

# MONTANE ETHNOBOTANY GARDEN ON A SUBTROPICAL ISLAND

Wulin Farm  
24° 22' 59" N 121° 18' 9" E

Lu Hsin  
DIPLOMA, AHO, Spring 2023

*A Montane ethnobotany garden on a subtropical island is a place that tell the story of different montane plants. The origin of plant diversity is the secret of nature hidden on the island of Taiwan.*

## **1. TRANSFORMATION OF MOUNTAIN AGRICULTURE**



Montane Ethnobotany Garden  
on a Subtropical Island

## STRUCTURE

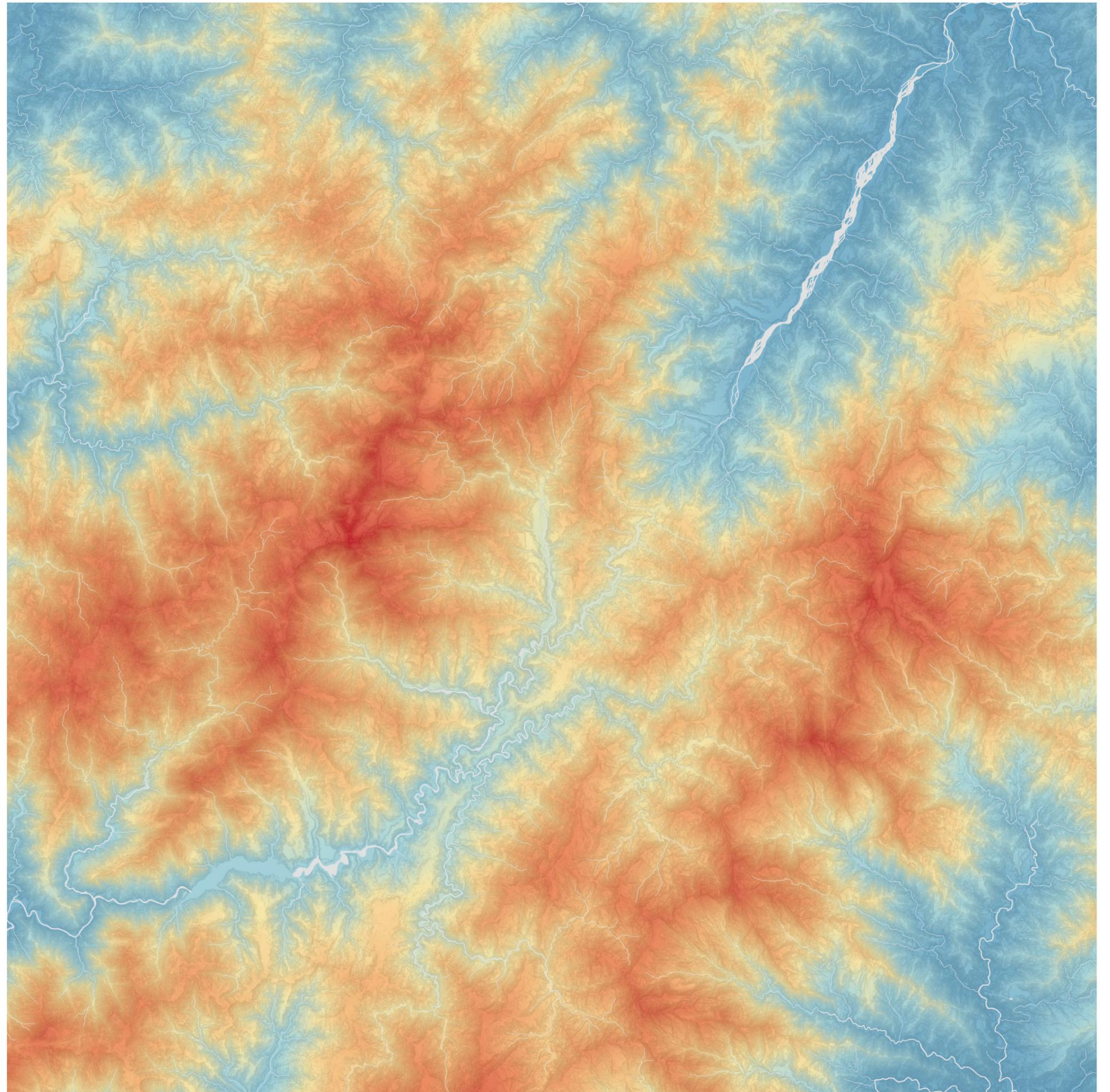
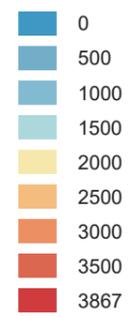
45 x 45 1:75 000 A1,  
*Aerial photo*



0 5 10 km.

## STRUCTURE

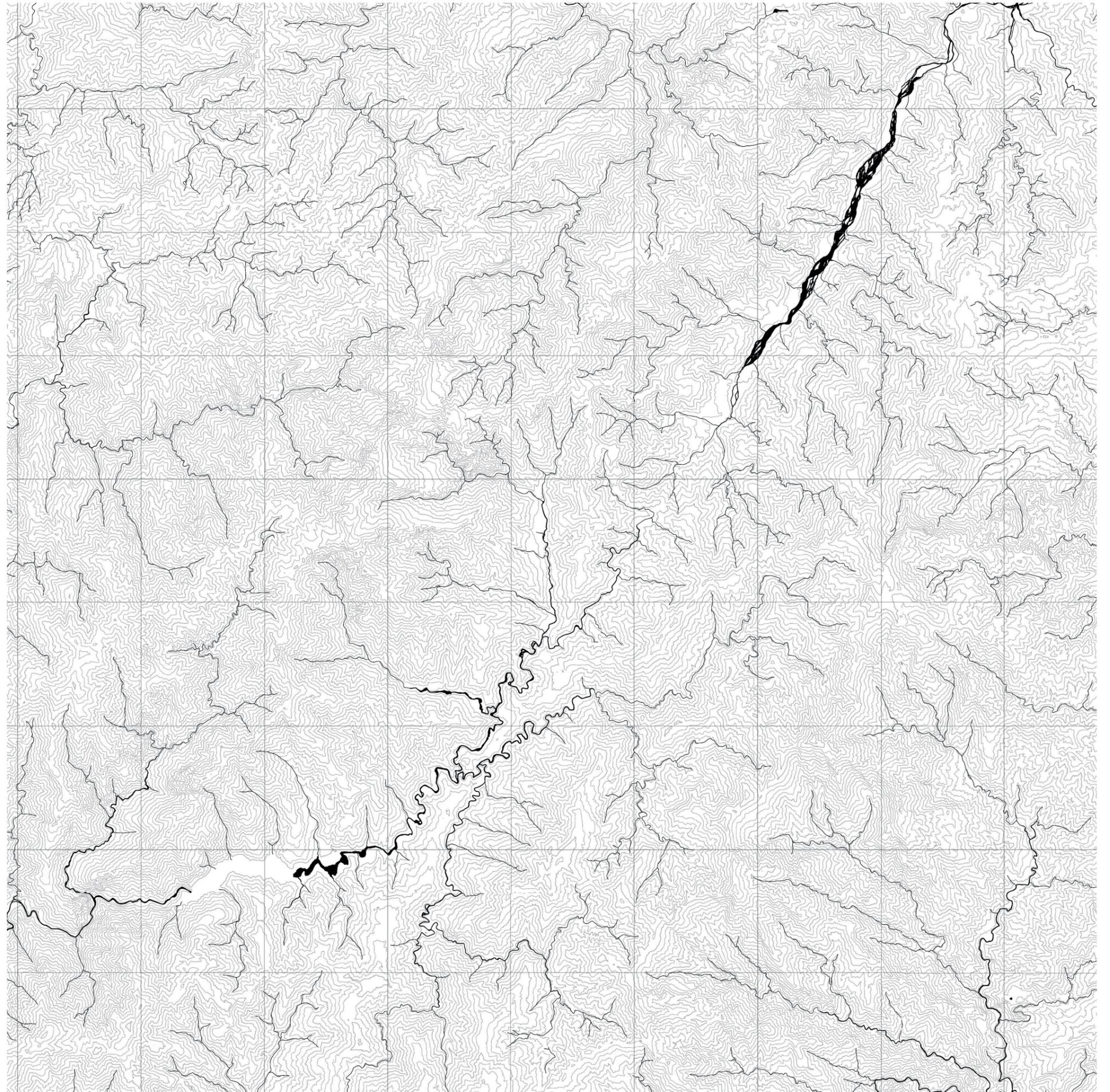
45 x 45 1:75 000 A1,  
*Topography*



0 5 10 km.

**STRUCTURE**

45 x 45 1:75 000 A1,  
*Hydrology*

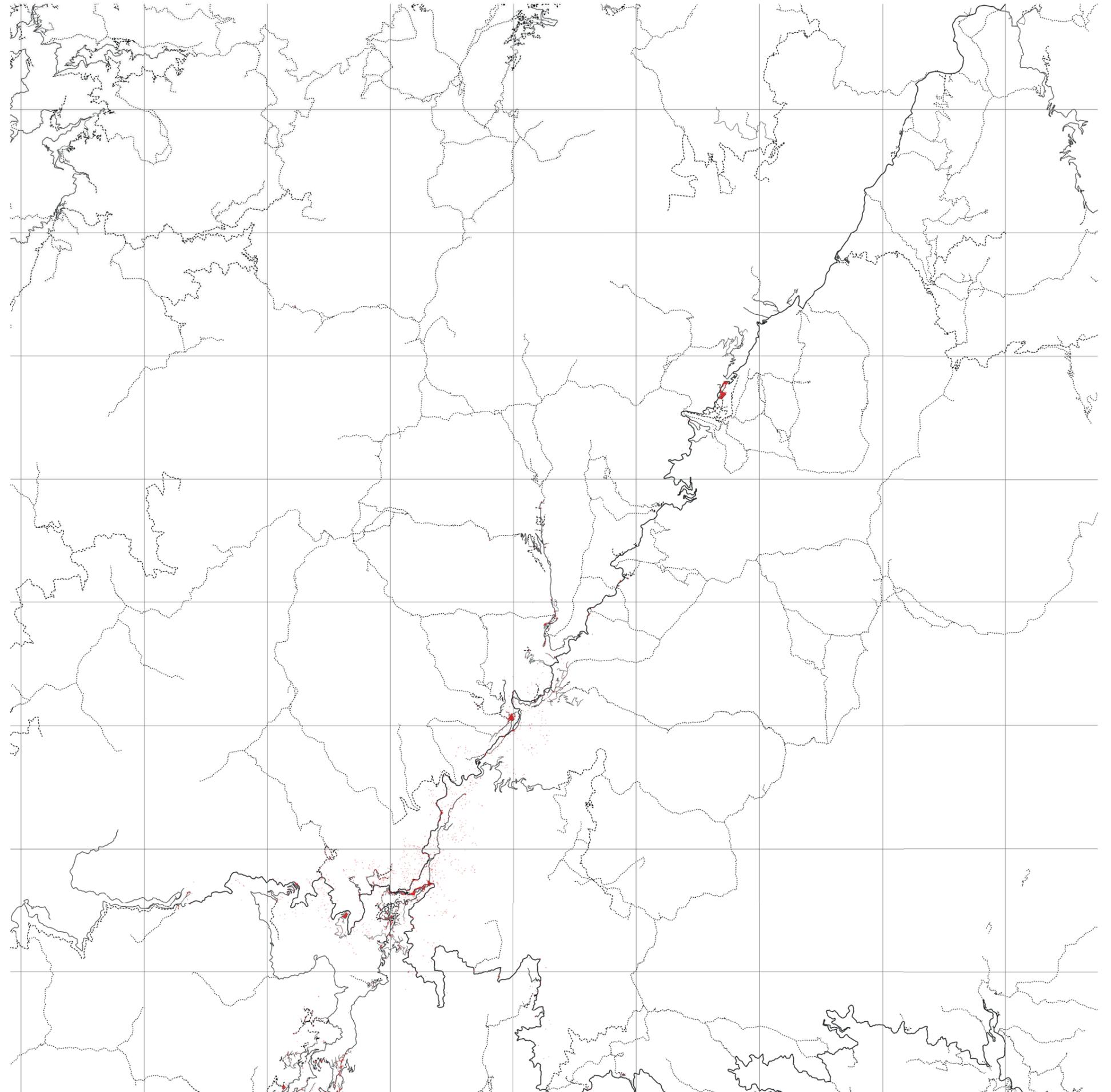


0 5 10 km.

