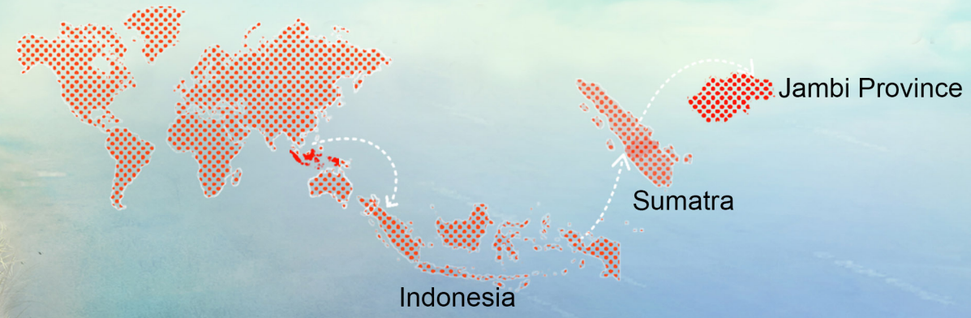
# Balance of Life and Fire

## Building Carbon Sequestration System Based on Resilience




Achieveing Dynamic Balance

Setting up Monitoring Facilities

Developing Ecological Industry

Constructing Three Ecological Systems of Carbon Sequestration

| | |
|---|---|
| Country / City | Wuhan, China |
| University / School | Huazhong University of Science and Technology |
| Academic year | 2019-2020 |
| Title of the project | Balance of Life and Fire -- Building Carbon Sequestration System Based on Resilience |
| Authors | Meng Shiqi，Chen Xi，Zhang Shixuan，Zhong Di，Hou Lingling |

## TECHNICAL DOSSIER

| | |
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Written statement, short description of the project in English, no more than 250 words

Jambi Province and its surrounding areas were in great trouble of severe haze problems. This increasing carbon emissions was caused by local people burning rain forest to develop economic crops. Our project aims to change the existing local carbon cycle imbalance and rebuild a new carbon sequestration system.

Firstly, we will construct an ecological security pattern through sensitivity analysis. Then we will combine the pattern, local habitat types and human activity characteristics as a basis to plan three types of ecological carbon sequestration systems within the province: forest ecosystem, agricultural ecosystem and wetland ecosystems. In each of ecosystem, we will focus on the restoration of habitats and the development of industries as two key strategies. One is to use ecological composting measures to repair the soil and gradually restore habitat.The other is to develop ecological agriculture, fishery and tourism on the basis of the first step to solve the income problem of residents. In addition, we will treat atmospheric carbon concentration as an observation factor and set up monitoring facilities in each system to relieve rapid carbon emissions in a short time.

Once a dynamic balance between carbon emissions and carbon sinks in the system is re-established, the harmonious symbiosis between the economy and ecology will be achieved.



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# CLIMATE CHANGE AGAIN

**11th International Biennial Landscape Barcelona**

**Barcelona** September 2020

SCHOOL PRIZE

Primary forest
Logged forest
Cash crop plantation
Grassland
Cultivated land
Peatland
River

Ecological Sensitivity
Insensitive area
Lightly sensitive
Moderately sensitive
Highly sensitive
Highest sensitive

*Monitoring unit*
Village
City
Provincial capital
Farmland carbon sequestration cycle
Wetland carbon sequestration cycle
Forest carbon sequestration cycle
National parks

0 10 20 40 60 80 Km

*Jambi City*

## DISASTER

### Carbon Dioxide
Forest fires can emit 11.3 million tons of the carbon dioxide per day in September and October.

### Haze Disaster
In 2019, Indonesia's economic output value due to haze damage reached $ 5.2 billion.

### Climate Changes
IDN's dry season extended by 50 days due to climate change in 2019.

### Forest Fire
In 2019, more than 942,000 hectares of forest and land were burned in IDN.

## IDEA

Active Carbon → Static Carbon

Carbon Source | Carbon Sink

Burning Forests → Dynamic Equilibrium

Carbon Sequestration Mode

Farmland Ecosystems
Wetland Ecosystems
Forest Ecosystems

## SOLUTIONS

Based on the comprehensive analysis of burning fields, ecological security pattern and habitat types, we have implemented the following strategies.

