



WORKSHOP

CO-GOVERNANCE OF ROCKY MOUNTAIN FOREST ECOSYSTEMS IN THE NAN RIVER
WATERSHED AMONG 65 FOREST OWNER GROUPS IN CAO QUANG COMMUNE,
TUYEN HOA DISTRICT, QUANG BINH PROVINCE

Cao Quang commune, 9 March 2025



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CO-GOVERNANCE OF ROCKY MOUNTAIN FOREST ECOSYSTEMS IN THE NAN RIVER WATERSHED AMONG 65 FOREST OWNER GROUPS IN CAO QUANG COMMUNE, TUYEN HOA DISTRICT, QUANG BINH PROVINCE

With the participation of
65 forest owner groups

Cao Quang Commune People's Committee and functional sectors
Social Policy Ecology Research Institute (SPERI)



**BOUNDARY VERIFICATION, TIMBER VOLUME, CARBON STOCK AND CO2
SEQUESTRATION IN THE TOTAL BIOMASS ESTIMATION OF NATURAL
REGENERATION FORESTS AFTER SHIFTING CULTIVATION IN VINH XUAN VILLAGE,
CAO QUANG COMMUNE, TUYEN HOA DISTRICT, QUANG BINH PROVINCE**



Implemented by:

Mr. Nguyen Quang Huy - Standing Deputy Chairman of Cao Quang Commune People's Committee

Mr. Le Van Ca – Senior Expert in forest land measurement and planning

Mr. Nguyen Ngoc Que - Head of Vinh Xuan village, and Deputy village Head

Vinh Xuan village key farmers

Mr. Nguyen Truong Tuyen – Director of Tan Vinh Phat Cooperative, Cao Quang Commune

Mr. Truong Cao Hung – Expert in mapping, technology application and calculation tchung@co2justice.org

in coordination with cadastral officials and forest rangers of Cao Quang commune



LEGAL BASIS

| Legal document | Document's No |
|----------------|--|
| Law | <ul style="list-style-type: none">- Land Law 31/2024/QH15 of the Vietnam National Assembly- Forest Law 16/2017/QH14 of the Vietnam National Assembly |
| Decree | <ul style="list-style-type: none">- 102/2024/NĐ-CP of the Government elaborating the Land Law- 156/2018/NĐ-CP of the Government elaborating the Forest Law (amended and supplemented in Decree 91/2024/NĐ-CP)- 06/2022/NĐ-CP of the Government on mitigation of GHG emissions and protection of ozone layer |
| Circular | <ul style="list-style-type: none">- 08/2024/TT-BTNMT of MoNRE on statistics, inventory and mapping the land use current status- 31/2018/TT-BNNPTNT of MARD on forest boundaries determination- 33/2018/TT-BNNPTNT of MARD on forest survey, inventory and monitoring (amended and supplemented in Circular 16/2023/TT-BNNPTNT)- 23/2023/TT-BNNPTNT of MARD on measurement, reporting and verification of results of GHG emission mitigation in the forest sector. |



OBJECTIVES

1. Have a map and database system that complies with current legal requirements for forest owners.
2. Inventory and calculation of timber volume, carbon stock, and CO2 equivalent conversion
3. Identify positive changes
4. Identify negative changes