## STRUCTURE

45 x 45 1:75 000 A1,  
*Mobility*

- Building
- Primary
- Primary link
- Secondary
- Tertiary
- Roads
- Service
- Pedestrian
- Living street
- Track
- Trails

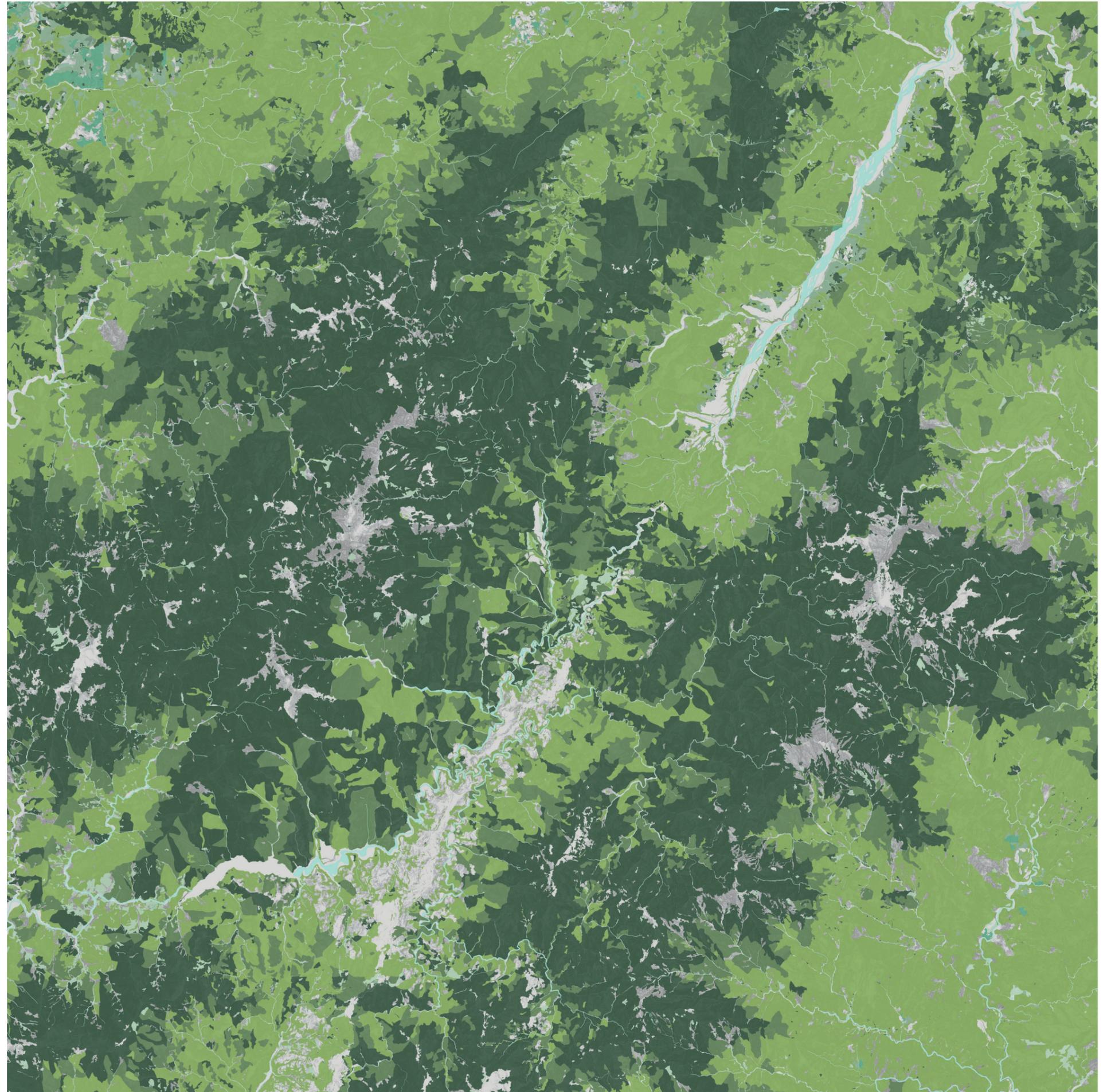


0 5 10 km.

## STRUCTURE

45 x 45 1:75 000 A1,  
*Forest Landcover*

-  Streams
-  Bamboo
-  Bamboo and coniferous forest
-  Bamboo and mixed forest
-  Bamboo and Broad-leaf forest
-  Pending forest
-  Coniferous forest
-  Mixed forest
-  Bare land
-  Broad-leaf forest

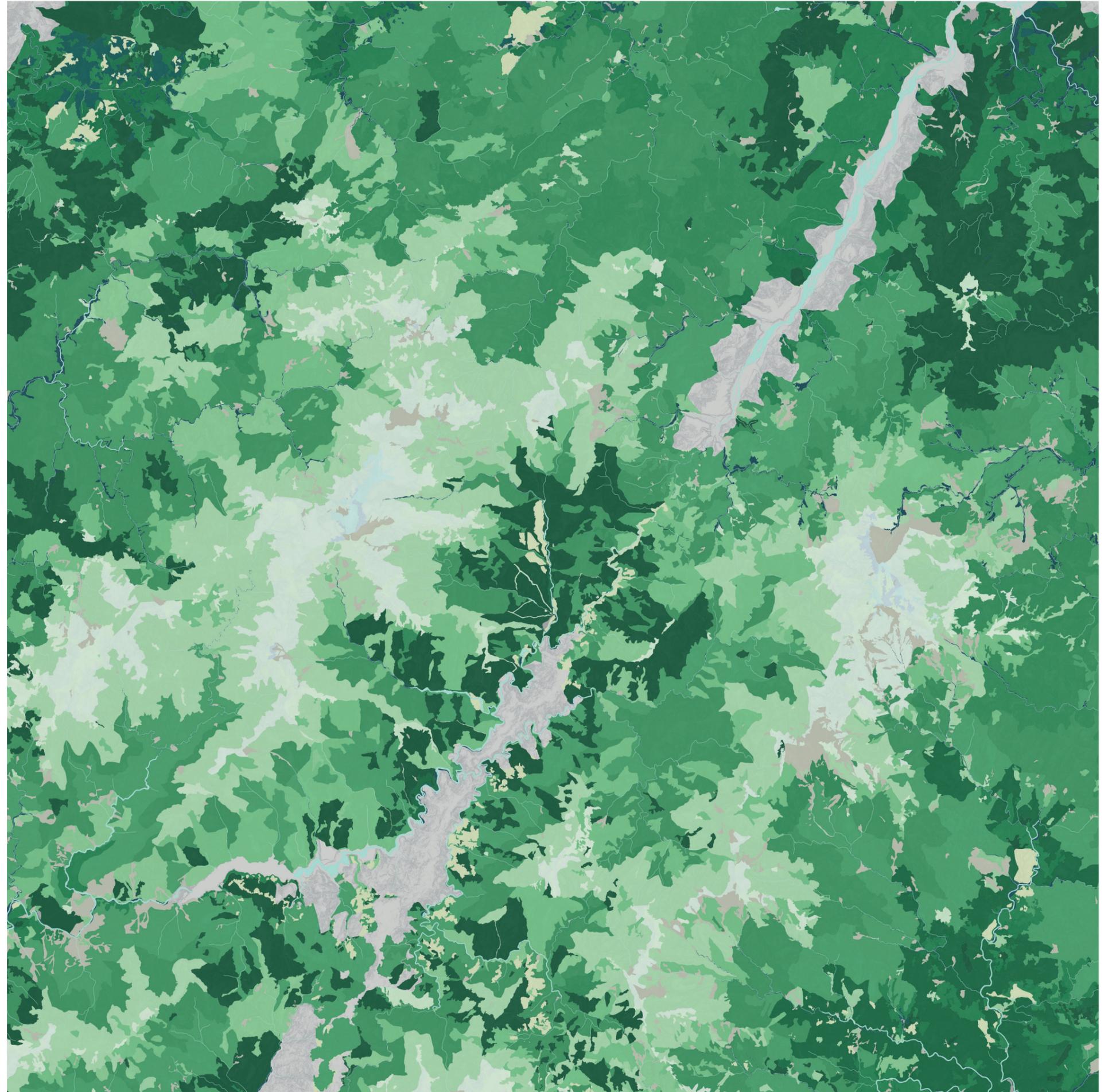


0 5 10 km.

## STRUCTURE

45 x 45 1:75 000 A1,  
Vegetation

-  Streams
-  Buildable land
-  Natural bare land
-  Arable land
-  Alpine herbaceous vegetation
-  Alpine conifer-hardwood scrub
-  Subalpine coniferous forest
-  Subalpine conifer-hardwood scrub
-  Subalpine herbaceous vegetation
-  Subalpine rock-outcrop vegetation
-  Upper-montane mixed forest
-  Upper-montane coniferous forest
-  Upper-montane semi-deciduous forest
-  Upper-montane semi-mixed forest
-  Upper-montane semi-coniferous forest
-  Montane evergreen broad-leaved brushwood
-  Montane evergreen broad-leaved cloud forest
-  Montane mixed forest
-  Montane coniferous forest
-  Sub-montane evergreen broad-leaved forest
-  Sub-montane broad-leaved scrub
-  Sub-montane herbaceous vegetation
-  Sub-montane rock-outcrop vegetation
-  Sub-montane semi-evergreen broad-leaved forest
-  Sub-montane deciduous semi-broad-leaved forest
-  Sub-montane deciduous broad-leaved forest
-  Lowland evergreen broad-leaved forest
-  Artificial bare land
-  Plantation
-  Bamboo
-  Water plants

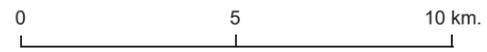
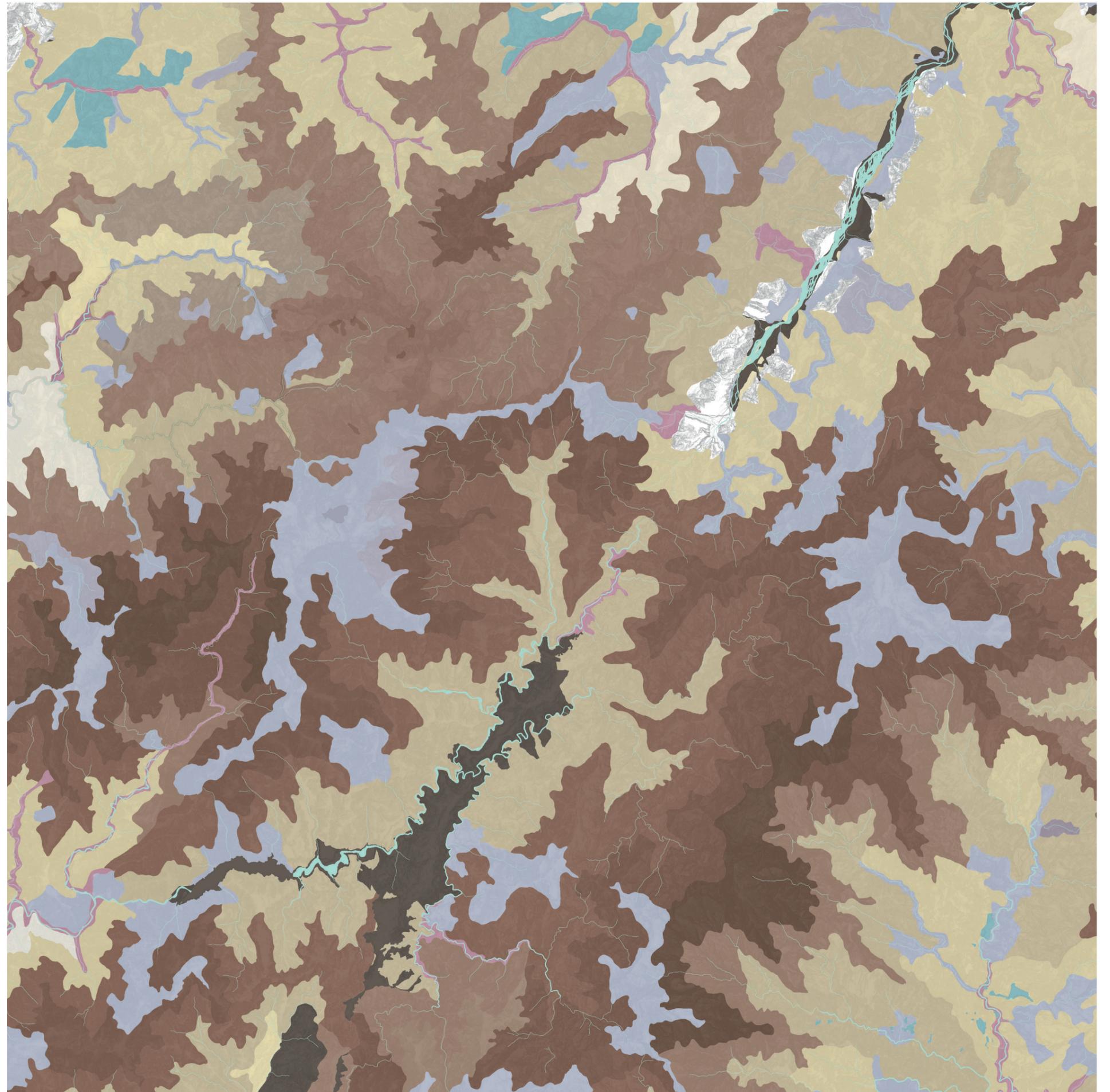


0 5 10 km.

