The 1st UU-A International Symposium Series

Poverty alleviation and ecosystems conservation under fragile environment

- A case in the Ulugru Mountains, Tanzania -

Lecturer: Prof. TANAKA Ueru (Setsunan University)

Date: 28th October 2021 17:30-19:00 (Japan time)

Professor Tanaka Ueru, who specializes a soil science and rural development gave a lecture on the possibility of vanilla cultivation in Ulugru Mountains located in west part of Tanzania. Under prevailing poverty and soil degradation, vanilla is a potential spice cultivated at home garden, processed, kept for a long time, and sold at high price. Especially, the elders, who ordinary stay at home can engage in the process of vanilla cultivation such as hand pollination and processing, coping with both poverty alleviation and ecosystem conservation.

第 1 回 UU-A 連続国際シンポジウム

脆弱環境での貧困削減と生態環境の保全

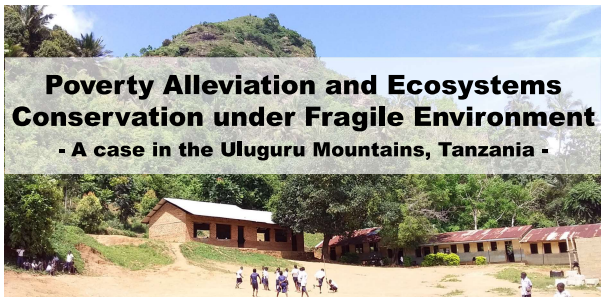
― タンザニア・ウルグル山域の事例 ―

講　　師：摂南大学　田中　樹 教授

日　　程：2021 年 10 月 28 日（木）17 時 30 分～19 時 00 分

土壌学と地域開発を専門とする田中樹教授が、タンザニアの西に位置するウイグル山域におけるバニラ栽培の可能性について講義。貧困と土壌の劣化が課題となっている地域で、バニラは地域の生態環境を守りながら、ホームガーデンで栽培、及び加工することができ、 長期保存して高値で販売することができる香辛料である。特に、家にいることが多い高齢者が、短時間の人工授粉や加工に関わることで収入を得ることができ、生計向上と生態環境の保護の両立を図ることができる。

1st Symposium, Inter-University Exchange Project,
Utsunomiya University（Oct 28, 2021）



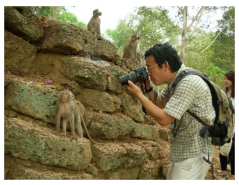
Poverty Alleviation and Ecosystems Conservation under Fragile Environment

- A case in the Uluguru Mountains, Tanzania -

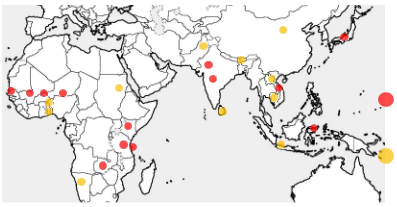
Ueru TANAKA

Faculty of Agriculture, Setsunan University, Osaka, Japan

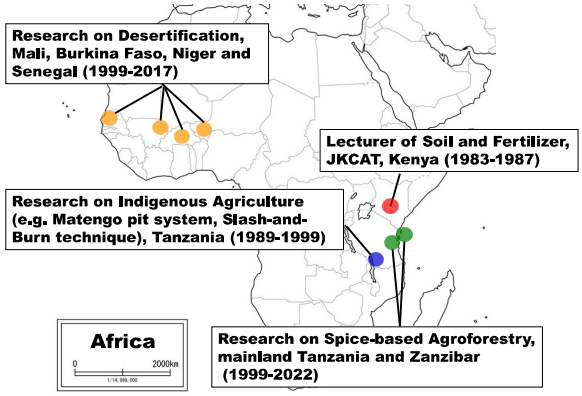
About myself



Name: TANAKA Ueru
Born: Hokkaido, 1960
Study fields: Soil Science, Agronomy, Rural Development
Professional carrier:
J. Kenyatta Collage of Agric. & Tech. (Kenya, 1983-1987)
Kyoto University（1990-2011）
Research Institute for Humanity and Nature（2011-2017）
Setsunan University (2020 - date)