METHODOLOGY

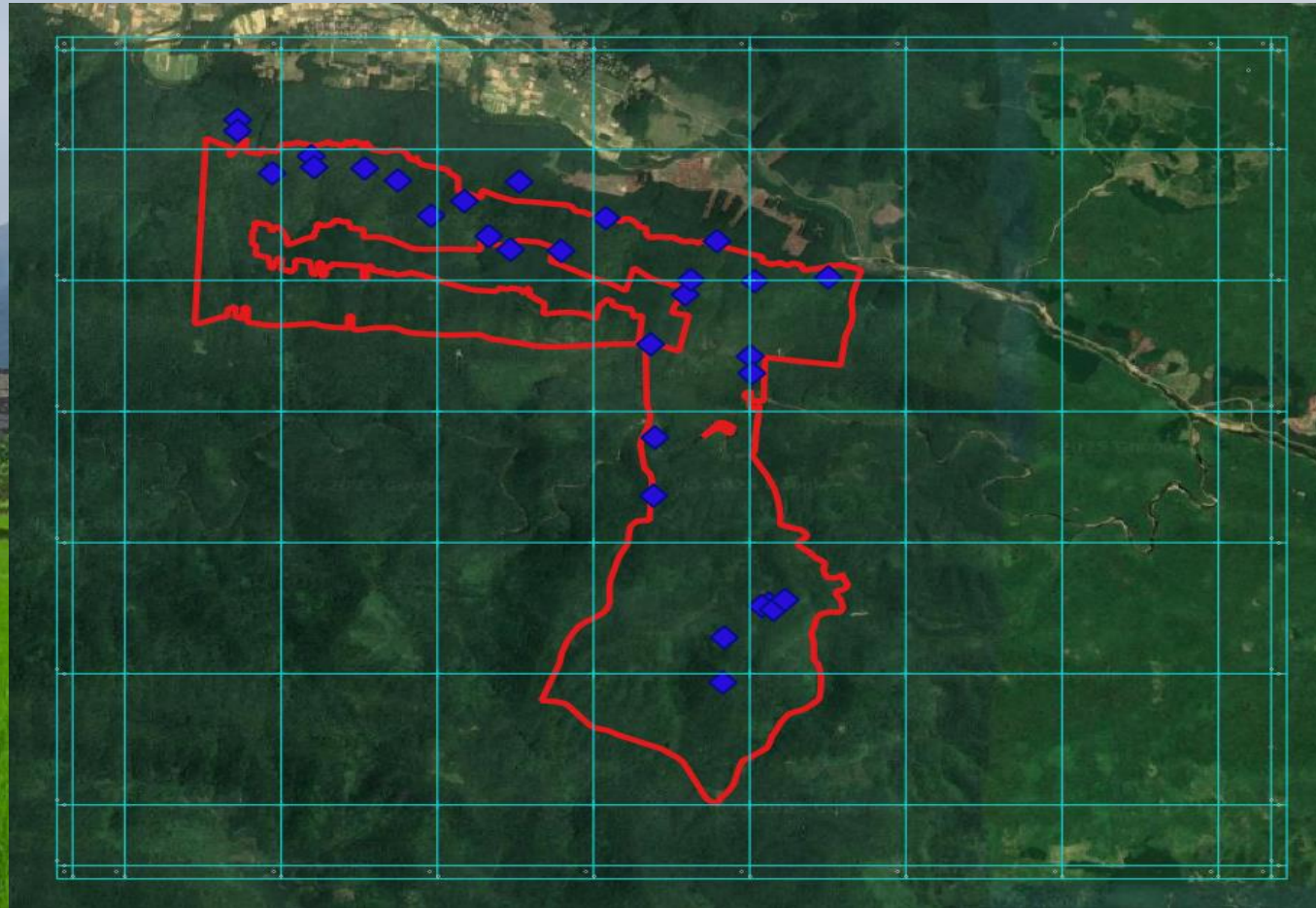
- Forest field survey and inspection, forest status verification with forest owners
- Inventory by standard plots and boundary markers identified by forest owners
- Application of GPS technology
- Interpretation of satellite image (Landsat 9 and Sentinel 2)
- Software: Qgis, Arcgis, Mapinfo, Microstation and Cad.



PROCESS

- COMBINED INTERPRETATION OF SATELLITE IMAGE, FIELD SURVEY AND DATA RECONSILIATION
- FIELD SURVEY OF BOUNDRARIES AND OBSERVATION OF FOREST STATUS
- INHERITANCE, INDEPENDENT AUDIT OF STANDARD PLOT INFORMATION AND BOUNDARIES AMONG FOREST OWNERS
- CALCULATIONS AND ANALYSIS
- FEEDBACK AND ACCURACY VERIFICATION AMONG FOREST OWNERS

