



**APPLICATION AND COMPARISON
OF METHODS FOR ESTIMATING CARBON STOCK
IN ABOVE-GROUND BIOMASS
OF TROPICAL RAINFORESTS IN NORTH-CENTRAL VIETNAM
*TOWARD CO2 JUSTICE***

**PILOT EMPIRICAL RESEARCH
HEPA, Sept 2023 - Sept 2024**



**NURTURING
NATURE**



GREEN CLOROPHIL

METABOLIC PROCESS

LEAVE – BRANCH – STEM

ROOT SYSTEM

YANG ENERGY FLOWS

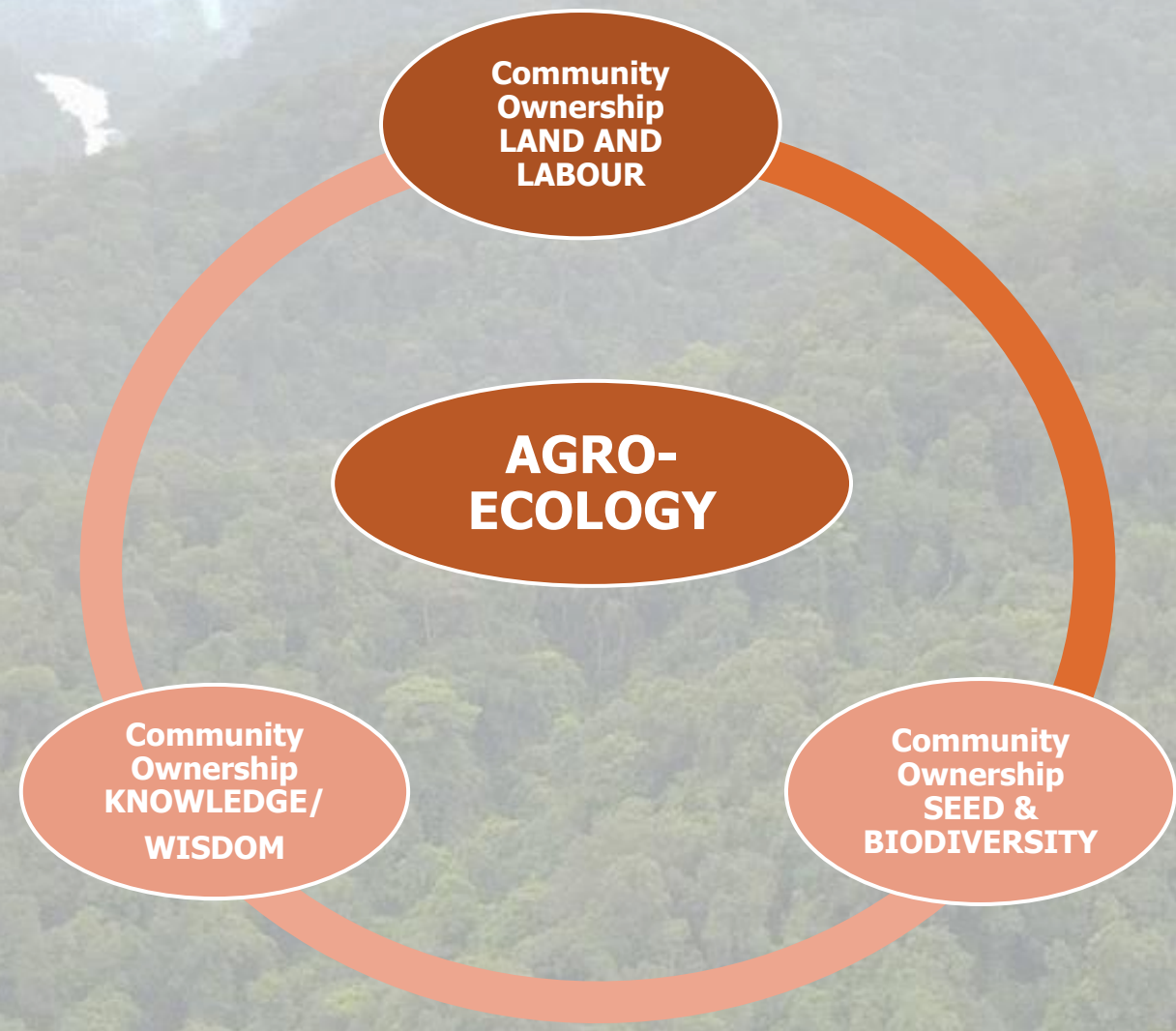
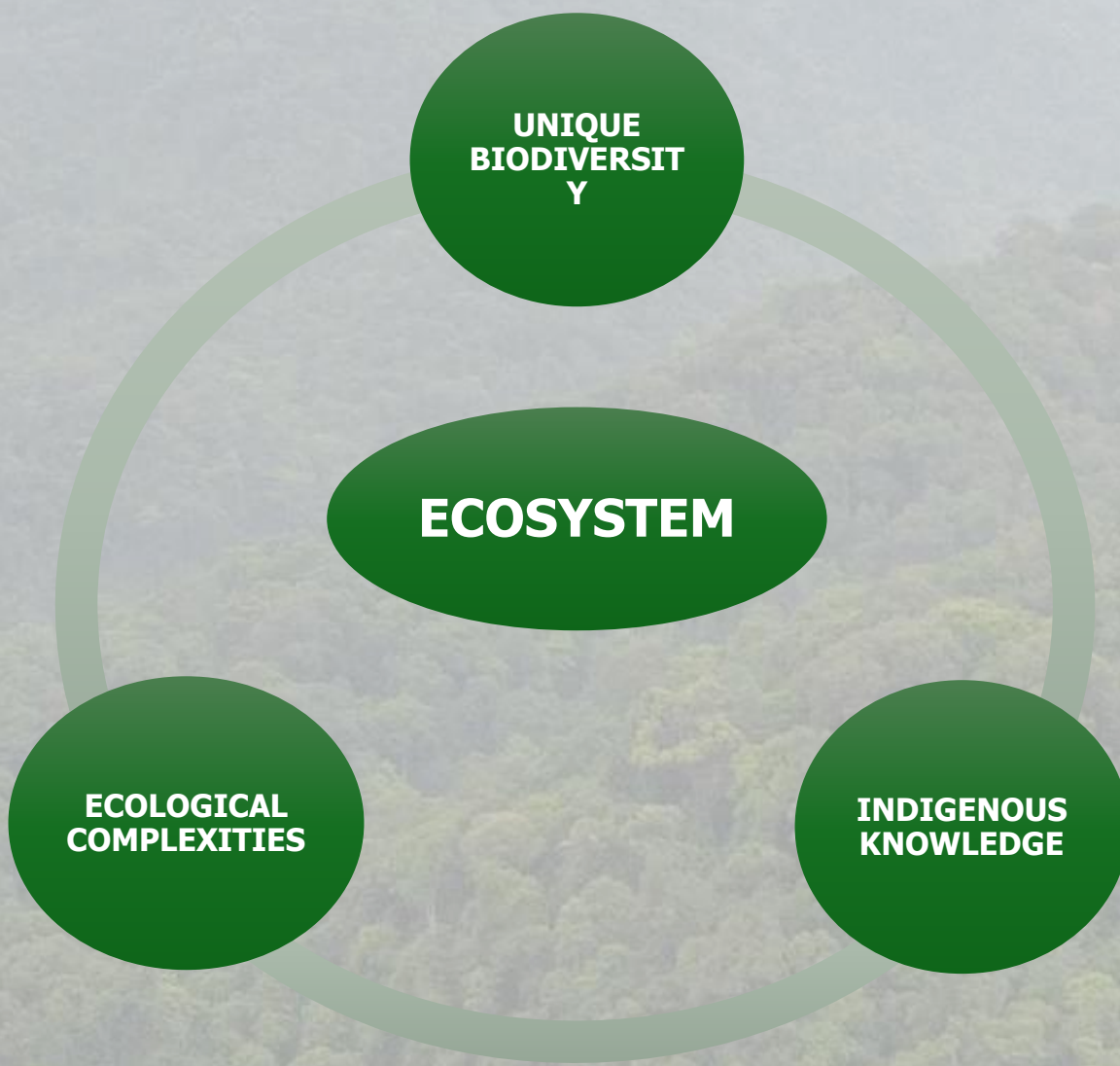
AIR