Montane Ethnobotany Garden  
on a Subtropical Island

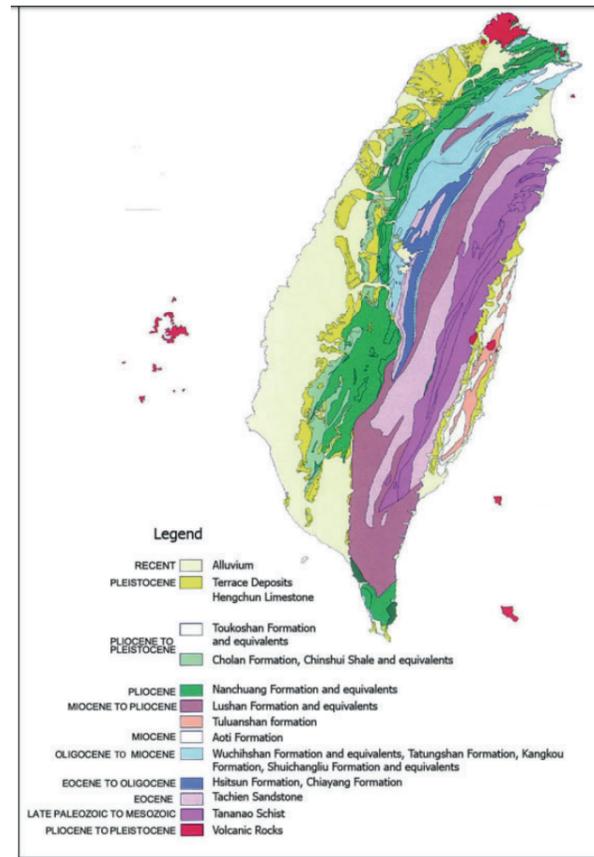
**STRUCTURE**

45 x 45 1:75 000 A1,  
Soil

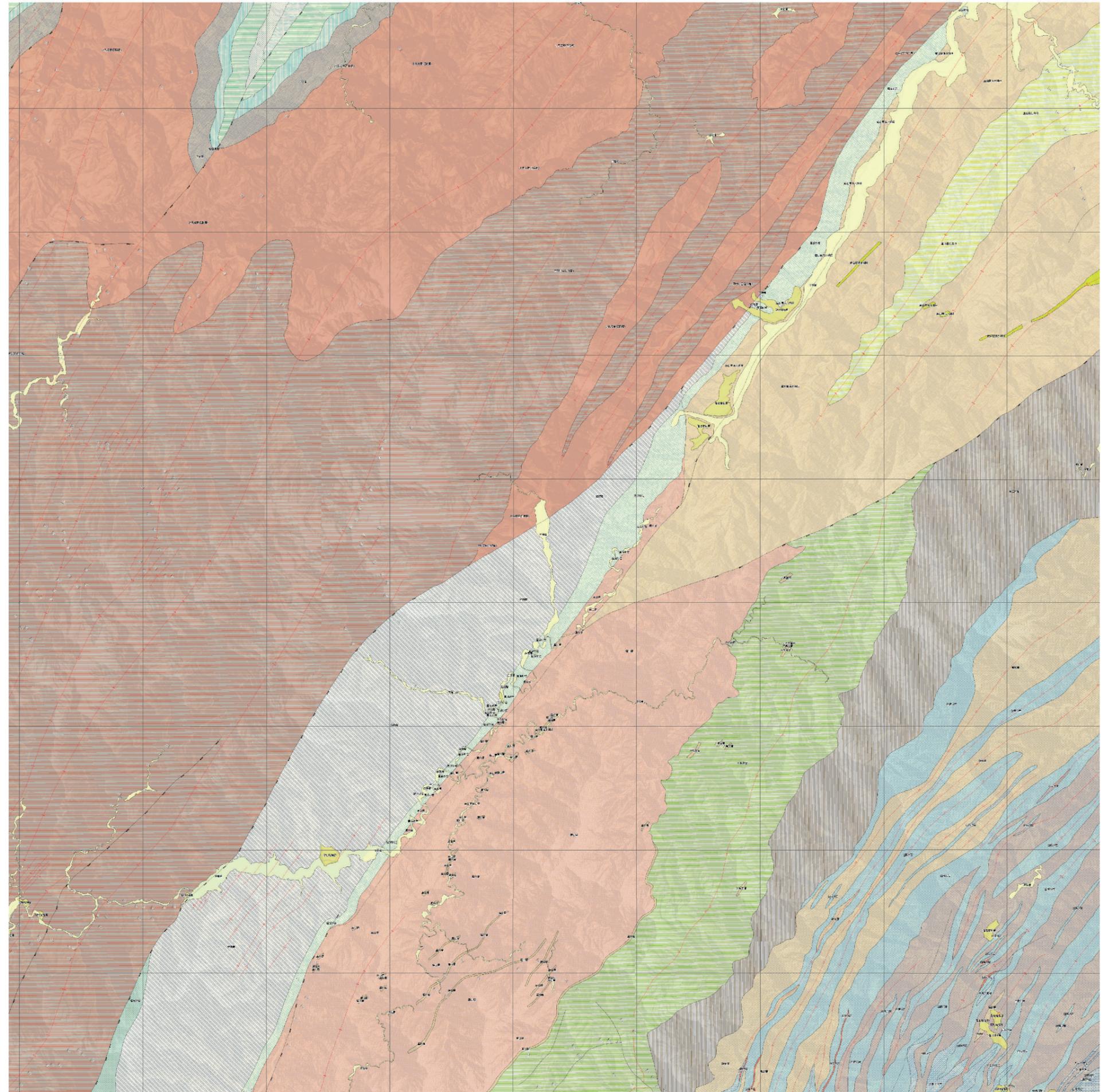


## STRUCTURE

45 x 45 1:75 000 A1,  
Bedrock



Geological map of Taiwan (Source redrawn from Taiwan Central Geological Survey)



0 5 10 km.



Orchard Cultivation



*Pyrus pyrifolia*



*Amygdalus persica*



*Malus domestica*



*Diospyros kaki*



Vegetable Cultivation



*Brassica oleracea* var. *capitata*



*Camellia sinensis*

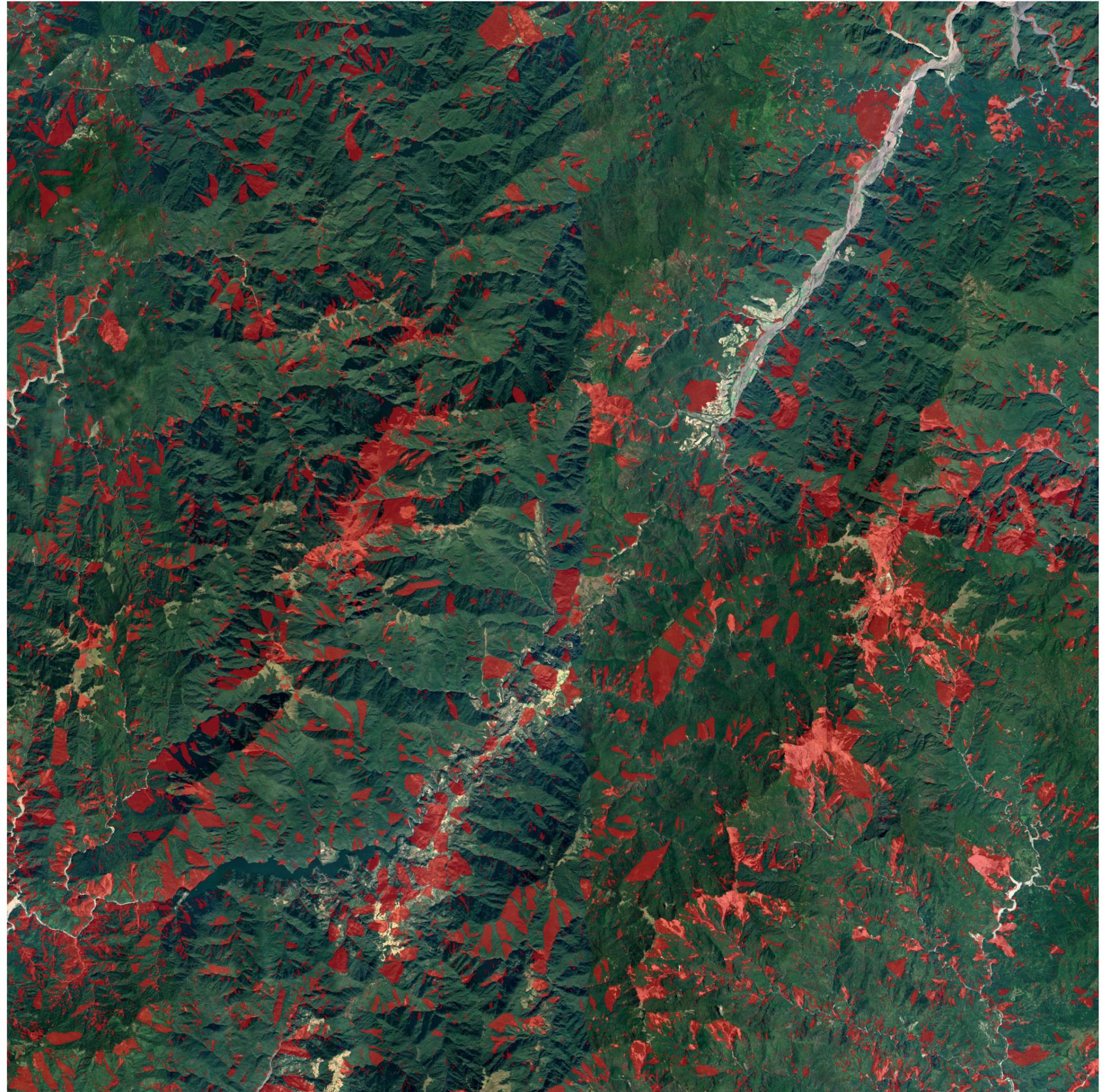


*Allium sativum*



*Cirsium kawakamii* Hayata

**LANDSLIDE AND GEOLOGICAL  
SENSITIVE AREA**



Montane Ethnobotany Garden  
on a Subtropical Island



REFORESTATION



2010

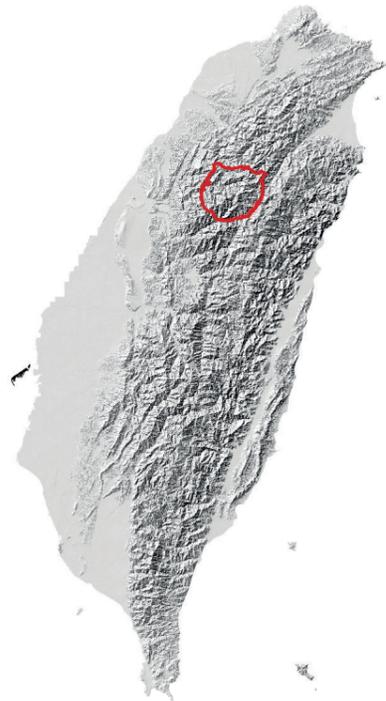


2018

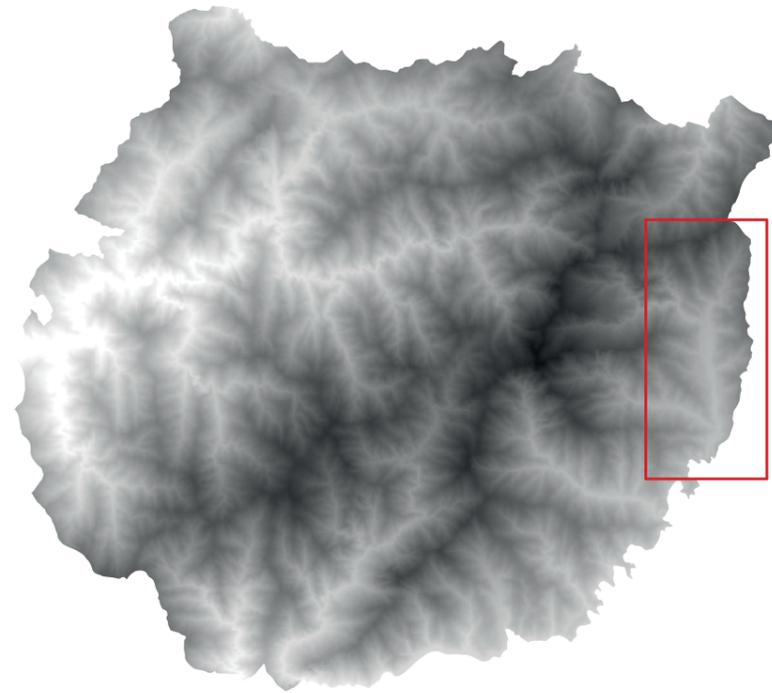
## 2. WULIN FARM

Montane Ethnobotany Garden  
on a Subtropical Island

*Taiwan*



*Shei-Pa National Park*



*Wulin Farm*



*Elevation (m)*



**Montane Ethnobotany Garden  
on a Subtropical Island**



Montane Ethnobotany Garden  
on a Subtropical Island

SITE



## HISTORY



Aerial photo of Wulin farm in spring.

4000 B.C.



Archaeological site shows a group of ethnic groups lived by the Qijiawan Stream. From the unearthed relics, there are a large number of architectural relics and tools for farming, fishing and hunting, indicating that the ancestors lived here for a long time, and farming was the main way of life.

1956



Central Cross-Island Highway was built. The Atayal settlement that originally lived here was relocated to the Huanshan tribe.

1963



Wulin farm was build for the veterans. They reclaimed the land and started the trail of planting vegetables and temperate fruit trees.

1967



Expanding the area of agricultural production, implementing agricultural mechanization, effectively improving efficiency and saving labor. Since 1981 the business has reached the goal of self-sufficiency.

1989



The farm completes the first phase of transformation plan to promote tourism and recreation such as building a campground, tea houses, gardens, hotels, and a tourist service center.

1999



The farm started to implement its second phase of transformation, starting with the construction of its second hostel. It expanded and renovated its facilities in its garden, park, camping grounds, tea, electrical system, and botanical garden.