Experiences in Africa



Contents

1. Introduction
- 1-1 Study background: Poverty and Degradation
- 1-2 Focus on small-scale farmers

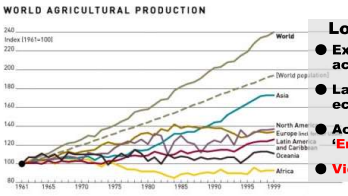
2. Study area
- 2-1 Ecosystems, livelihood and problems
- 2-2 Home-garden agroforestry

3. Spices
- 3-1. Spice-based home-garden system
- 3-2. Small livestock raising

4. Livelihood and Ecosystems
- 4-1. Livelihood improvement
- 4-2. Ecosystems conservation
- 4-3. Further challenges

1. Introduction

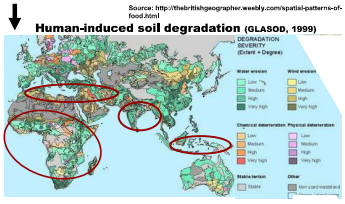
Poverty and Degradation



Local and Global Concerns
- Expanding population and human activities
- Land use pressure toward fragile ecosystems
- Acceleration of 'Poverty' and 'Environmental degradation'
- Vicious spiral of the above

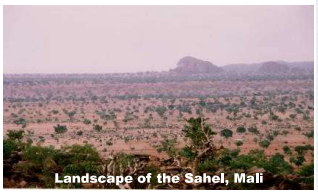
Source: http://thebritishgeographer.weebly.com/spatial-patterns-of-food.html

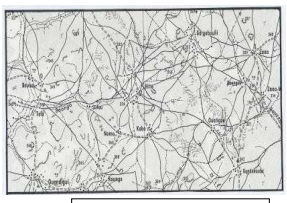
Human-induced soil degradation (GLASOD, 1999)



World poverty map (World bank, 2009)

Focus on small-scale farmers


Landscape of the Sahel, Mali

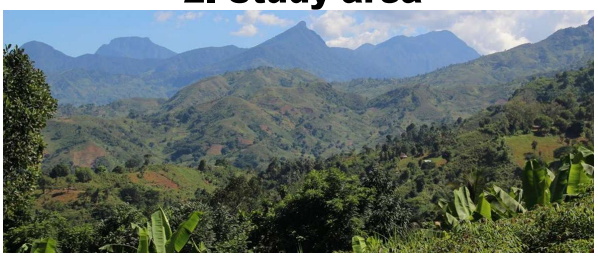


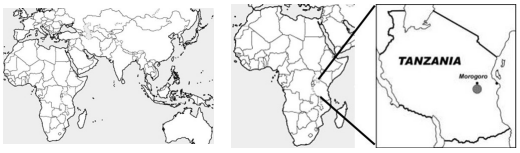
1. **Majority or minority?:** Famer exists as 'point', farmers exist as 'area'.
2. **Influences:** Farmers 'use', 'conserve' and 'destroy' land resources and ecosystems.
3. **International concern:** UN Decade of Family Farming (2019-2028).

Focus: Re-appraisal of the potentiality of small-scale farmers.

http://www.fao.org/family-farming/decade/en/

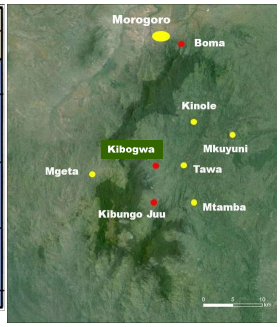
2. Study area





The Uluguru Mountains

The Uluguru mountains
in the 'Eastern Arc Mountains'

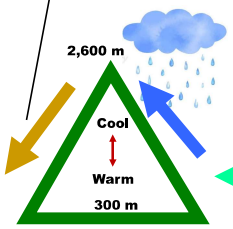


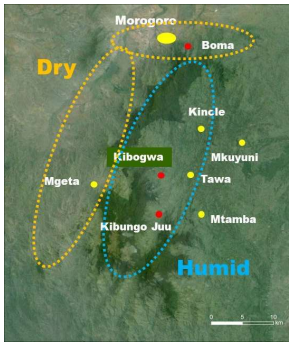
Study sites (in red)