HUMUS /MOTHER EARTH SKIN

16 ELEMENTS FOR LIVING INTERDEPENTLY

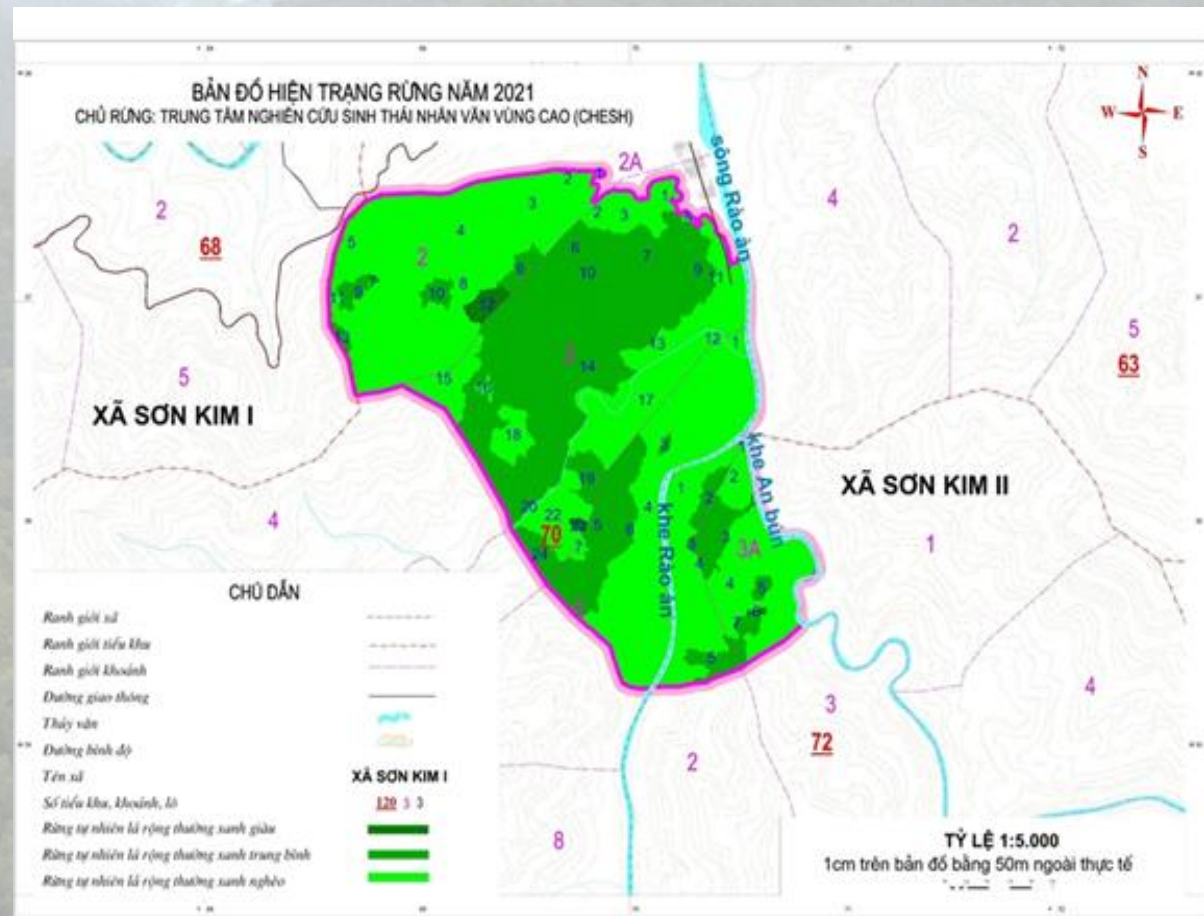
MOTHER STONE

MARMA STONE



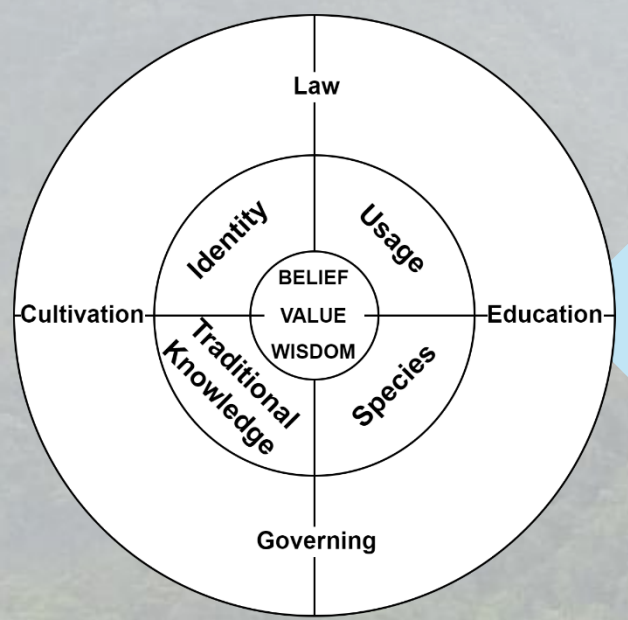
HUMAN ECOLOGY PRACTICE AREA (HEPA) – A CRITICAL WATERSHED

- The Human Ecology Practice Areas (HEPA), managed by CHESH, exemplifies successful