INTERPRETATION OF SATELLITE IMAGE



- Boundaries
- Standard plot location





FIELD MEASUREMENT EQUIPMENT



| Equipment | Specification | Photo |
|-------------------------|---|-------|
| Handheld GPS unit | <ul style="list-style-type: none"> - Positional accuracy of ± 2 m - Handheld GPS is preferred for forestry surveys due to its mobility and negligible positional error within the acceptable tolerance. | |
| Electronic theodolite | <ul style="list-style-type: none"> - Positioning accuracy of ± 0.2 mm. - High accuracy but low mobility by the requirement for establishing a network of survey markers along the transmission line which is labor-intensive. | |
| Dual-frequency GPS unit | <ul style="list-style-type: none"> - Positional accuracy of ± 2 cm, utilizing a Radio Base Station, a CORS station of the Department of Surveying and Mapping, or a private Base Station - High accuracy, good mobility, and low manpower requirements, but higher cost. | |

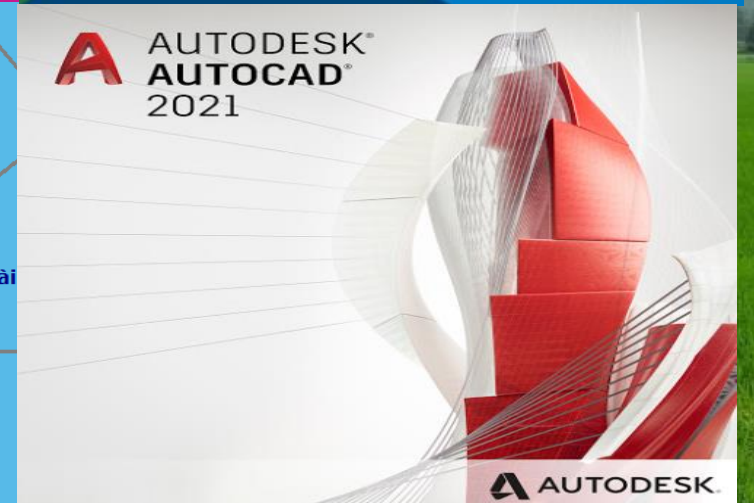
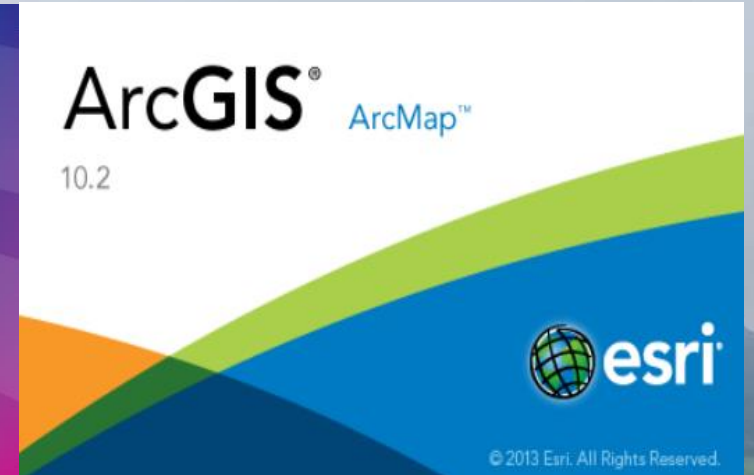
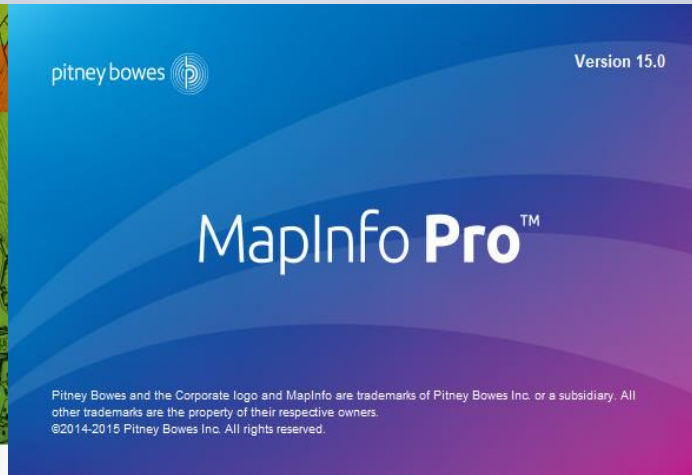
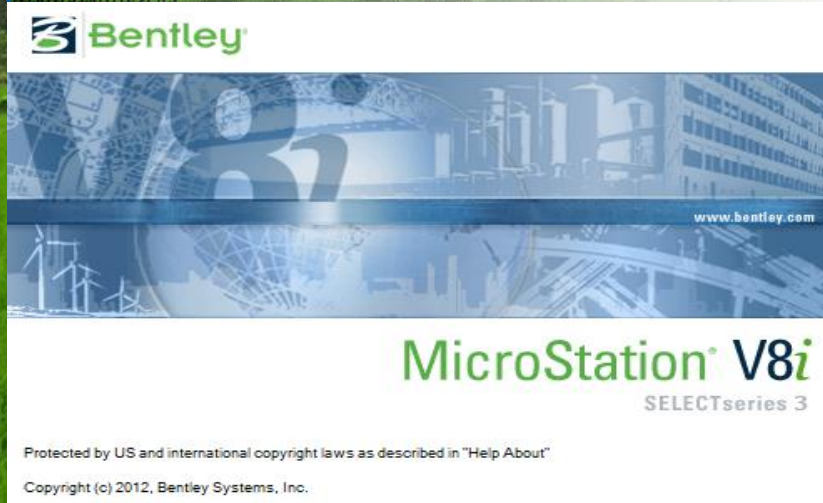
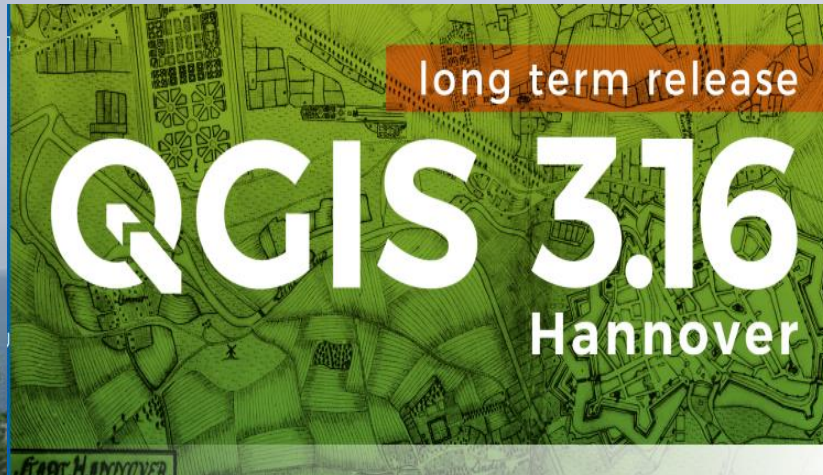
FIELD SURVEY MEASUREMENT TOOLS