Climatic condition

North and West: Dry
800~1,000 mm/year

East: Humid
2,500~3,000 mm/year





Eastern wind
(Trade wind)

Study area Precious Ecosystems

Eastern Arc Mountains

Various fauna and flora with endemic species

- Geological formation: 1 million years ago
- Ice age: Quaternary/Middle Pleistocene (0.78 –1.26 million years ago
- Endemic species: Mammals 10, Birds 19, Reptiles 29, Amphibians 38, Vascular plants 800 (of which 10% are trees), Moss plants 32

WWF: Global 2000 Ecoregion, Conservation International: Biodiversity Hotspot, BirdLife International: Endemic Bird Area

Study area Livelihood of local people

Slash-and-burn farming

Small business
in local market

Logging (illegal)

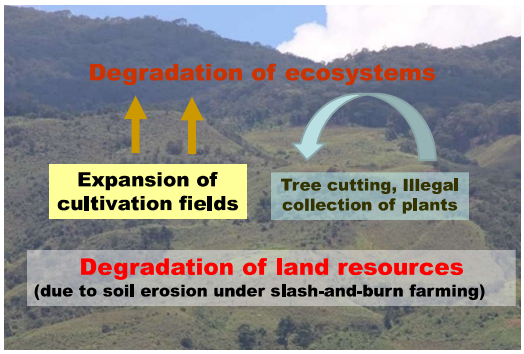
Home-garden agroforestry

Wedge labor

Problems Degradation: Human vs Nature

Problems

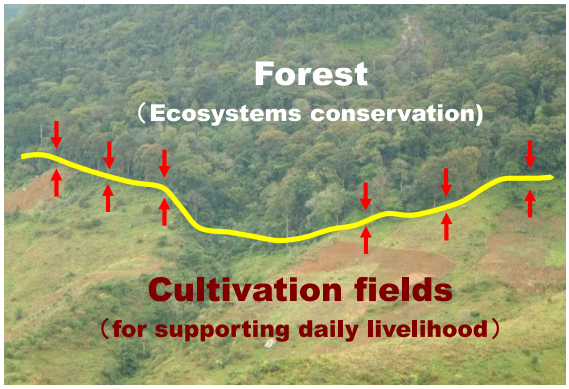
Degradation: Human vs Nature



Poverty as the root-causes

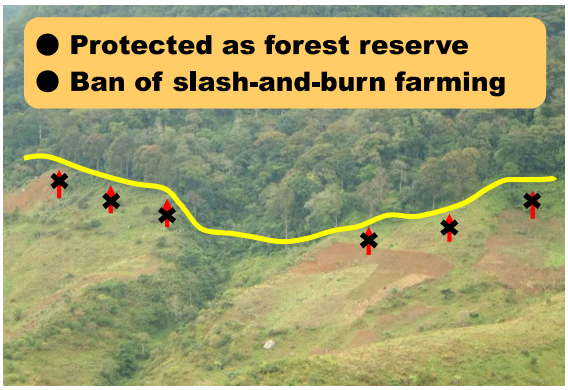
Problems

Confrontation



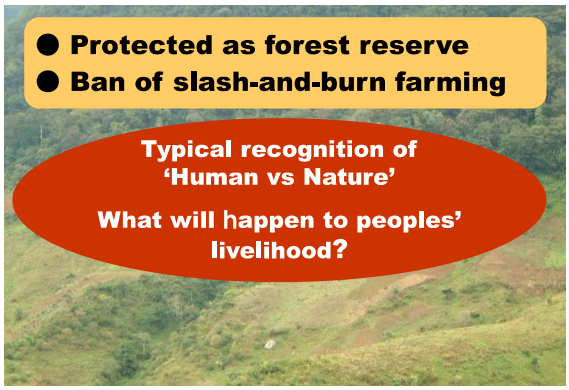
Problems

Any measures?