forest revitalization efforts initiated in the 1990s.
- Total area: 310.7 hectares
- Altitude: 499 meters above sea level
- Trans-border economic area
- The coordinates:
X=468718.17;Y=20333336588.90
(on the VN-2000 Mapping System)

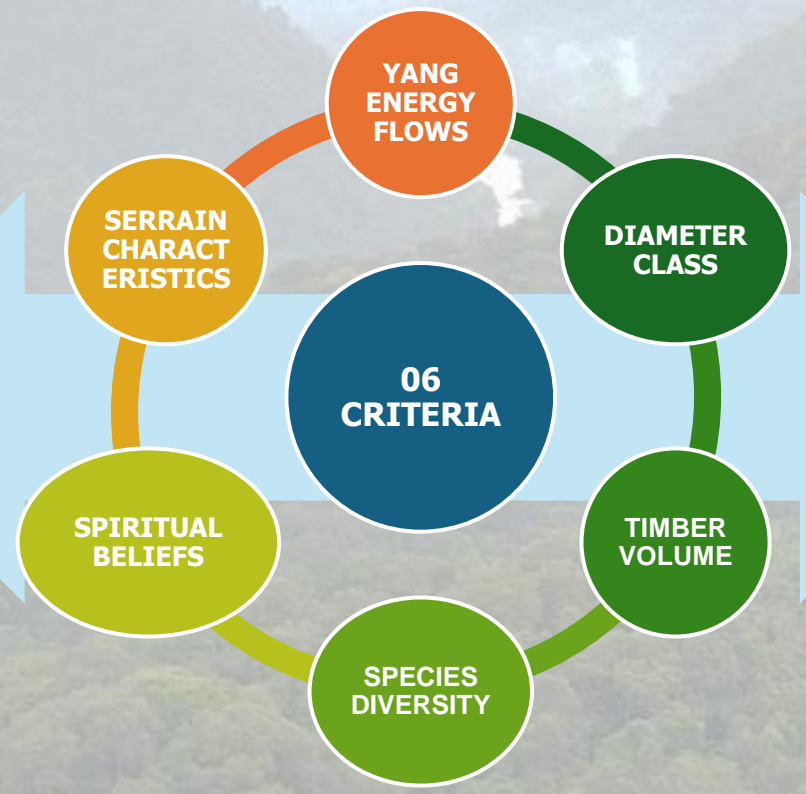
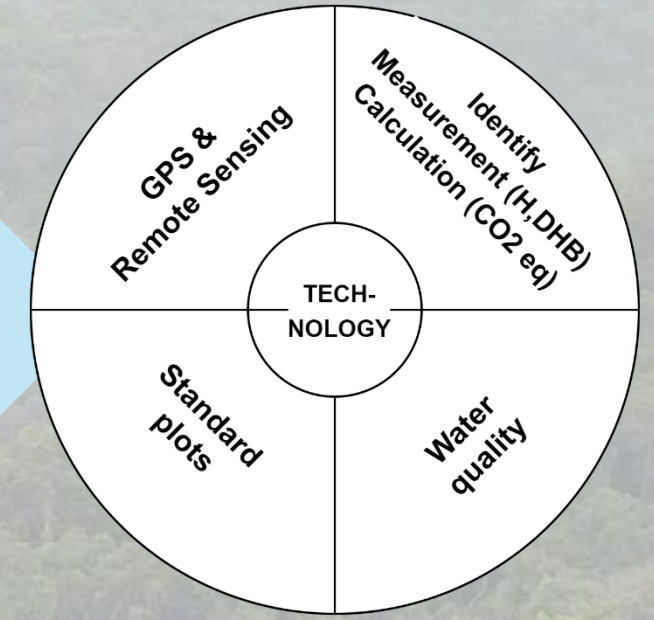