### Step 1.
Establishing an haze detection and fast carbon sequestration device network at the junction of sensitive areas.

### Step 2.
Reusing agricultural and forestry wastes and raising groundwater level to restoring peatland and reducing carbon emissions.

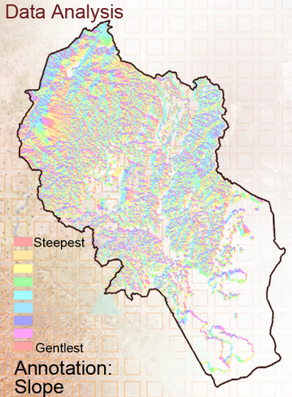
### Step 3.
Building the ecological carbon sequestration systems of agriculture,wetland and forest to realize the dynamic balance of carbon source and carbon sink.

### Step 4.
Constructing an ecotourism service system and realizing transformation of sustainable industry to increase the residents' income.

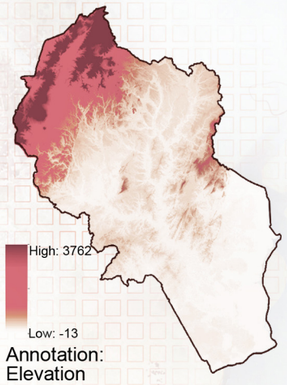
Haze Detection
Chemical Carbon Sequestration +Sprinkling Irrigation
Network System
Agricultural and Forestry Wastes
Ecological Composting
Soil Fertility
Rainwater collection
Rise of Groundwater Level
Farmland Ecosystem
Wetland Ecosystem
Carbon Balance of Ecosystem
Forest Ecosystem
Fishing
Crop Harvest
Clean Energy
Income
Landscape Facilities
Ecotourism