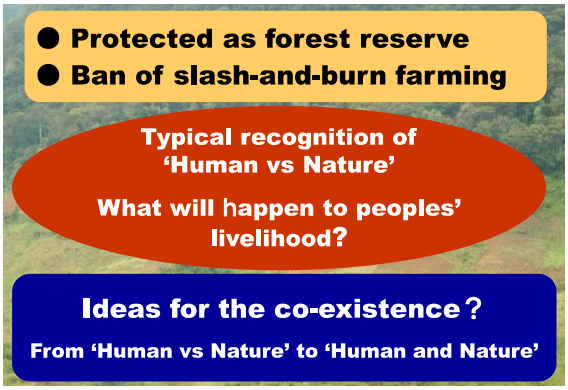
Problems

Is it right way?



Problems

Our challenge



Our concern

View of the study site

(Eastern slope of the Uluguru mountains)

Our concern

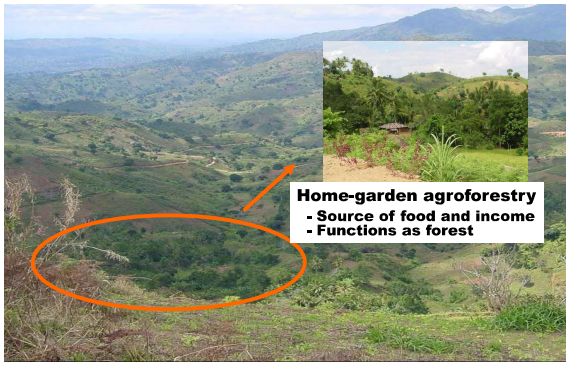
Degradation caused by human activities

Our concern

Can you find a hint?

Our concern

It looks like a woodland (forest)

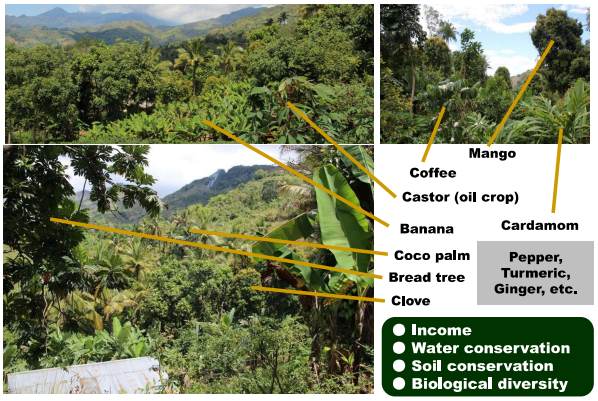


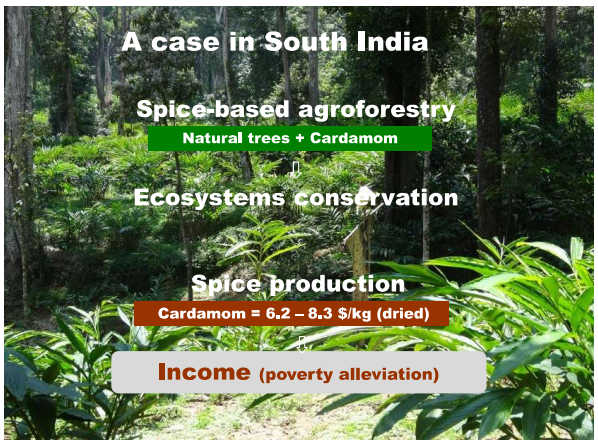
Our focus

Home-garden Agroforestry

Our focus

Home-garden Agroforestry



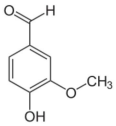


3. Spices

Spices cultivated in the Uluguru

No need for tillage, weeding, fertilizer and chemicals

Newly introduced spice: Vanilla



Vanilline

Vanilla (***Vanilla planifolia***):
Native to the Yucatan Peninsula, Mexico.
A vine plant in the family Orchidaceae.
Prefers a warm, moist, slightly shaded environment.