RESEARCH METHODOLOGY

COMMUNALIZATION



CAPITALIZATION



**Local experts
(Key farmers)**

Technical Experts

**Measurement,
Calculation and Analysis**

SPERI team

- Lý Mản Chạn
- Triệu Thị Khang
- Nguyễn Thị Liên
- Nguyễn Đức Sự
- Cao Thị Thù
- Nguyễn Tiến Hồ
- And others

- Professor Friedham Goeltenboth
- Prof. Dr. Bao Huy
- Dr. Nguyen Van Sy
- Trương Cao Hùng
- Nguyễn Tiến Vương
- Võ Văn Thế
- And others

APPLIED FORMULAS



No	Formula	Input variable	Appropriateness	Inadequacies
1	Brown (1997)	DBH (cm) & H (m)	<ul style="list-style-type: none"> Two basic inputs are widely used in carbon calculations globally 	<ul style="list-style-type: none"> It has not been used for biomass and carbon stock calculations in Vietnam. It has low reliability in practical applications. It only analysed 168 tree species and excluded those found in Vietnam. The data source is limited.
2	Chave et al (2005)	DBH (cm), WD (g/m ³)	<ul style="list-style-type: none"> The data source is varied, covering Asia, the Pacific, and Latin America 	<ul style="list-style-type: none"> No representation of the data source in Vietnam. No basis for assessing the appropriateness and reliability of tropical forests in Vietnam. Low reliability in practical applications.
3	Natural Resources Wales	DBH	<ul style="list-style-type: none"> Simple and suitable for guiding forest owners who are farmers 	<ul style="list-style-type: none"> Unclear research method, location and data source Low practical reliability
4	Bao Huy (2012)	DBH (cm), H (m), WD (g/m ³)	<ul style="list-style-type: none"> Tailored for Central Highlands evergreen broadleaf forests, considering local conditions and timber Enhances biomass estimation, especially for mixed forests, using DBH, H and WD Offers direct carbon estimation, improving accuracy over indirect methods. Provides more accurate carbon estimates compared to Brown (1997) and Chave et al. (2005, 2014), which only estimate biomass and indirectly estimate carbon using CF=0.47 of IPCC (2006) 	<ul style="list-style-type: none"> The modelling data source is unavailable in the study ecosystem, despite similarities in ecology and species composition between the modelling region and the research area.