| Type | Uses | Photo |
|---|--|---|
| Cloth tape measure (German technology) | Measuring tree circumference/diameter |  |
| Diameter caliper | Measuring tree diameter |  |
| Blume tape measure | Measuring tree height |  |
| Tape measure | Measuring standard plot dimensions |  |



APPLIED TECHNOLOGY SOFTWARE



Forest status/ Classification



APPLIED FORMULAS



Bao Huy Formula

$$C_AGB = \text{Exp}(-3,40031 - 0,819475 \times \text{Ln}(\text{DBH}) + 0,787115 \times \text{Ln}(\text{H} \times \text{DBH}^2) + 0,673237 \times \text{Ln}(\text{WD} \times \text{DBH}^2))$$

Where:

- C_AGB is the carbon in the above-ground biomass for each tree (kg/tree)
- DBH is the diameter at breast height of 1.3m (cm)
- H is the clear bole height (m)
- WD is the wood density of the tree species (g/cm³) (WD= 0.55 is taken as the average wood density of tree species in Southeast Asia)

MARD Formula

$$AGB = 277,273 \times (\text{DBH}^2 \times \text{Hmt} / 10000)^{0,947} \times 10^{-3}$$

Where:

- AGB is the biomass of the given timber tree (ton)
- DBH is the diameter at breast height of 1.3m (cm)
- Hmt is the merchantable trunk height calculated from the clear bole height (m) (Hmt = Hvn x 1.04)

| | Average carbon /ha (ton/ha) | | | Average CO2-e (ton/ha) | Total carbon on the entire area of 712.77 ha (ton of C) | Total CO2-e on the entire area of 712.77 ha (ton of CO2-e) |
|-----------------|---|---|------------------------------|------------------------|---|--|
| | Above ground - Average C_AGB /ha (ton/ha) | Below ground - Average C_BGB /ha (ton/ha) | Total (C_AGB+C_BGB) (ton/ha) | | | |
| Bao Huy Formula | 78.88 | 18.93 | 97.81 | 358.96 | 69,716.03 | 255,855.92 |
| MARD Formula | 57.52 | 11.50 | 69.02 | 253.30 | 49,195.39 | 180,544.64 |