## SENSITIVITY

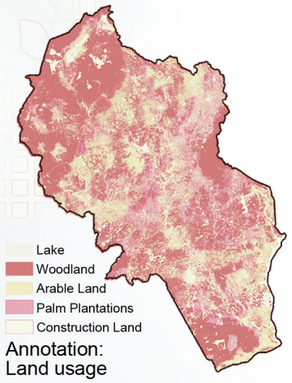
Data Analysis



Annotation: Slope

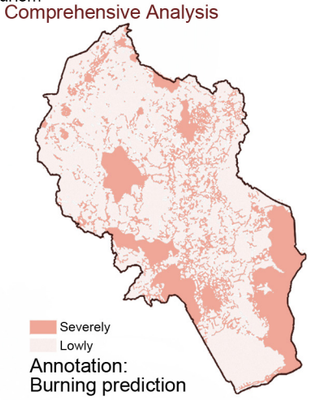


Annotation: Elevation



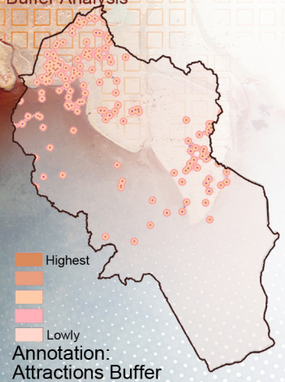
Annotation: Land usage

Comprehensive Analysis

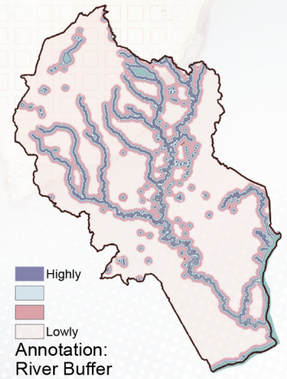


Annotation: Burning prediction

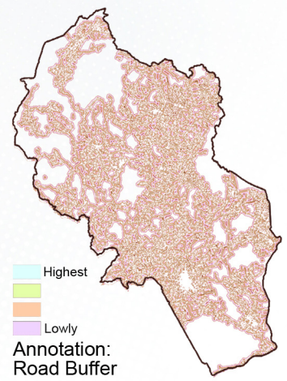
Buffer Analysis



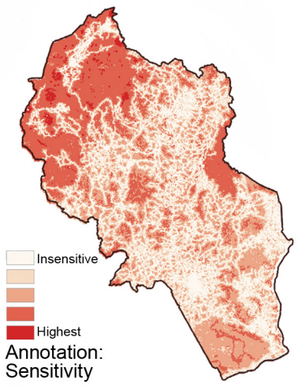
Annotation: Attractions Buffer



Annotation: River Buffer



Annotation: Road Buffer



Annotation: Sensitivity

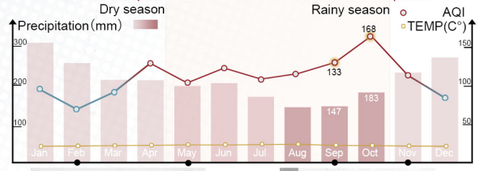
## LIVELIHOOD

IDN 's total population reaches 258 million, ranking 4th in the world.

More than 91.6% of the manpower chooses jobs related to the agriculture as a livelihood in Jambi.Agriculture dominates the local economy. Engaging in fisheries and plantation is the life choice of most people.

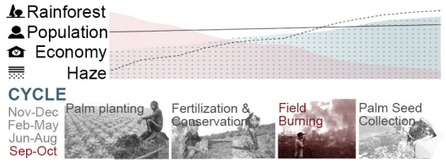
## CLIMATE

Jambi is a tropical monsoon climate in the southern hemisphere.




## DEVELOPMENT

Agricultural development without intervention will also stop due to climate.




### CYCLE

Nov-Dec
Feb-May
Jun-Aug
Sep-Oct




## POLICY

| Reclamation | Field Burning | Prohibition | Guide | Control | Mobilization |
|---|---|---|---|---|---|
| After 1980, Indonesia began to grow palms to develop the economy. | After the 1990s, in order to obtain land faster, it began to field burning. | Stop issuing new licenses for virgin forests and peatlands | Cooperation with Singapore to develop sustainable agriculture. | Suspension of approval for palm park expansion development permit. | Solicit solutions from officials and call on security personnel to strengthen patrols |

1980 1990 2000 2010 2015 2020 Now

With little success Burning continues

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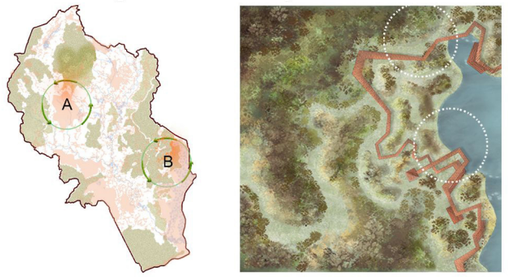
## STRATEGY

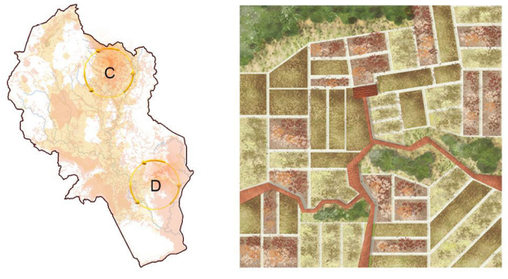
According to the burning prediction , we divide the regions prone to extreme climate conditions into three ecosystems for carbon sequestration regulation and make them a complete system.