Montane Ethnobotany Garden  
on a Subtropical Island

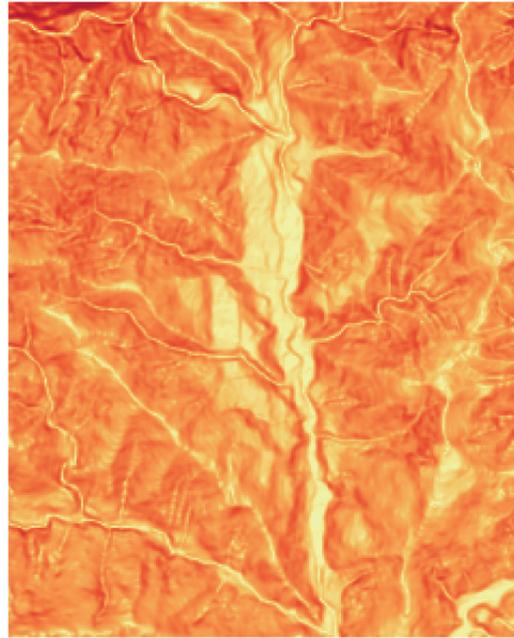


Montane Ethnobotany Garden  
on a Subtropical Island

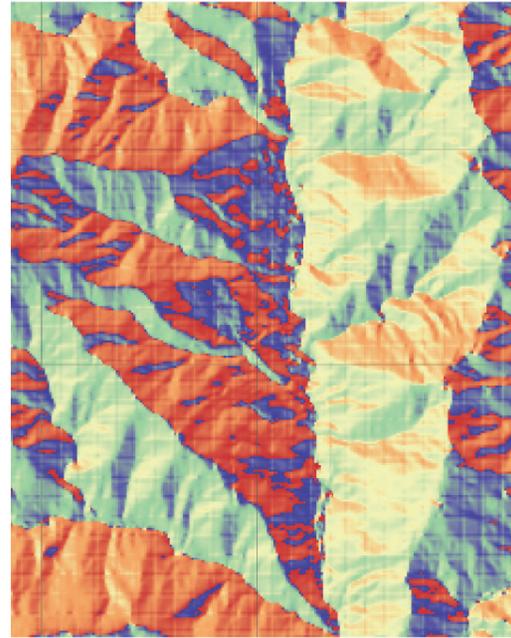
*Topography*



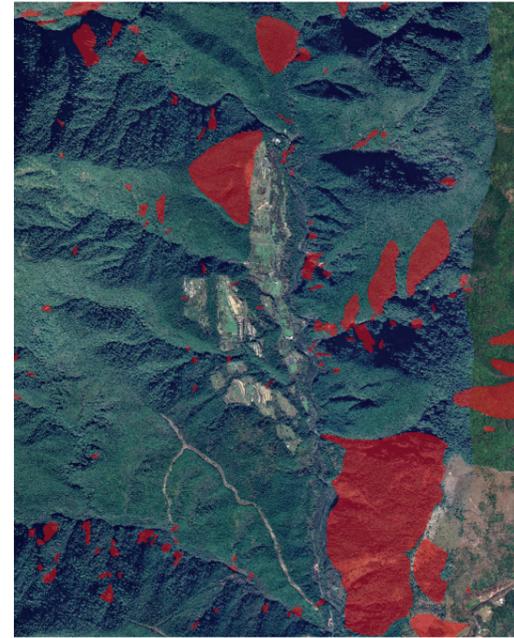
*Slope*



*Aspect*



*Geological sensitive area*

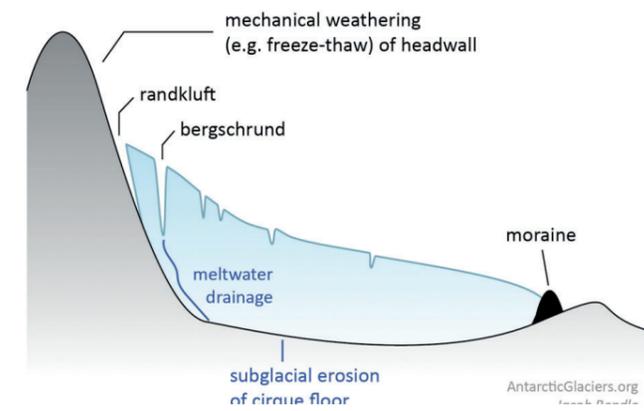
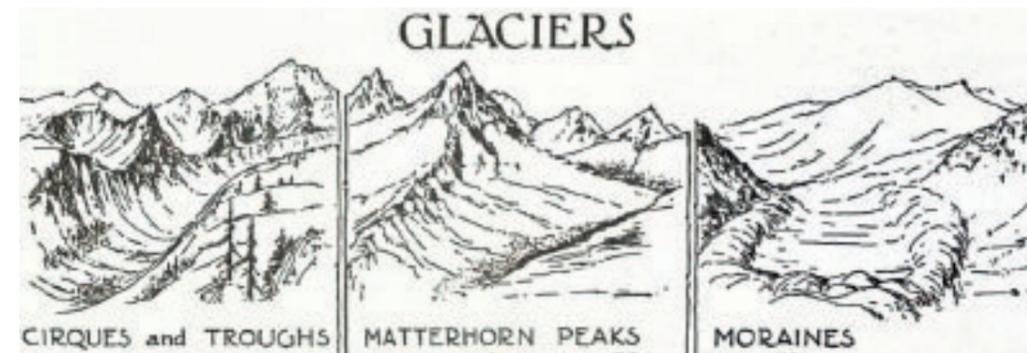


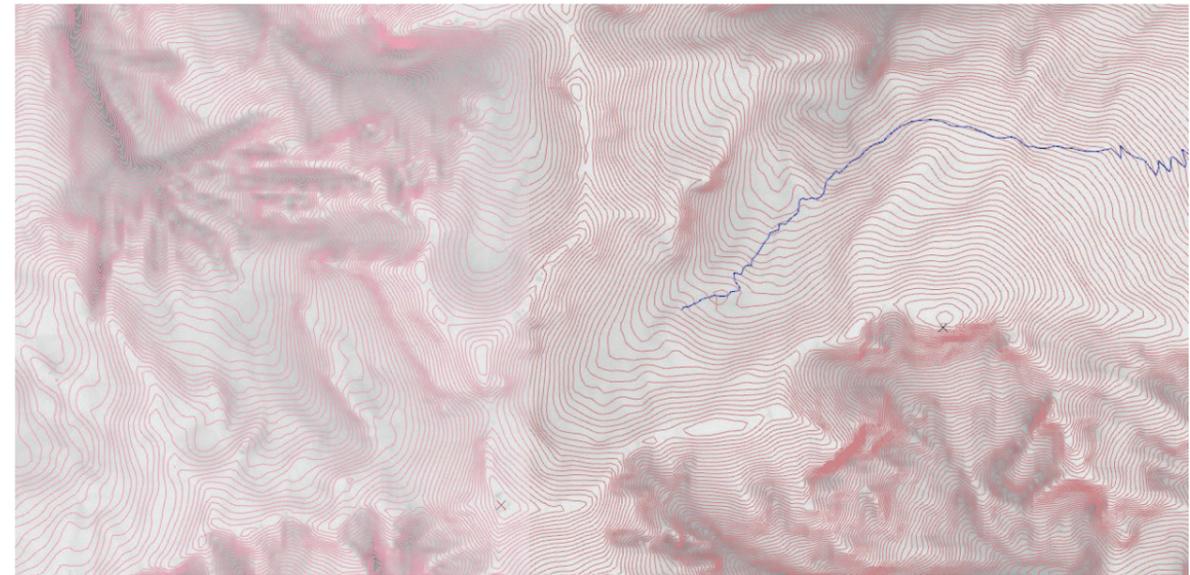
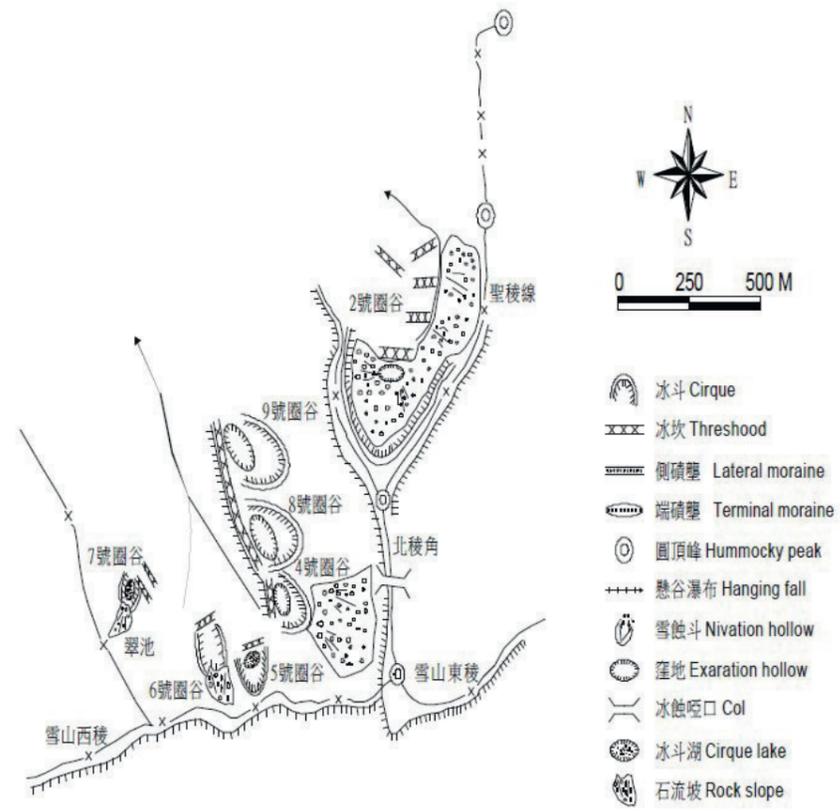
*Forest landcover*



### 3. LANDSCAPE ENTITY

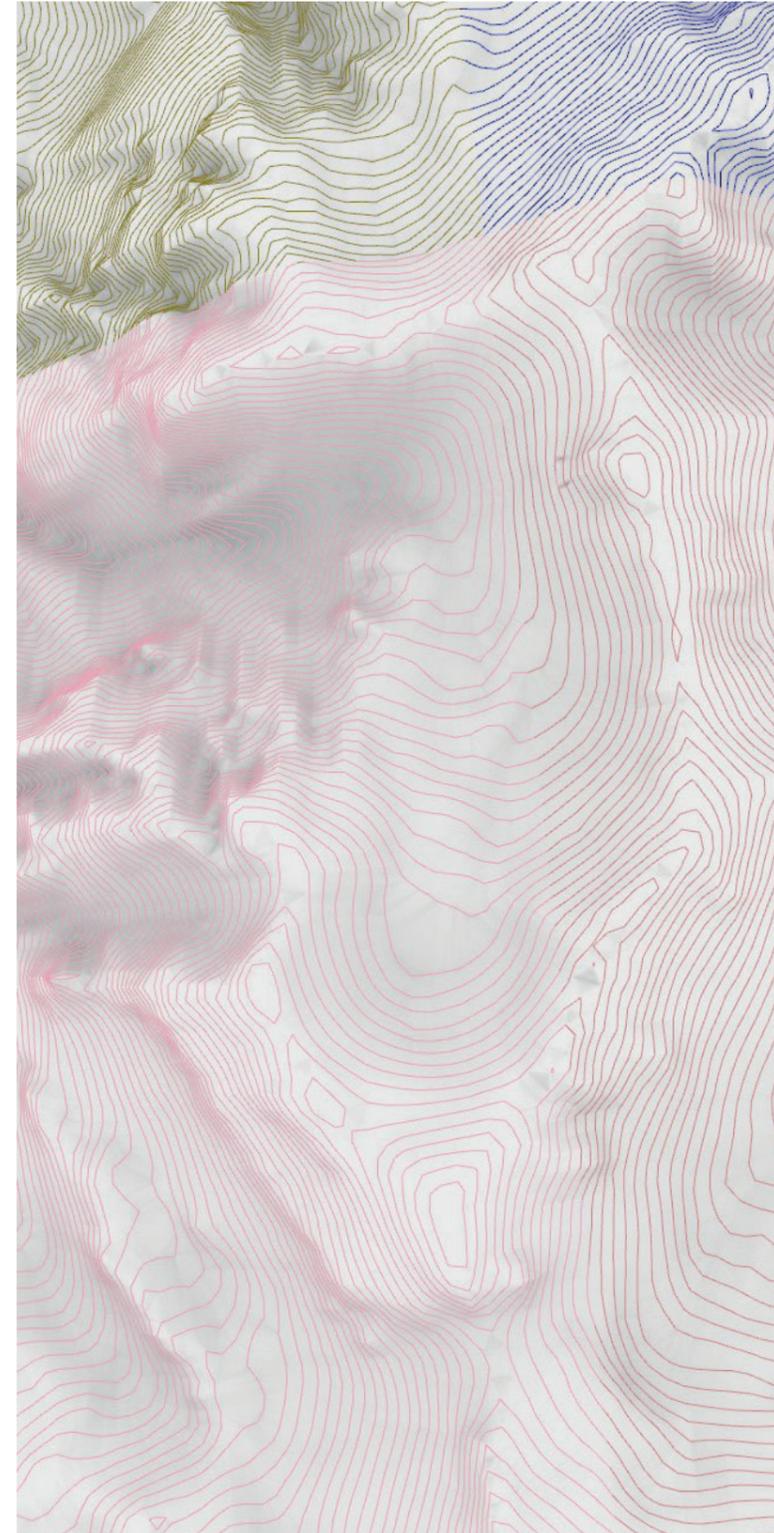
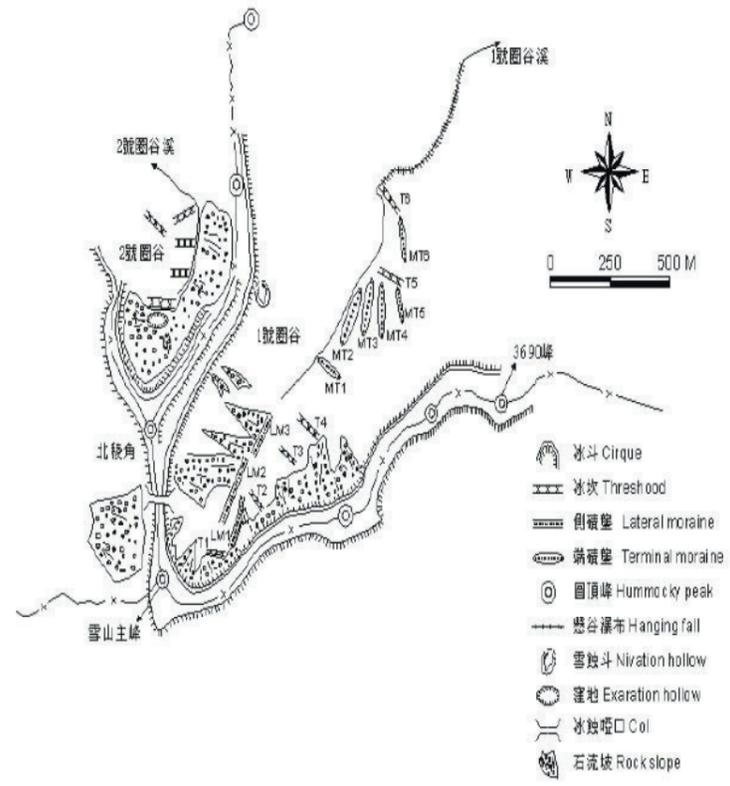
## GEOGRAPHIC ENTITY





*Landform map of snow mountain cirque*

**Montane Ethnobotany Garden  
on a Subtropical Island**



Montane Ethnobotany Garden  
on a Subtropical Island



LANDSCAPE ENTITIES



*Rock slope*



*Cirque lake*



*Cirque*



*Headwall*



*Black forest*



*Ridge*



*Alpine bamboo grass land*

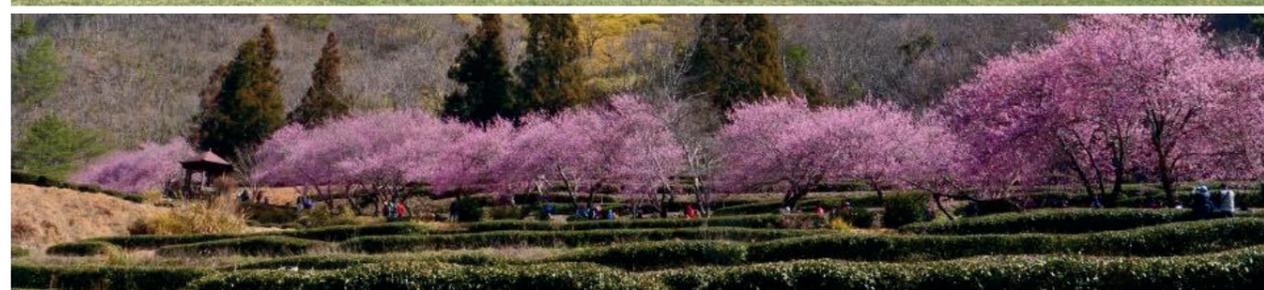


*Alpine bamboo grass land*



*Alpine bamboo grass land*

Montane Ethnobotany Garden  
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3800