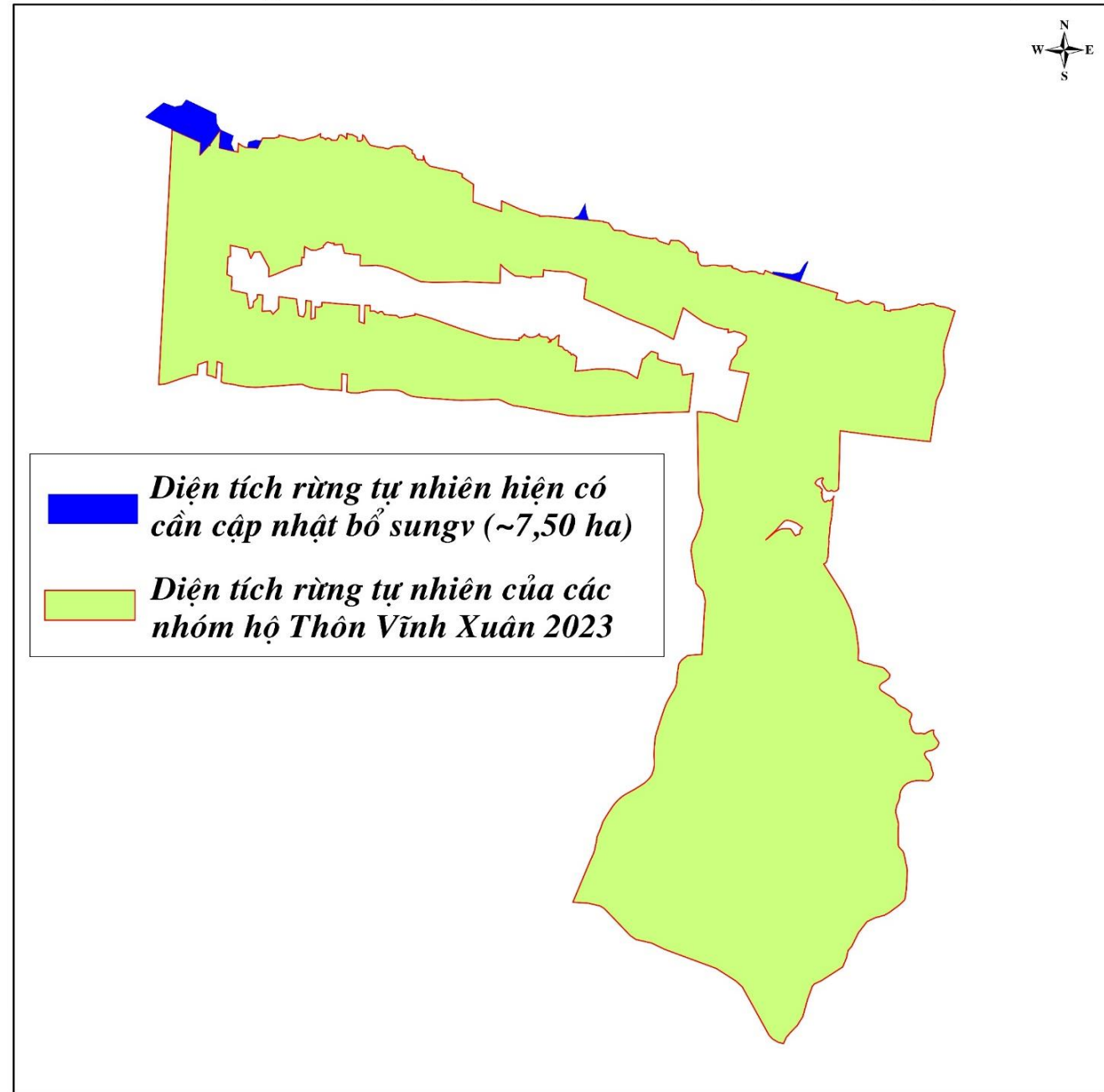
The MARD (Ministry of Agriculture and Rural Development) formula's value is approximately 70-75% lower than Bao Huy formula's value

CHANGES

Forest status changes:

- Findings from the comparison between aerial and satellite image data obtained in February 2025 vs 2023 in the Vinh Xuan village forest reveal that some forest plots recorded as natural forest in 2023 are now either planted forest or non-forested land area.