APPLIED FORMULAS

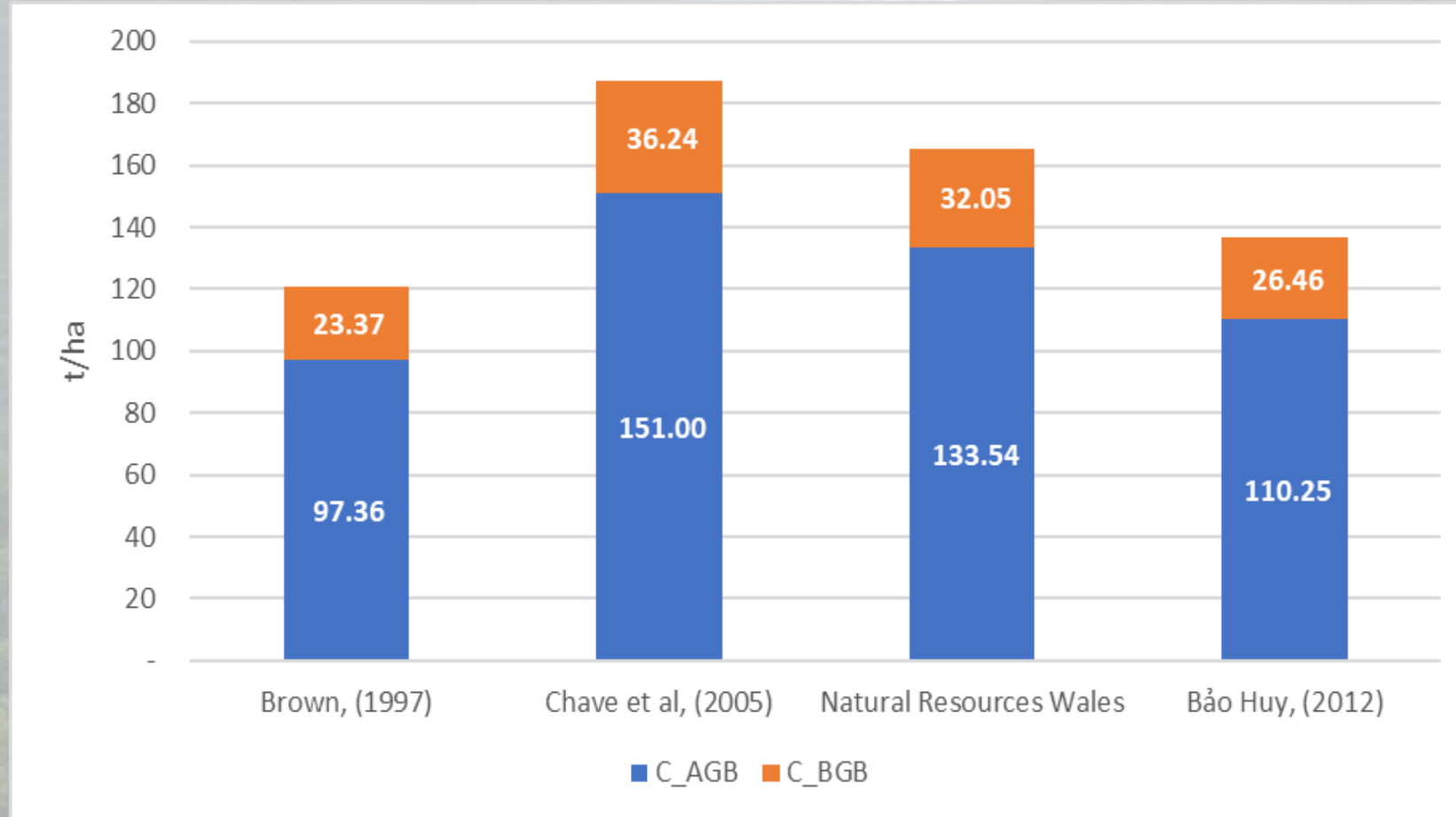


Figure 1: Average carbon biomass C_{AGB} , C_{BGB} (t/ha)

CARBON SEQUESTRATION QUANTIFICATION FOR HEPA'S FOREST

- The total C-stock (AGB and BGB) for the entire HEPA forest was calculated to be **42,475.8 tons**.
- The forests have sequestered a total of **155,886.19 tons of CO₂**, derived from the C-stock using a conversion factor of 3.67.

COMMUNITY ENTREPRENEUR DEVELOPMENT



DOCUMENTATION PROGRESS FOR RESEARCH APPROVAL

No.	Documentation and activity	Progress by June 2024
1	HEPA's legal status and forestland rights	Done
2	Assessment of substantial threat of destruction	Complete
3	Mapping systems of HEPA's forest and land use planning	Complete
4	Inventory report on HEPA's forest biomass	Complete
5	HEPA's sustainable forest management plan, 2022 - 2031	Complete
6	Assessment of leakage areas	Complete
7	Forest -stock measurement and calculation	Complete
8	Approval of Ha Tinh Provincial People's Committee	Complete
9	Approval of authorized organisations (CODE-SPERI)	Complete
10	Approval by Ministry of Science and Technology	In progress