3500

3200

2700

2000

*Wulin farm*

1800

1600

*Elevation (m)*

Montane Ethnobotany Garden  
on a Subtropical Island



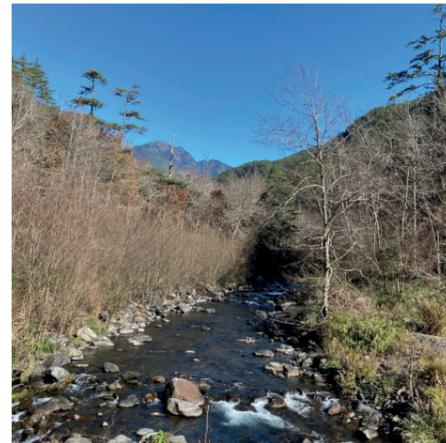
7. Camping area



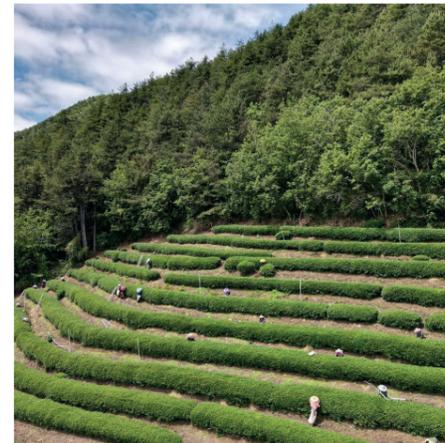
8. The alpine botanical garden



9. Flower field



4. Cijiaawan river



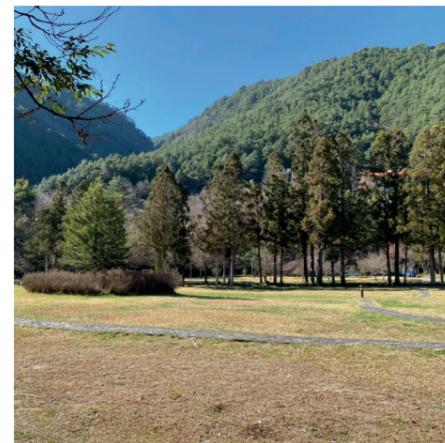
5. Tea garden



6. Orchards



1. Visitor Center



2. Pine Avenue

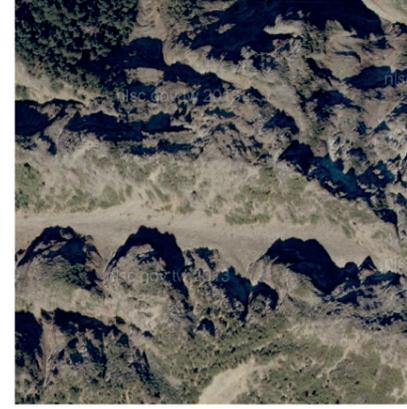


3. Bird watching trail

## LANDSCAPE ENTITIES

*Rocky slope*

*Headwall*



*Rhododendron pseudochrysanthum*

*Juniperus squamata*

*Rock slope*



*Threshold*



*Black forest*



*Abies kawakamii*

*Ridge*



*Juniperus squamata*

*Berberis kawakamii*

*Sedum morrisonense*

*Potentilla leuconota* D. Don

*Scabiosa lacerifolia* Hayata

*Clematis tsugetorum*

*upper Forest 2500-3000*



*Pinus armandii* Franchet var. *mastersiana*

*Picea morrisonicola*

*Tsuga chinensis*

*Trochodendron aralioides*

*Cyclobalanopsis stenophylloides*

*Quercus spinosa*

*Cirque lake*

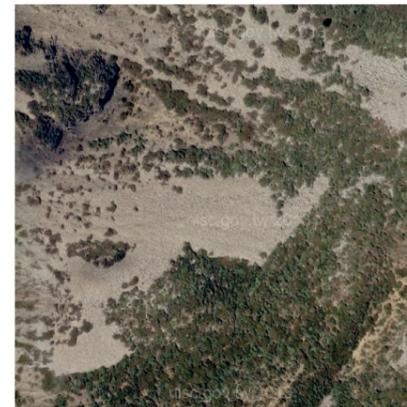


*Juniperus squamata*

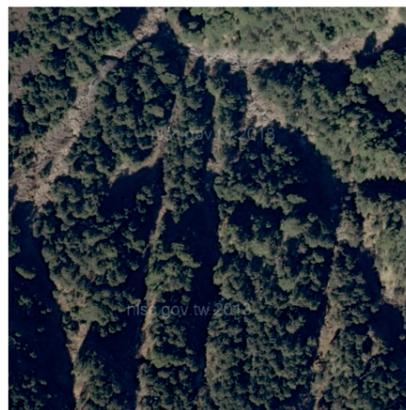
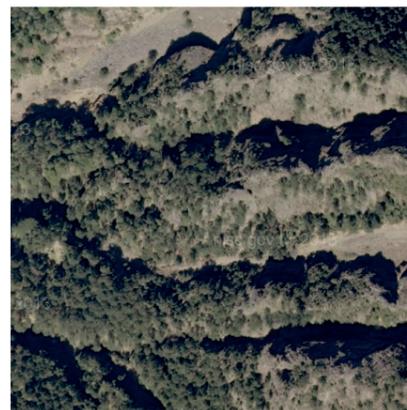
*Berberis kawakamii*