SƠ ĐỒ BIẾN ĐỘNG CÁC DIỆN TÍCH RỪNG TỰ NHIÊN CẦN CẬP NHẬT (Đối chiếu giữa hiện trạng thực tế và số liệu quản lý rừng 2023)



SUBJECTIVE CHANGES

- Synchronous collaboration among forest owners and forest owner groups, forest rangers and cadastral officials, and commune PC management in conducting inventory, review and updating of positive forest status changes
- Annual verification of forest status changes



OBJECTIVE CHANGES

- The conditions and capacity of forest owners and forest owner groups to access technology and software for building forest databases and maps remain limited
- Forest owners lack initiative and confidence to use database systems for measuring, calculating timber volume and carbon stocks, and converting CO2 absorption
- Annual updates on forest changes by forest owners are still inadequate



RECOMMENDATIONS

- Forest owners, forest owner groups, and the Commune-level forest owner group's Coordination Board should continue to improve:
 1. Disseminate to each forest owner the latest Government documents related to Obligations and Rights to benefit from the CO2 absorption of forest trees protected by the forest owners:
 - a. **Article 1. Clause I. Views and Principles: Point 2. Develop a carbon market according to a centralized model, operating according to market principles under the strict management and supervision of the State, ensuring the principles of publicity, transparency, safety, efficiency, in accordance with national conditions and international practices, ensuring national interests, and harmonizing the interests of market participants (Decision 232/QD-TTg/24/01/2025).**

RECOMMENDATIONS

1. Disseminate to each forest owner the latest Government documents related to Obligations and Rights of forest owners (forest owners pay for publication of a document/documents) such as a handbook to be carried during forest visits of forest owner groups.
 - b. Land Law 31/QH15/2024 and Forest Law 16/QH/2017, together with Decrees, Decisions, Circulars, and documents guiding the implementation from the State at all levels.**



RECOMMENDATIONS

1. Disseminate to each forest owner the latest Government documents related to Obligations and Rights of forest owners:

Forest Law 16/QH 14/2017:

Articles 2, 3, 4, 5, 8, 12, 14, 16, 53, 56, 60, 81, 83, 86, 90, 102, 108.

- Decree 156/2018 elaborating the implementation of the Forest Law 16/QH 14/2017
- Decree 06/2022 supplementing the GHG emission mitigation –related objectives.
- Circular 31/16/11/2018/BNNTPTNT on forest boundaries determination
- Circular 33/16/11/2018 on survey, inventory and forest transition monitoring.
- Circular 16/15/12/2023 amending and supplementing the Circular 33/16/11/2018.
- Circular 22/15/12/2023 amending and supplementing Circulars in the forestry sector.
- Circular 23/15/12/2023 on measurement, reporting and verification of results of greenhouse gas emission mitigation and greenhouse gas inventory in the forestry sector
- Decree 91/2024 amending and supplementing the Decree 156/2018
- Decision 232/QĐ-TTg/24/01/2025 approving the Project on Establishment and Development of a Carbon Market in Vietnam.



RECOMMENDATIONS

Disseminate the Land Law 31/QH15/2024 to each forest owner:

- Article 5, Clause 4: Principles of land use.
- Article 9, Clause 3, Point g: Land classification. Religious land.
- Article 14, Clause 1 and 2: The State exercises the right to represent ownership.
- Article 23: Citizens' rights to land.
- Articles 26 and 31: General rights and obligations of land users.
- Article 39, Clause 2: Rights and obligations of residential communities using land.
- Clause 2: Compliance with Article 86 of the Forest Law No. 16/QH14/2017.
- Chapter V: Land Use Planning. Article 60: Principles of land use planning.
- Article 60, Clause 1: Compliance with the Planning Law.
- Article 61: District-level land use plans
- Article 66: District-level land use planning
- Article 70: Obtaining opinions on land use planning and plans.
- Clause 3: District-level land use planning and plans (Point a,b,c).
- Clause 4: Transparency, publicity, democracy in responding
- Article 71: Appraisal of land use planning
- Clause 2, Point c and d. Meeting economic, social, environmental, and feasibility requirements of land use planning.
- Article 75: Public disclosure and transparency to all types of forest owners.

