1	Severe acidification	81.000	0,18	0,24
6.2	Moderate acidification	17.000	0,04	0,05
6.3	Mild acidification	27.000	0,06	0,08
	Total	45.026.000	100,00	

Source: General Department of Land Administration, 2020

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