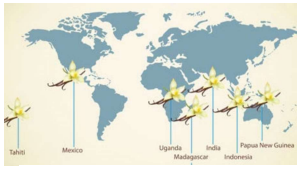
→ **Suitable for home-garden agroforestry**

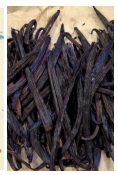
Attractiveness: Price (profitability)

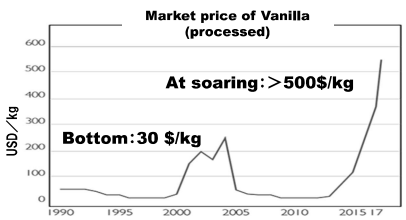
Crop	Selling price($/kg)	References
Clove	6.4 ~ 13.3	Sawa Sawa Foods Ltd. (2017)
Cardamom	6.4 ~ 8.3	
Pepper	4.3 ~ 10.7	
Cinnamon	0.6 ~ 1.1	
Vanilla	32.3 ~ (>500) → 460 USD as of 2021	
(Nutmeg)	(69.9 ~ 96.3)	
Coffee	1.25	http://www.coffeeboard.or.tz/auctions.php (2020)
Maize	0.4 ~ 0.7	https://allafrica.com/ (2019)
Rice	0.6	
Banana	1.4	

＊1Tsh = 0.00043$

Vanilla in the world



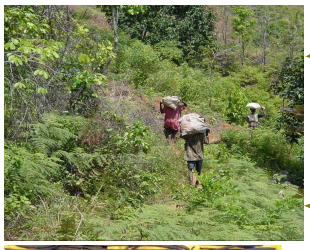




Places	Production (Fresh Wt, ton)
Indonesia	3,200
Madagascar	3,100
Mexica	463
Papua New Guinea	433
China	335
Turkey	290
Tonga	198
Uganda	161
French Polynesia	60
Comoros	35
Others: French Reunion, India, Tanzania, Columbia, Brazil	

Source: FAO, 2013

Attractiveness: Weight and storage



Workload: 3 hours walk with heavy goods to the market

Example: Carrying and selling 15 kg of Mangoes brings 20 $
（0.5$/pc X 15kg÷400g/pc）

Most crops cannot be stored for a long time

Processed vanilla

- 32.3 ～(>500) $/kg
- Storage period: 2 to 3 years
  （⇨ Selling while looking at the market price）

Memo：GDP per capita in Tanzania = about 600 $

4. Livelihood and Ecosystems

New house surrounded by home-garden agroforestry

Meaning of a galvanized iron roof and bricks
⇨ wealth, income, better life ....

Livelihood improvement

Quality control
(conventional spices)

Before:
Drying on the ground
⇩
- Reduction of aroma
- Contamination of mold poison
- Pollution of dust and dirt

After:
Drying on the table
⇩
- Quick drying
- Maintenance of aroma
- No contamination and pollution

Better quality, better price

Livelihood improvement

Quality control
(Vanilla)

Livelihood improvement

Quality control
(Vanilla)

Before:
Harvesting as a bunch
⇩
- Mixing of immature pods
- Reduction of the grade (size and aroma)

After:
Harvesting one by one
⇩
- Pods harvested at the right time
- Improvement of the grade (size and aroma)

Better quality, better price

Livelihood improvement

Value addition
(Vanilla)

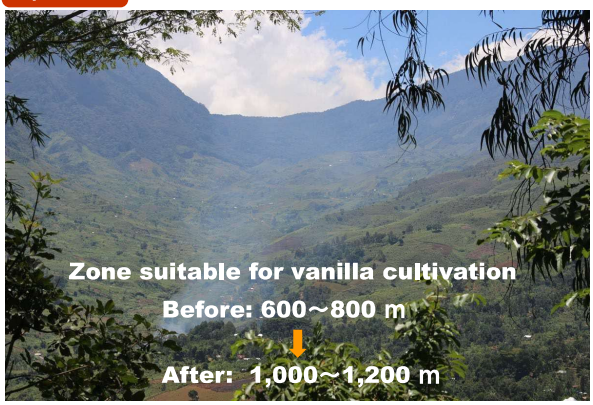
Processing at household

	Fresh Vanilla	Processed vanilla
Price ($/kg)	15	30 ～ 500
Storage	10 days	3 years
Price negotiation	Weak	Strong