*Trochodendron aralioides*

*Scattered vegetation*



*Ravines*



*Riparian strip*



*Vegetable carpet*

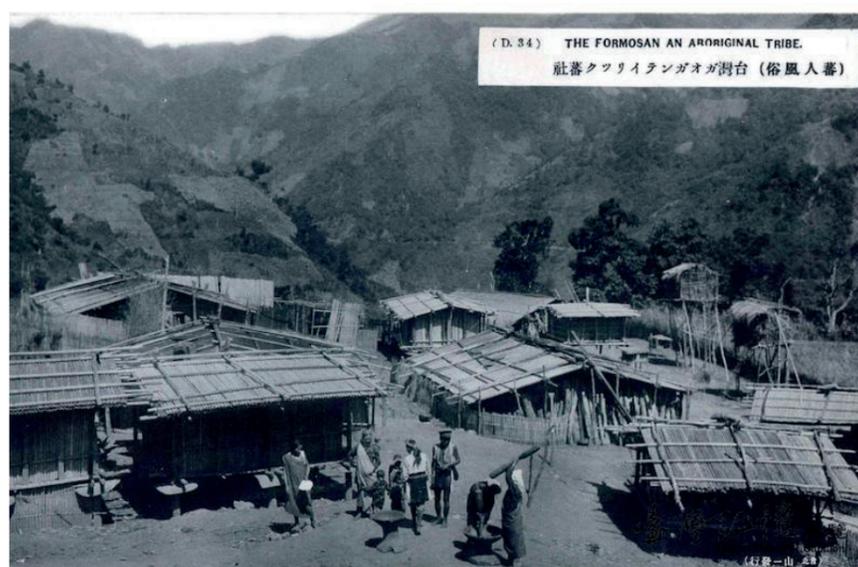


*Tea strips*

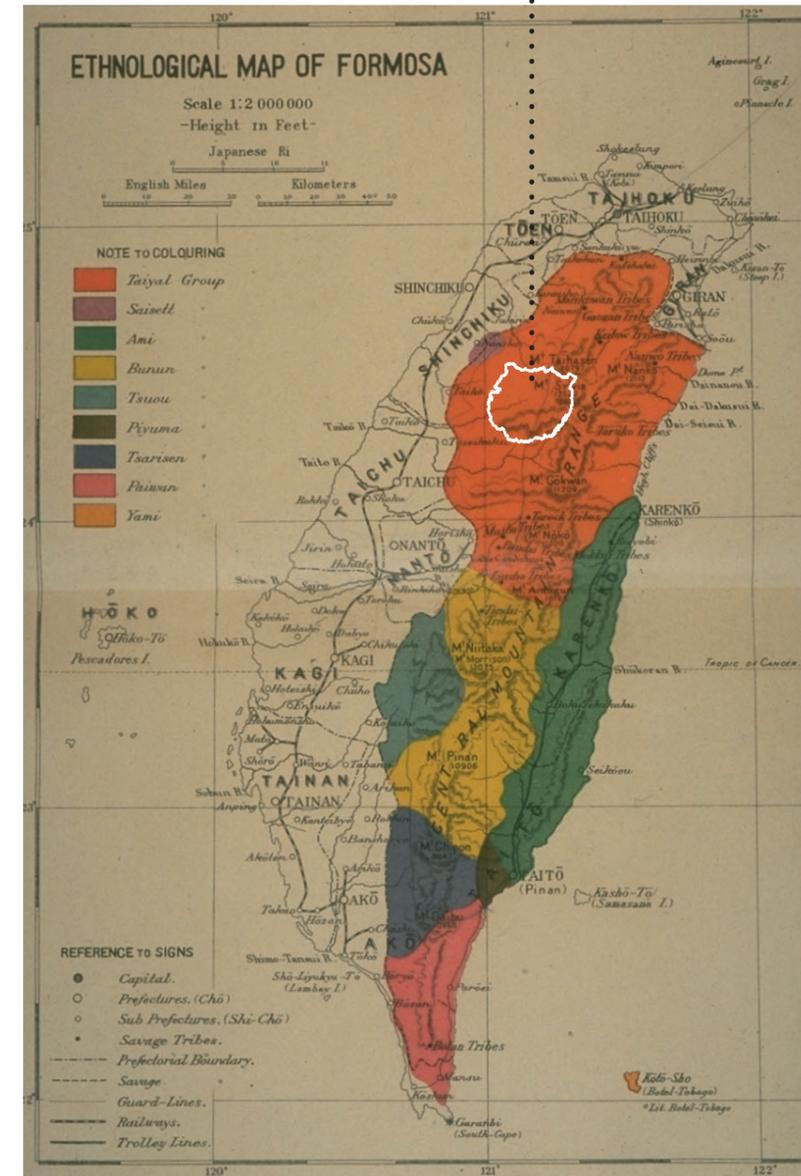


## 4. ETHNOBOTANY

Montane Ethnobotany Garden  
on a Subtropical Island



Shei-Pa National Park



Ethnobotanical Plants in Taiwan

Potential Use

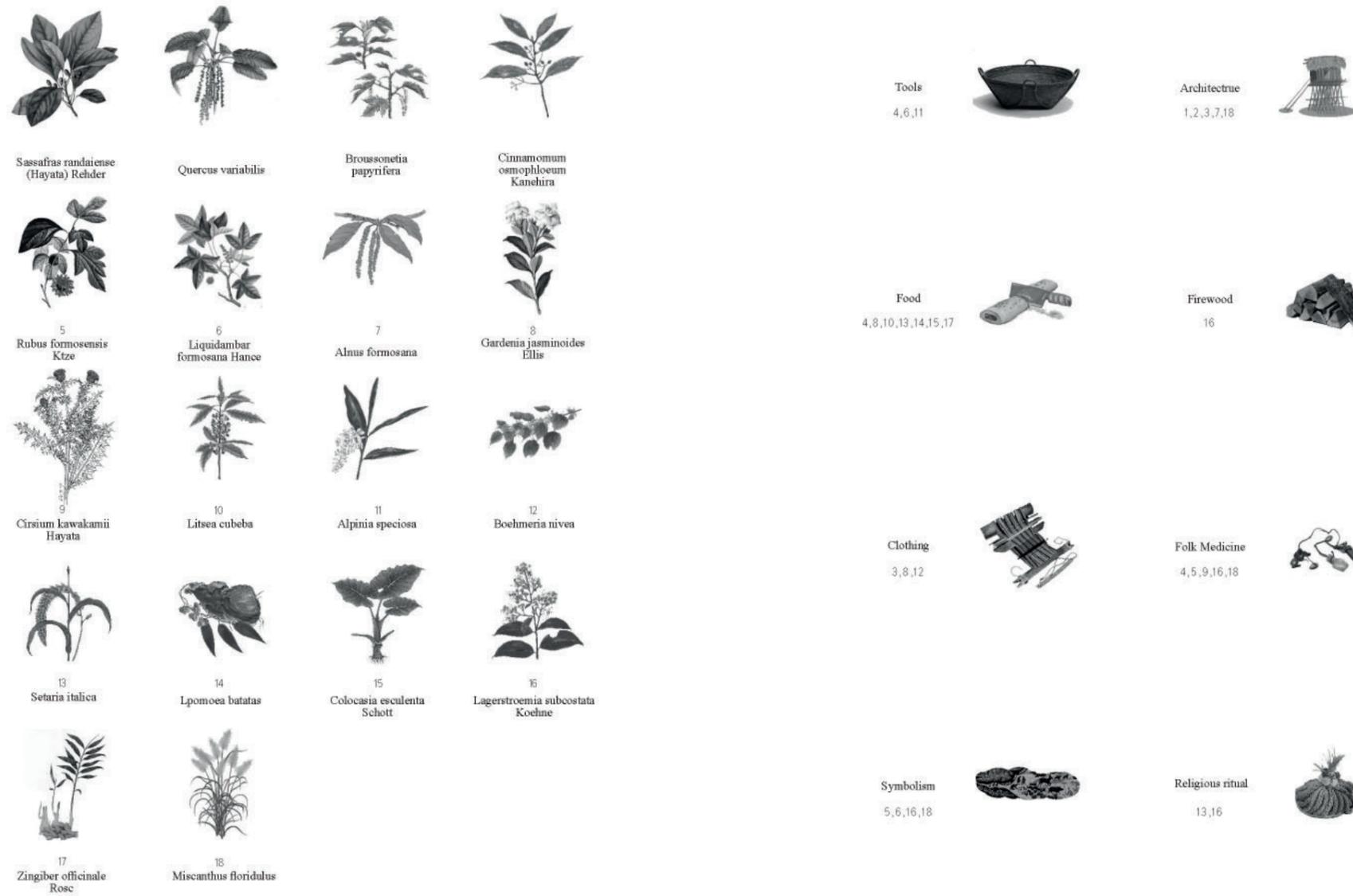


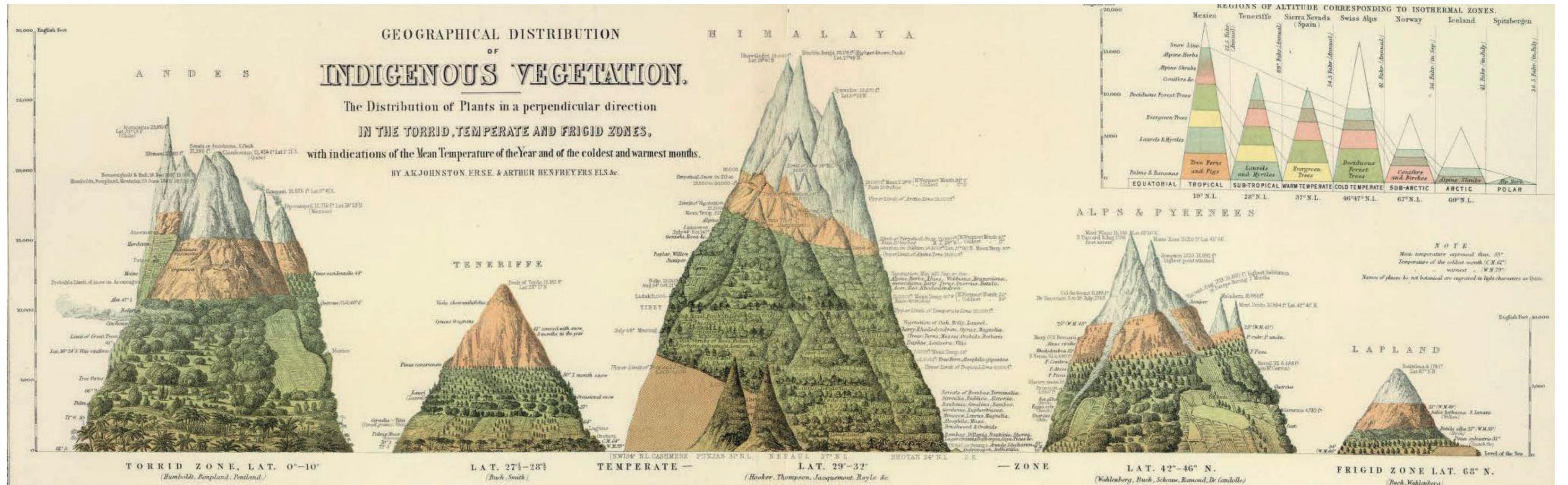
Figure 29 : A Study of the Ethnobotanical Plants from mountain indigenous tribe in Taiwan.

*A Botanical Garden is an institution with a scientific and educational vocation , intended to introduce all audiences to the world of plants, biodiversity, nature and the sustainable management of natural resources.*

*it is a space for exhibiting and preserving botanical heritage.*

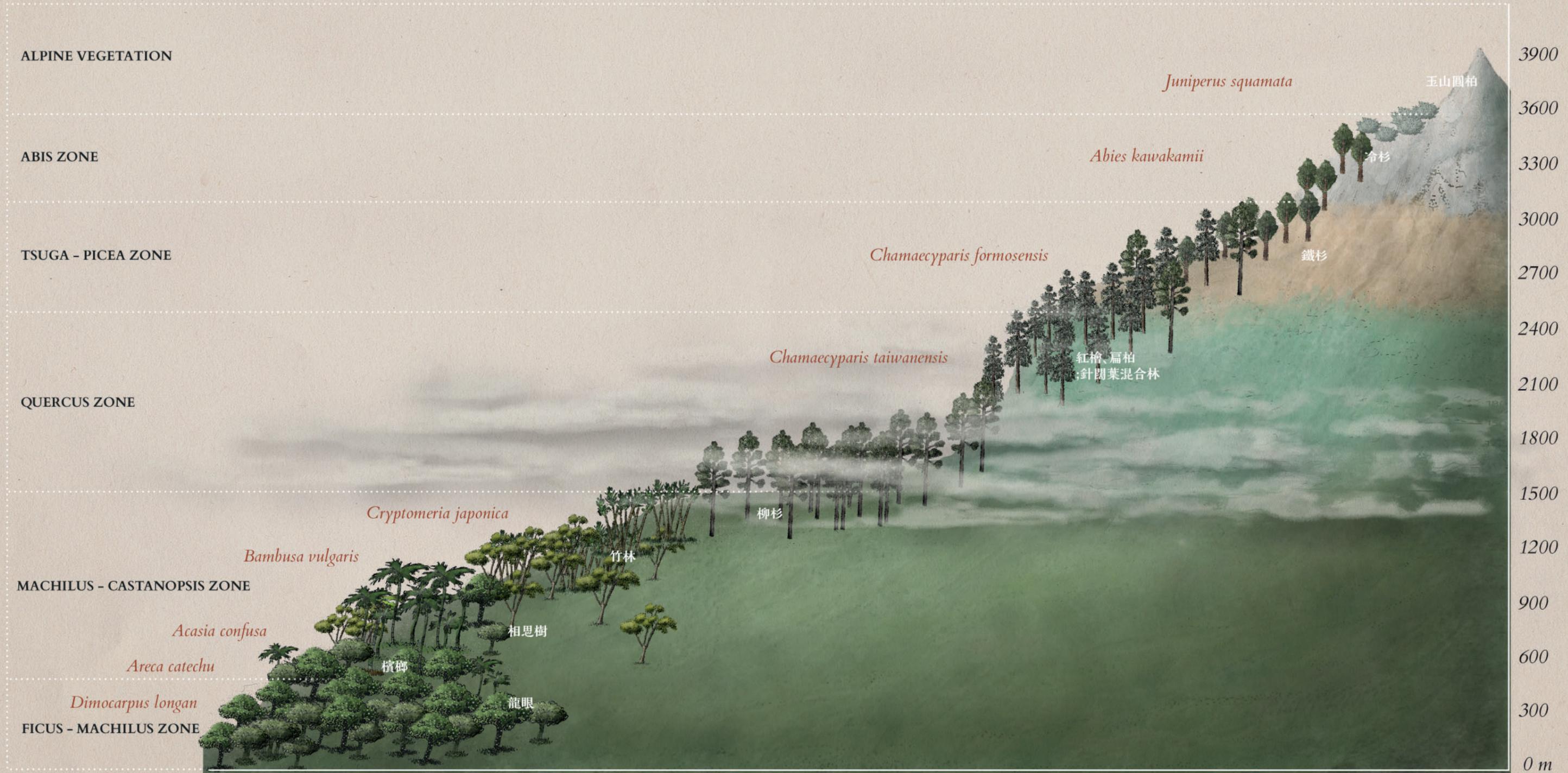
VEGETATION

*“Altitude mimics latitude” and “Everything is uncannily connected”*  
\_ Alexander Von Humboldt



The distribution of plants in a perpendicular direction  
by Alexander von Humboldt, 1817 CE

## ALTITUDINAL VEGETATION ZONES



*The evolution of endemic species reflect the process of island formation.*

There are currently 4,077 known species of native vascular plants in Taiwan, of which 1,067 are endemic, accounting for 26.2% of the species. The distribution of endemic species tends to increase with altitude, the higher the altitude, the higher the proportion of endemic species, which is quite reasonable from the perspective of plant dispersal and evolution.

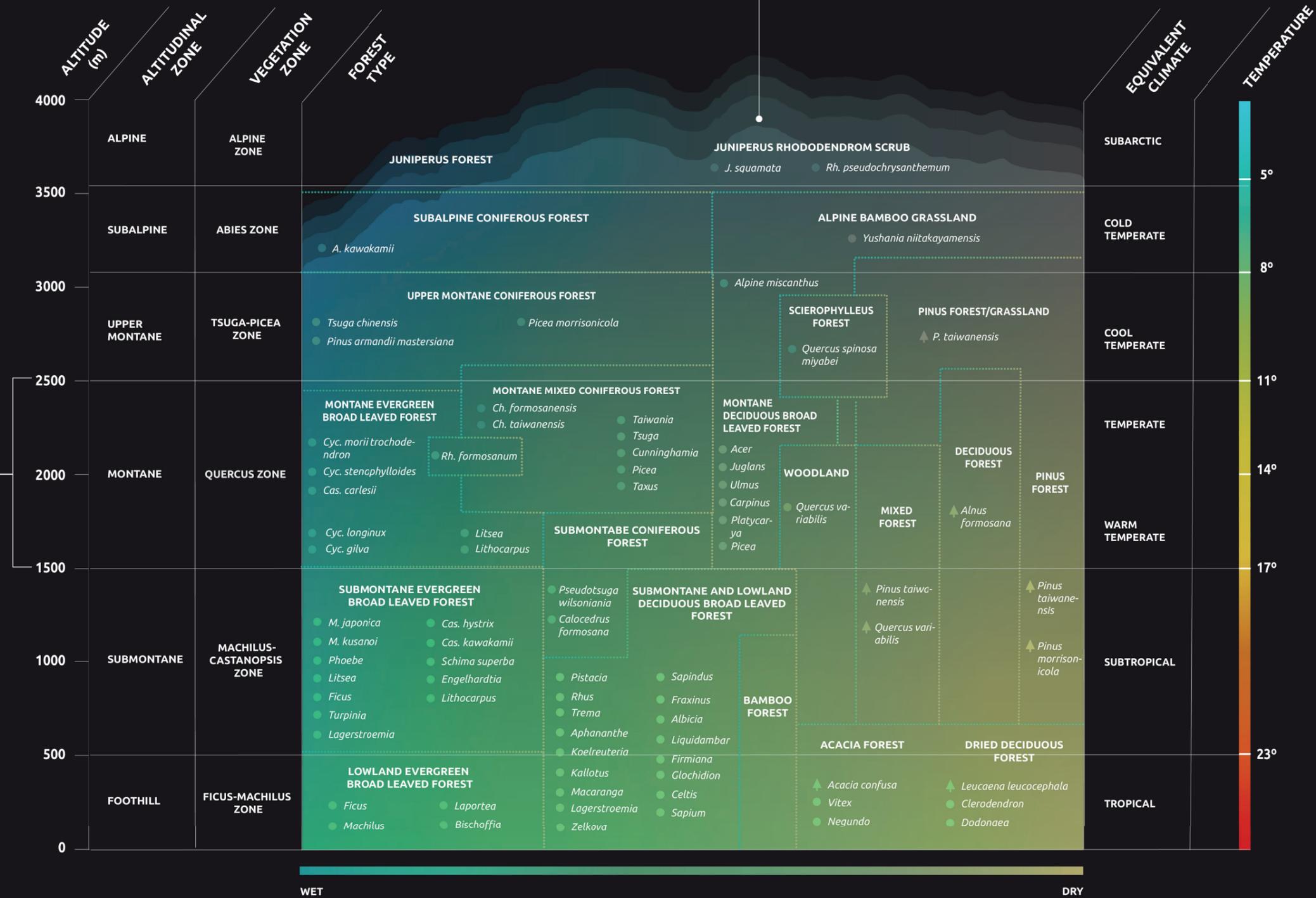
# ALTITUDINAL VEGETATION ZONES OF CENTRAL MOUNTAIN IN TAIWAN

This graphic highlights the altitudinal vegetation zones found in the central mountain region of Taiwan, with a special emphasis on the Quercus zone, as the Wuling Farm is situated within this area. As elevation increases, diverse vegetation types emerge, each adapting to their specific altitudinal range.



Xueshan 雪山  
▲ 3,886 m

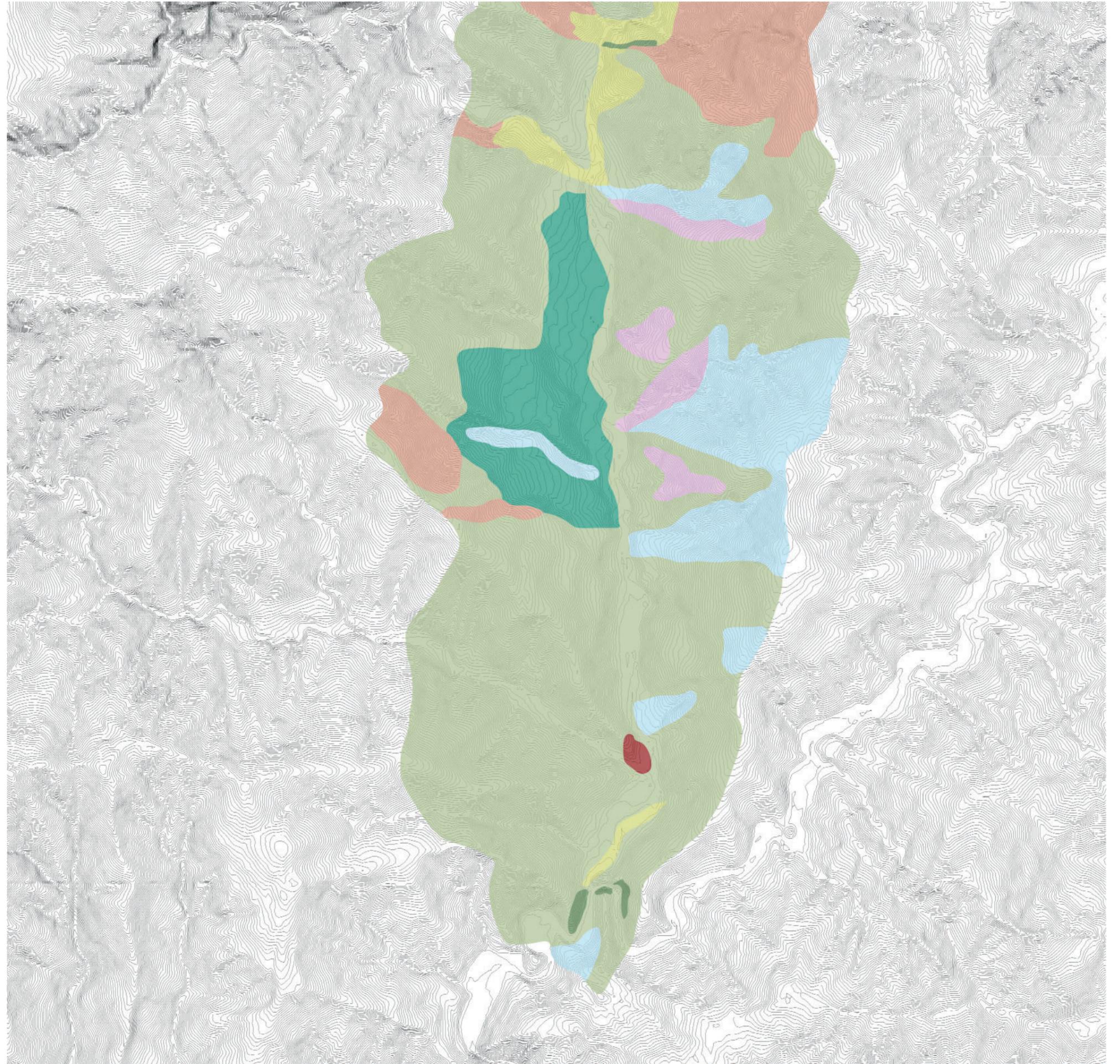
The Quercus zone is characterized by the dominance of oak trees (*Quercus* spp.), providing a unique habitat for numerous species of flora and fauna.