Procedure of Listing Carbon Credits on the Exchange

General international criteria (updated annually)





HOW NATURAL FOREST CARBON STOCK TO BE LISTED ON INTERNATIONAL EXCHANGES

1. Forest owners must possess a complete set of legal documents and the legal entity that constitutes the Land Use Rights Certificate.
2. Forest owners must have a full database system on boundaries, planning, plans, and methods for nurturing, protecting, and developing forest assets approved by competent authorities.
3. Forest owners must have annual/quarterly/monthly plans for monitoring, supervising and updating changes according to the approved planning and plans by competent authorities.
4. Forest owners must maintain a logbook recording changes in forest area, forest volume, and changes caused by natural disasters and other incidents.
5. Forest owners must report changes to competent authorities in accordance with legal regulations.
6. Forest owners must commit to an annual carbon leakage rate of less than 5%.
7. Forest owners must control, monitor, and know the forest quality, timber volume, carbon stock, and CO2 sequestration capacity annually according to their own forest change logbook.
8. Forest owners must present a "Carbon Credit Certificate" on their own forest area that has been issued by an independent appraisal agency according to international standards.
9. Forest owners, forest owner groups, forest owner cooperatives, and forest owner associations, upon demonstrating full, transparent, and professional compliance with the eight criteria above, will then decide whether or not to proceed with listing carbon credits on the exchange according to market principles!



Carbon credit listing procedure in Vietnam





Decision 232/QĐ-TTg/24/01/2025

Article I. Clause I. Views and Principles

Point 2. Develop a carbon market according to a centralized model, operating according to market principles under the strict management and supervision of the State, ensuring the principles of publicity, transparency, safety, efficiency, in accordance with national conditions and international practices, ensuring national interests, and harmonizing the interests of market participants.



Decision 232/QĐ-TTg/24/01/2025

Article I. Clause II. Objectives. Point 2.

a) Period prior to June 2025:

Complete legal and technological infrastructure for forest owners.

Enhance the capacity, skills, and knowledge of forest owners.

Finalize the Carbon Credit management mechanism based on market principles.

b) Period from June 2025 to 31 December 2028:

Pilot domestic Carbon Credit trading for all types of forest owners (individuals, households, organizations, companies, cooperatives, etc.).



ACKNOWLEDGMENT

This lecture demonstrates a great effort and collaboration among the local people, leaders, forest rangers, cadastral and police officials of Cao Quang commune, and the coordinators of the key farmers network of 13 communes across three districts of Tuyen Hoa, Minh Hoa and Bo Trach of Quang Binh province, with the financial support of ICCO and SODI. It also reflects the continuous and dedicated training and consultation of the staff from TEW-CIRD and SPERI from 1995 to the present, overcoming many ups and downs to nurture the beautiful and vibrant Forest-Upland farm-Rice valley field ecosystems in Cao Quang commune.

We express our deep gratitude in such a warm space in the Cao Quang CPC meeting hall on this Sunday morning, March 9, 2025 as a greeting to the dawn of the 116th anniversary of International Women's Day, the day that women around the world join hands and step into the Era of Takeoff!

We are honored to welcome our dear friends from Myanmar, who have overcome difficulties to come back to Cao Quang to continue receiving love for forest, land, and water today.

We are delighted to be accompanied by the three young people Quyen, Nhi, and Bang from the West of HCM City, who are full of love for their homeland and country of Vietnam.



Please refer to the link:

WWW.CO2JUSTICE.ORG

Interpretation:

1. Total carbon stock is defined as the amount of carbon in both above-ground biomass and below-ground biomass (roots).
2. Bao Huy (2012) is a formula for calculating the carbon stock in above-ground biomass (AGB) for evergreen broadleaf forests in the Central Highlands.
4. All databases, logo, and images in this lecture are copyrighted by both Cao Quang Commune and SPERI.



Towards Net Zero by 2050