Vanilla processing can be done at affordable cost with simple equipment

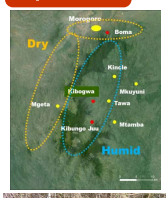
Livelihood improvement

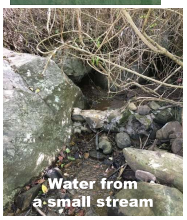
Expansion of the cultivation area



Livelihood improvement

Expansion of the cultivation area





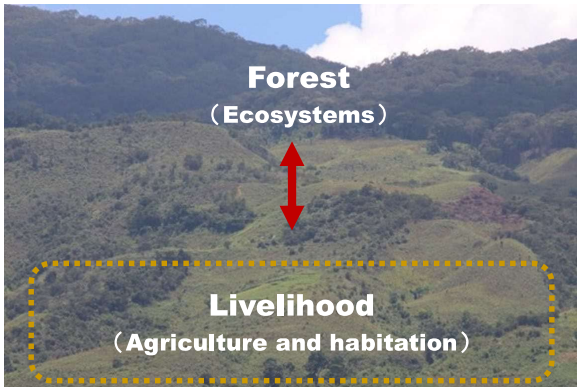
Small-scale irrigation + Vanilla

Expansion of home-garden agroforestry

- Reduction of a slash-and-burn
- Control of bushfire
- Recovery of forest vegetation

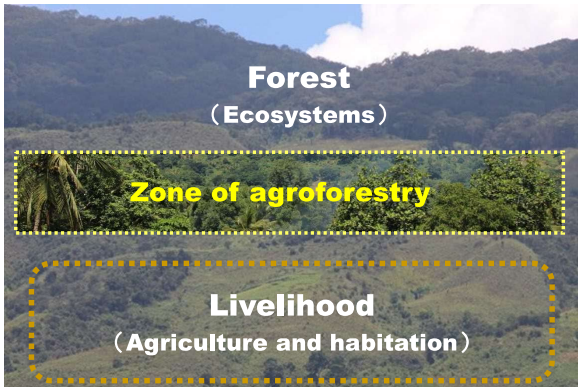
Human and Ecosystems

Situation: Human vs Nature



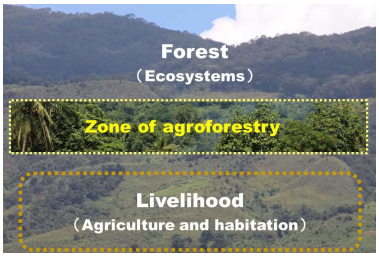
Human and Ecosystems

Idea of co-existence



Human and Ecosystems

What to expect



Natural ecosystems + Agroforestry
Maintenance of forest function
(conservation of water, soil and biodiversity)

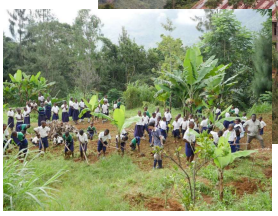
Agroforestry + Cultivation
Improvement of livelihood
(increase of income, reduction of workload)

Reference information:
Japan's *Satoyama* landscapes

Small mosaics composed of various types of ecosystems and land use that have been evolved out of the long term interaction between people and the environment.

Further challenges

Key to Sustainability



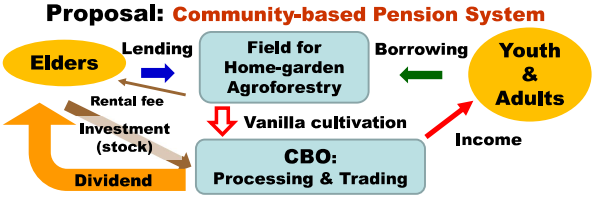
School spices garden for the education of science, agriculture and sustainable development (ESD)

Further challenges

For vulnerable people

Reality

- Out-flow of youth and adults
- Disappearing mutual-help system
- Lack of social security system

How does vulnerable people survive?

Proposal: Community-based Pension System