▲ Mountain  
● Genus  
▲ Tree species

## VEGETATION MAP OF WULING AREA

- Pinus - Miscanthus - Liquidambar
- Chamaecyparis - Cunninghamia
- Orchards and vegetable farms
- Pseudotsuga - Pasania
- Alnus formosana
- Pseudotsuga - Ulmus
- Juglans cathayensis
- Pseudotsuga wilsoniana



Montane Ethnobotany Garden  
on a Subtropical Island



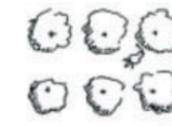
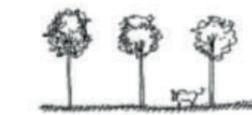




Windbreak



Contour Hedgerow



Silvopasture



Alley Cropping



Coastal Strand



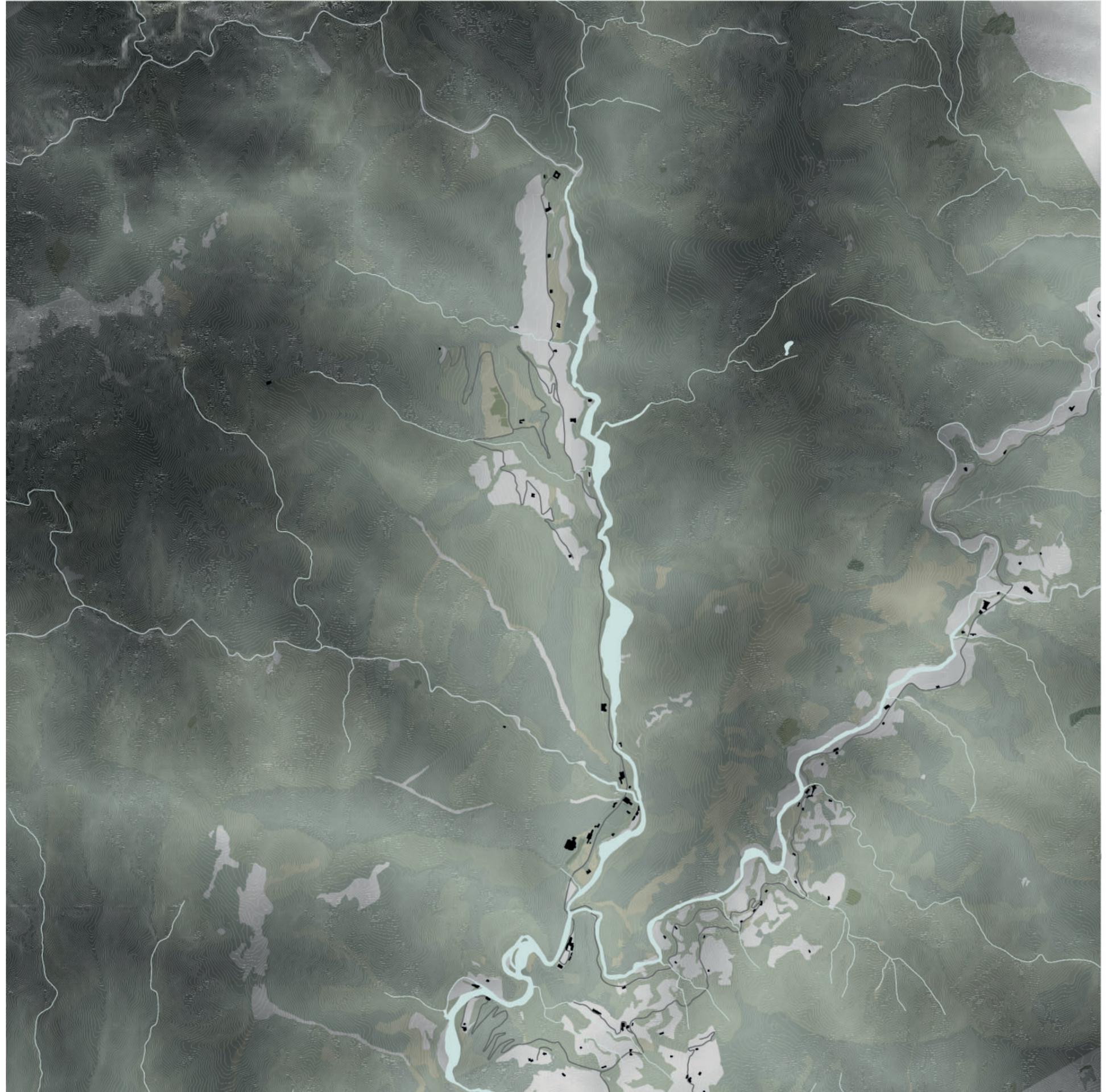
Forest Garden



Living Fence

## **5. MONTANE ETHNOBOTANY GARDEN**

Montane Ethnobotany Garden  
on a Subtropical Island



Montane Ethnobotany Garden  
on a Subtropical Island



Site Plan Sketch



*Orchards and forest gardens*



- *Conserve and promote biodiversity*
- *Forest restoration*
- *Agroforestry*
- *Rainwater harvesting*

Montane Ethnobotany Garden  
on a Subtropical Island



Montane Ethnobotany Garden  
on a Subtropical Island



## FOREST DIKES

*Prevent the landslide  
and strengthening the  
green corridors*



**Montane Ethnobotany Garden  
on a Subtropical Island**



*The montane ethnobotany garden*



- Disseminate and transmit knowledge about plants and nature.
- Show the functioning of natural environments and their evolution over time.
- Supporting scientific research.

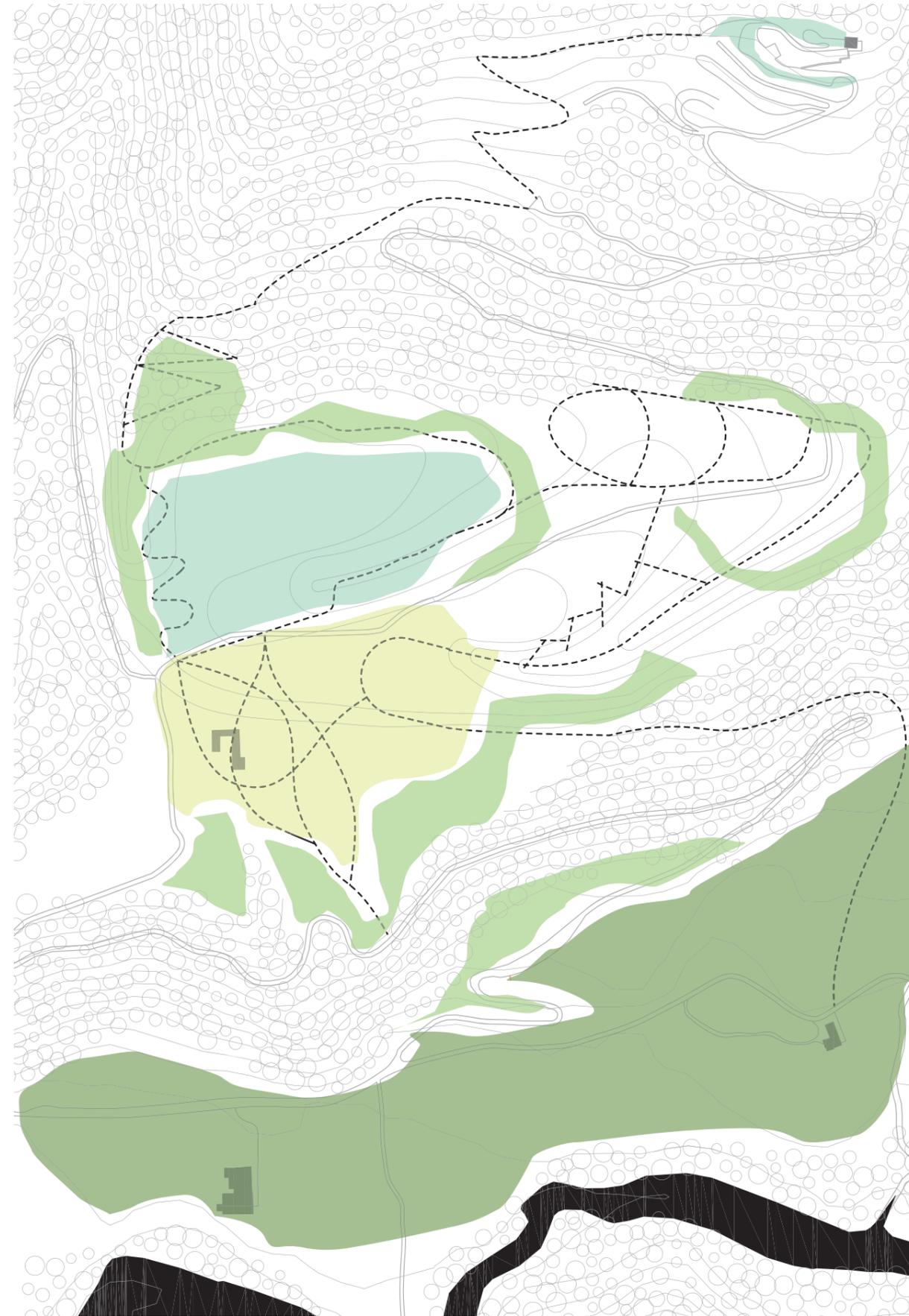
Montane Ethnobotany Garden  
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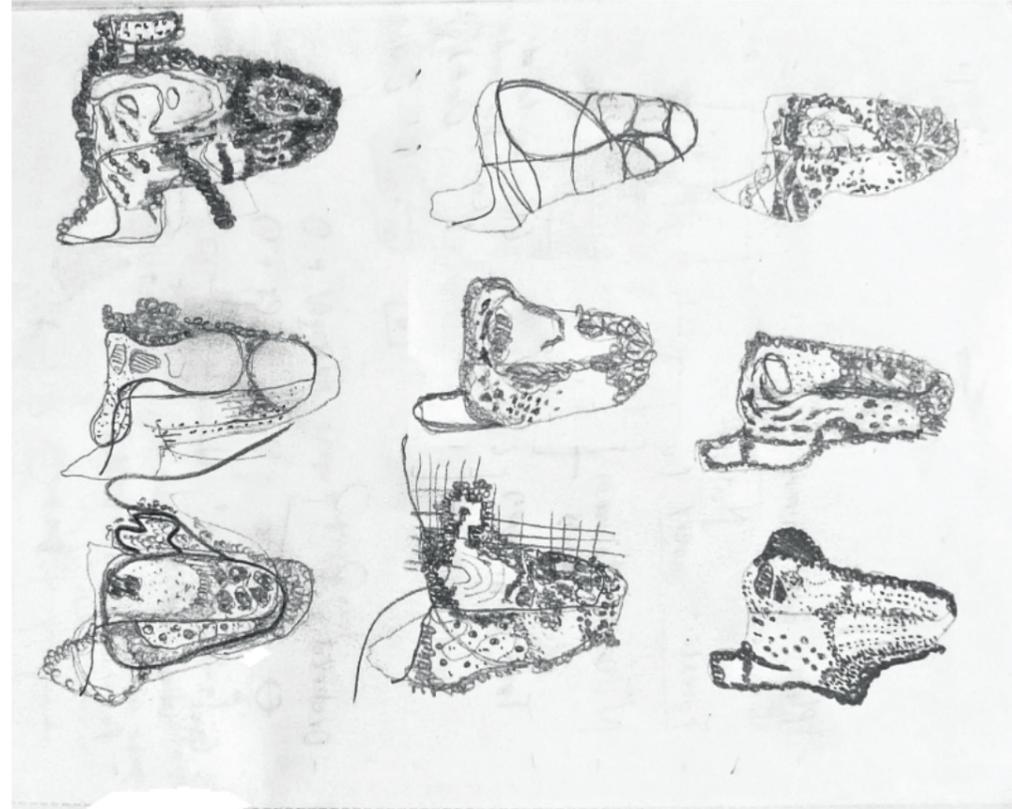
Montane Ethnobotany Garden  
on a Subtropical Island



## A GARDEN PATH



-  *Organic production*
-  *Environmental restoration*
-  *Gallery of milieu*
-  *Ethnic plants*
-  *Natural classroom*



*Sketch*

Montane Ethnobotany Garden  
on a Subtropical Island



## ENVIRONMENTAL RESTORATION

### *Forest discovery*

*A rich variety of ground-cover  
plant, shrubs, epiphytic, vines  
and a thick tree canopy make  
up the forest.*