### Constructing the Forest Ecosystem



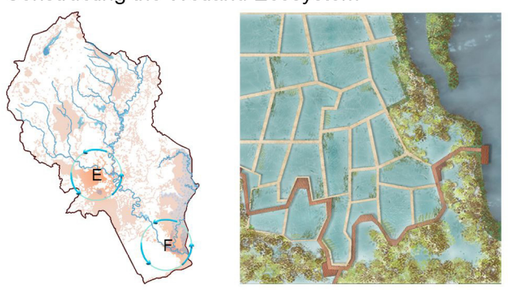



### Constructing the Agricultural Ecosystem



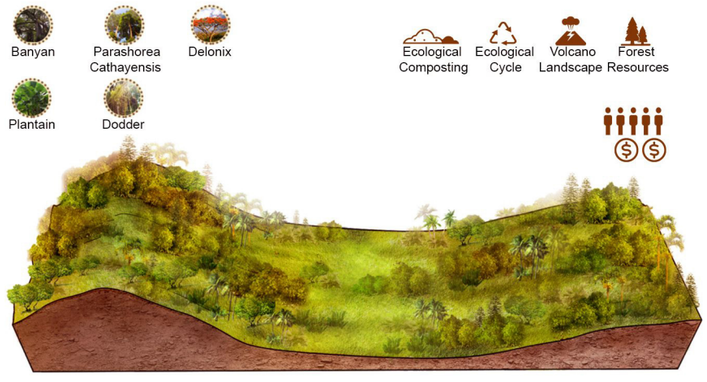



### Constructing the Wetland Ecosystem

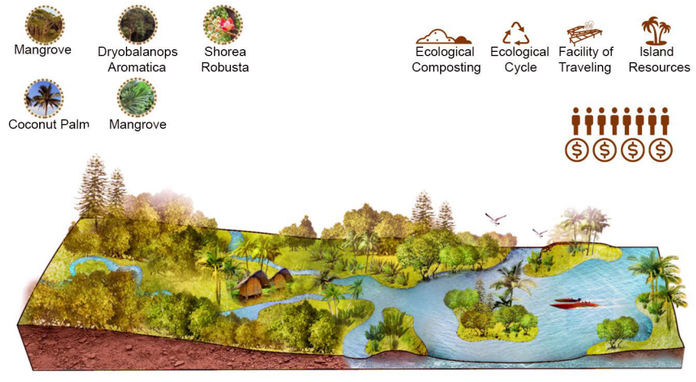





## DIVERSE TYPES OF RECOVERY AREAS

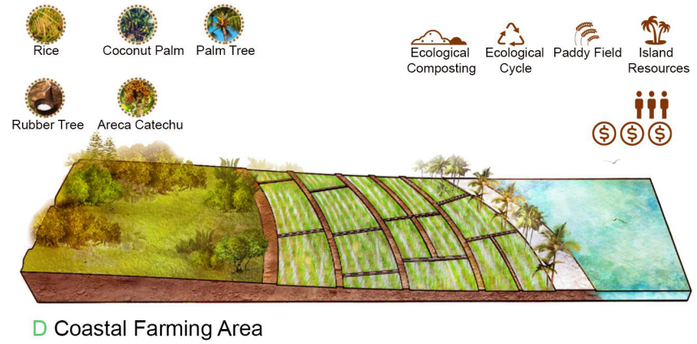



A Inland Rainforest Area

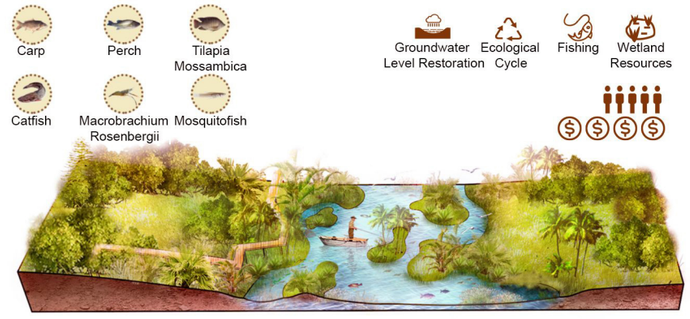



B Coastal Mangrove Area

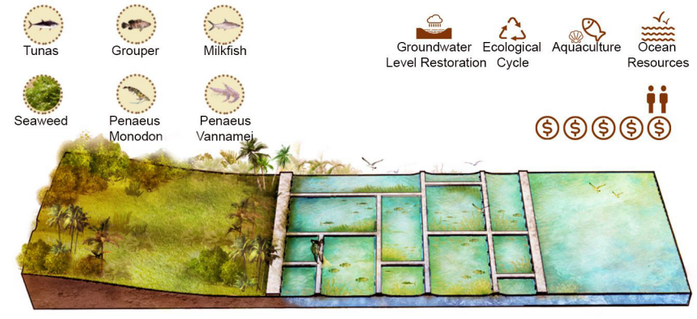

C Plain Farming Area




D Coastal Farming Area

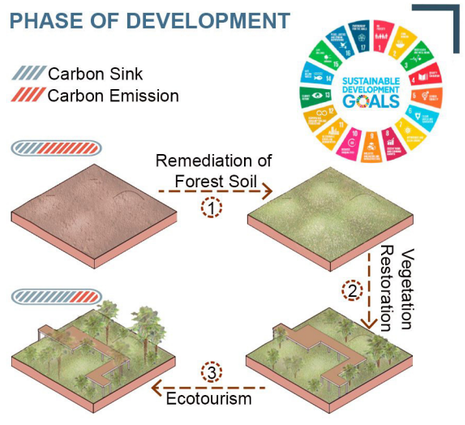



E Inland Wetland Area

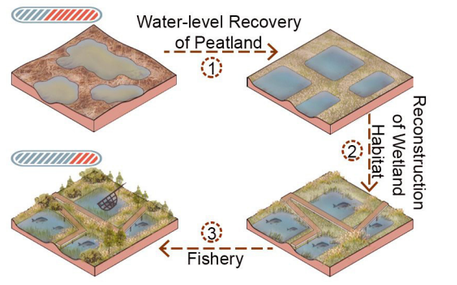



F Mariculture Area

## PHASE OF DEVELOPMENT

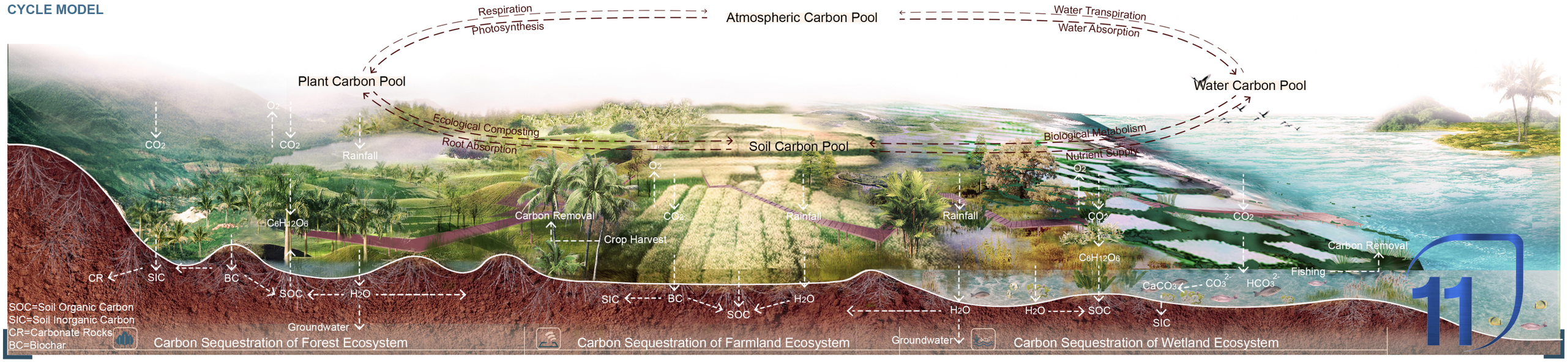



Pattern 1


Pattern 3

## CYCLE MODEL







PHASED IMPLEMENTATION

2020
Landuse

Establish
Main System

2025
Restore

Spatial
Unit Division

Regulate
Industry Balance

Ecological
Compensation

2030
Rebuild

Complete Carbon
Sequestration System

Economic and
Ecological Symbiosis

2040
Harmony

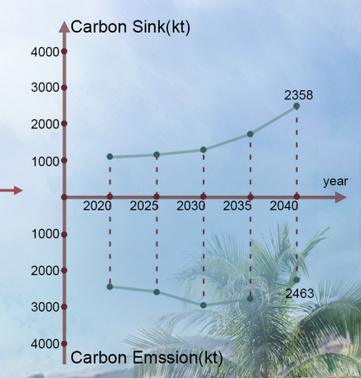
Target

Wetlands
Construction Land
Wild Woodland
Agricultural Land

Agriculture Area
Wetland Reserve
Urban Construction Area
Woodland Reserve

Agricultural Land
Addition
Urban Area
Addition
Wild Woodland
Addition
Planted Woodland

Wetlands
Addition
Urban Area
Addition
Wild Woodland
Addition




I feel suffocated by this fire.But,I have to...

The air quality is getting better, What a great thing it is!

It is a beautiful place to travel~

C2H6O

This place can turn vegetation residues into clean energy

This year's fishing industry has a good harvest!

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