*showcase native plant garden  
from wulin farm*

*restoration untouched forest (for  
animal)*

*recreational forest (Entrances +  
hiking trail ) for ecotourism*



## ORGANIC PRODUCTION

*Forest discovery*

*agroforestry*  
*agritourism*  
*rainwater harvest and irrigation*



*Orchard*

*prunus salicina*

*Pyrus pyrifolia*

*Amygdalus persica*

*Diospyros kaki*

*Forest garden*

*Vegetable carpet*

*Formosa Lambsquarters*

*Maize*

*Cajanus cajan*

*Ipomoea batatas*

*Cucurbita pepo*

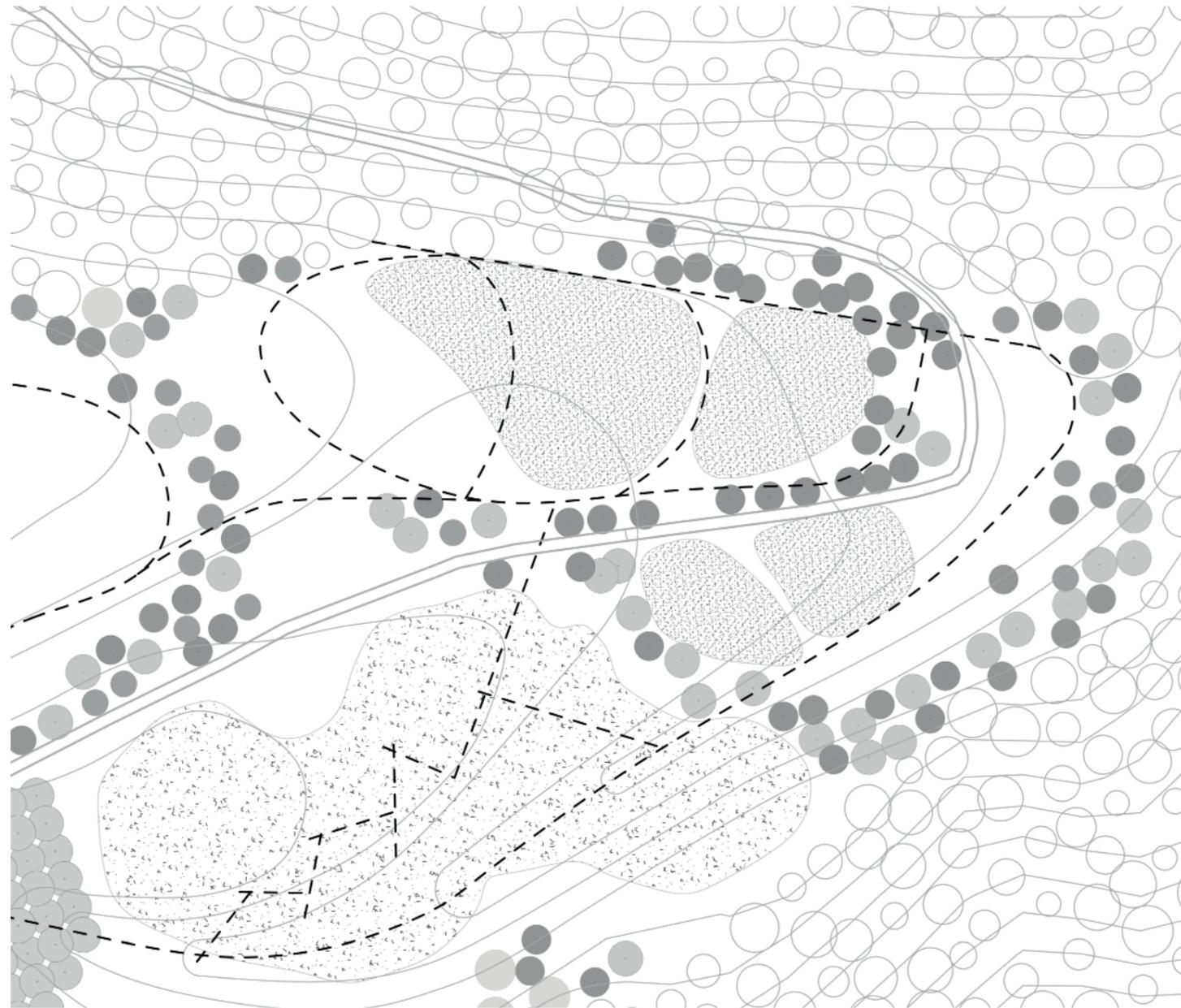
*Panicum miliaceum*

*Colocasia esculenta*

## ETHNIC PLANTS

### *Plants and human life*

*Ethnic plants- the wisdom of our ancestors can be found in the plants they utilized during times of material deficiency. Roots, stems, bark, leaves, flowers, and fruits provided food, clothing, shelter and other necessities. The plants in this area are those that were most commonly used by ancient peoples. The aim of the ethnobotany garden is to be a hub for research in ethnobotany and to provide educational opportunities for visitors. It reflects the traditional use of plants in medicine, in craft and construction, for symbolic purposes and for food.*



*Living Zone*

*Symbolism Zone*

*Medicinal Zone*

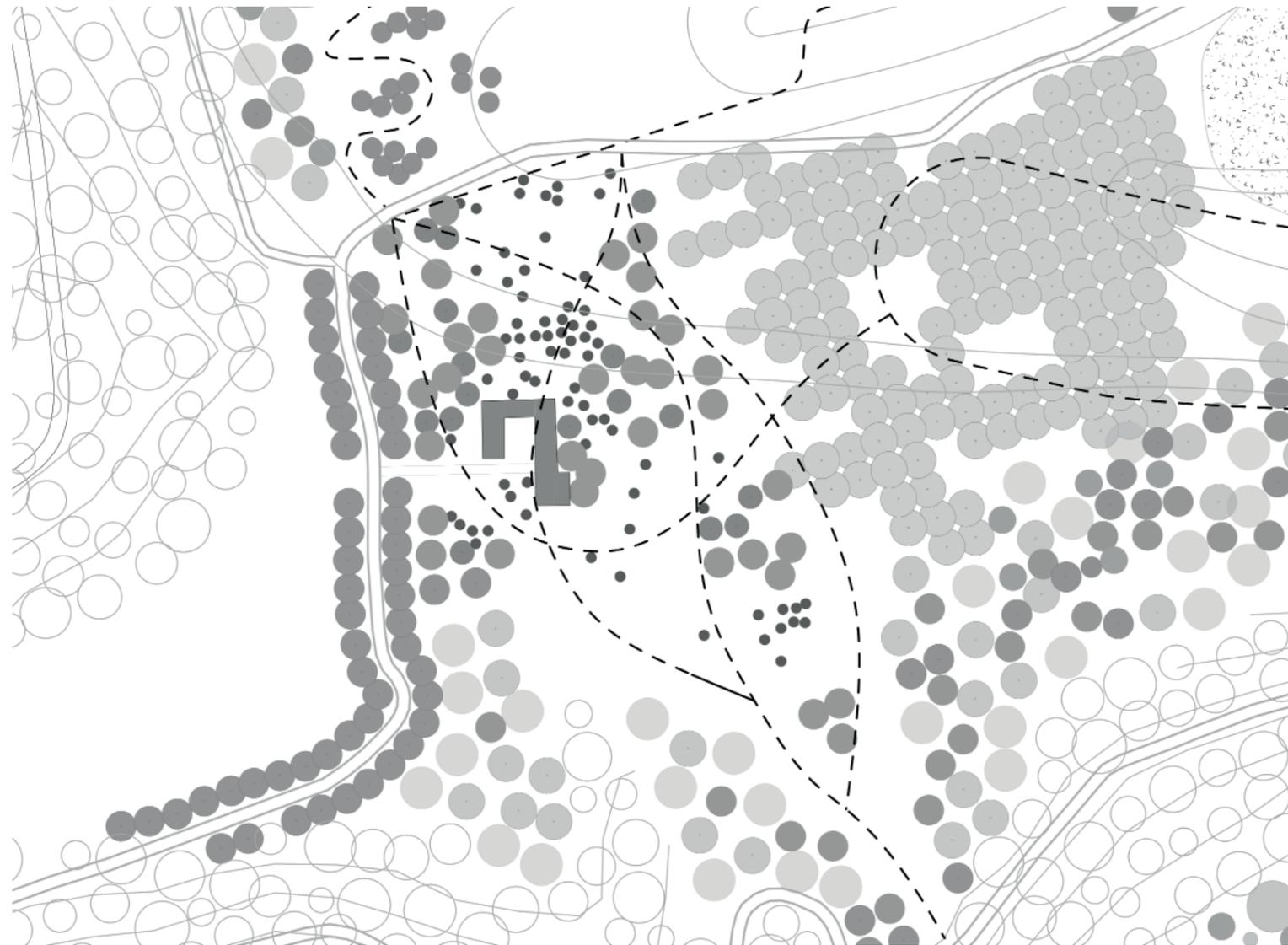
*Craft and Construction Zone*

## GALLERY OF MILIEU

### *Tree exhibition*

*It display a systematic collection of high-elevation oak and coniferous trees native to Taiwan which is dominate in 1500-2500.*

*Most of the trees in the area are native plants in Taiwan. As the seasons change, tree change.*



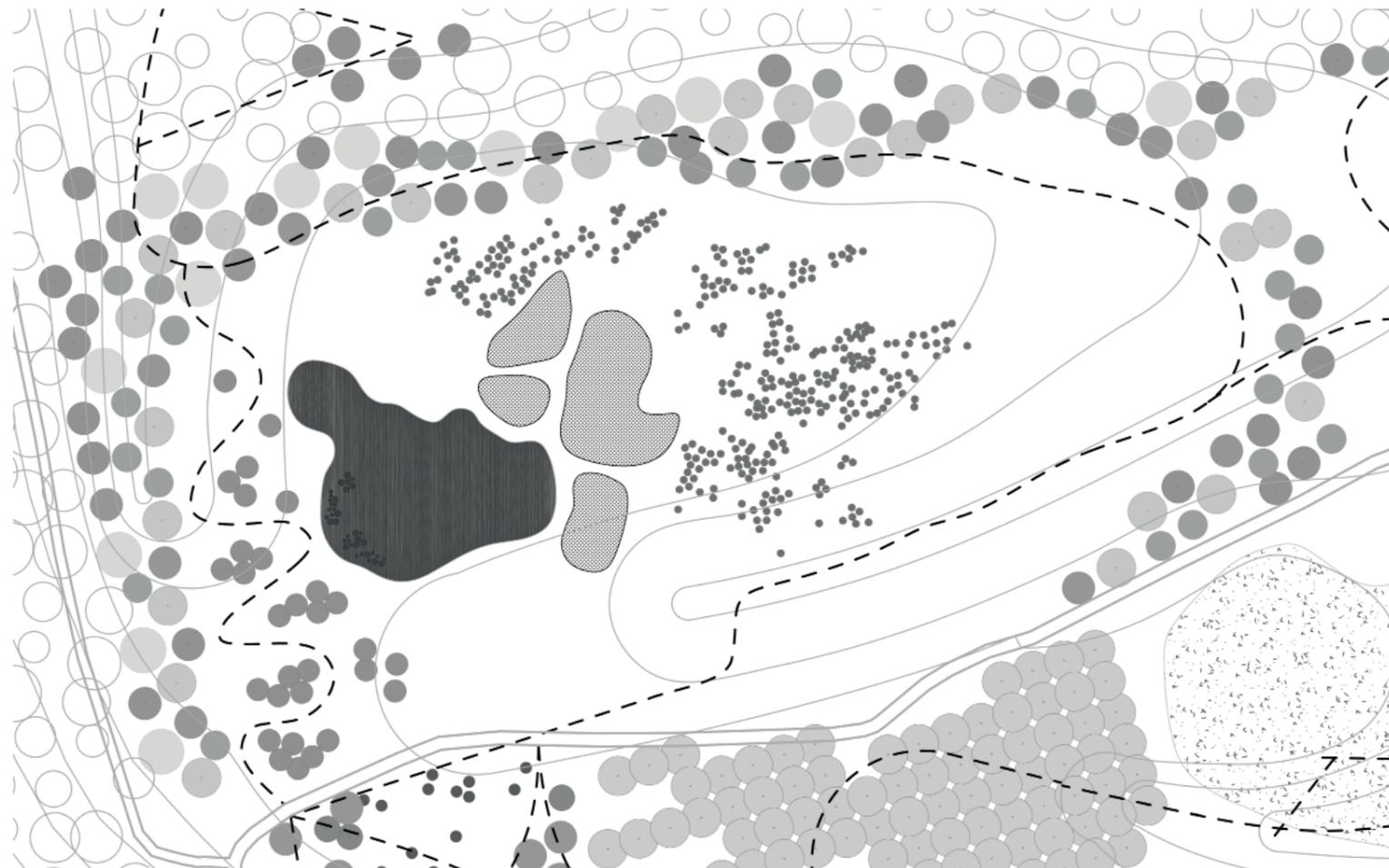
*Quercus forest*

*Deciduous forest*

*High stem meadow*

## NATURAL CLASSROOM

This area displays aquatic plants, alpine plants grow over 2200 m, endemic gymnosperms and the *Rhododendron belvedere* in the form of small classrooms, allowing you to observe these plants with special ecological habits at close range. In addition, the extremely high diversity of epiphytes in the surrounding forests, as well as the various wild animals that inhabit and move around the pool and its vicinity make this area a good place to observe and experience the natural ecology.



### *The rhododendron belvedere*

*Rhododendron noriakianum*

*Rhododendron pseudochrysanthum*

*Rhododendron oldhamii*

*Rhododendron formosanum*

### *Aquatic plants*

### *Rock garden*

*Sedum morrisonense*

*Potentilla leuconota* D. Don

*Scabiosa lacerifolia* Hayata

*Clematis tsugetorum*

*Berberis kawakamii*

### *Gymnosperm plants*

*Juniperus squamata*

*Abies kawakamii*

*Picea morrisonicola*

*Tsuga chinensis*

*Pinus armandii* Franchet

*Pinus taiwanensis*

*Pinus morrisonicola*

*Chamaecyparis formosensis*

*Chamaecyparis taiwanensis*

*Cunninghamia konishii*

*Calocedrus formosana*

*Pseudotsuga wilsoniana*

*Keteleeria davidiana*

*Taiwania cryptomerioides*

*Podocarpus fasciculus*

*Amentotaxus formosana*

*Cephalotaxus wilsoniana*

*Juniperus chinensis taiwanensis*