Challenges and Opportunities for Upland Rice in Laos after Food Security

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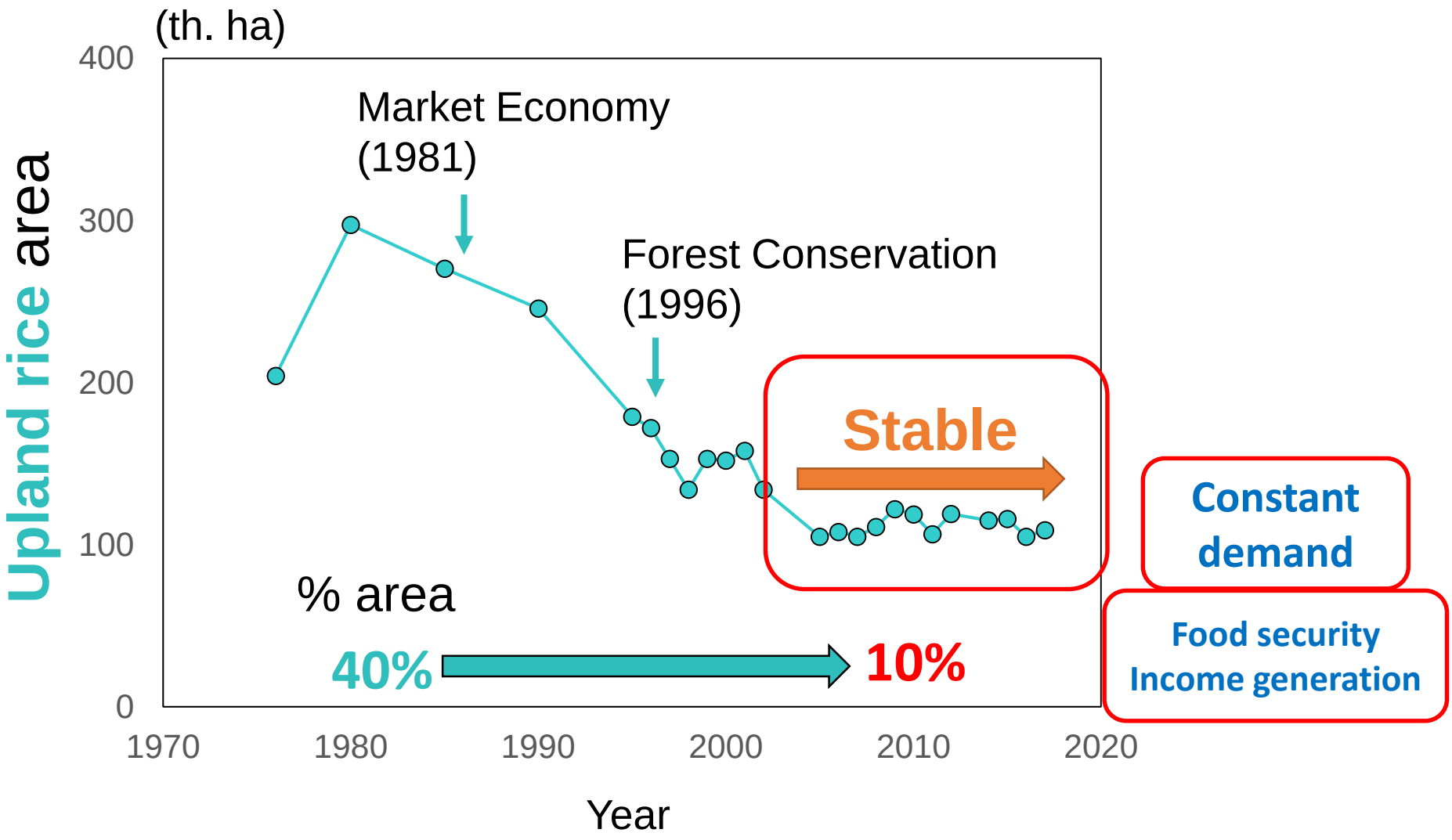
Why still upland rice?



Problems in upland rice

1. Productivity

- Low Productivity

Lowland 4.4 t/ha > Upland 2.0 t/ha

Research required for variety detection

- Stable productivity
- Value addition

2. Upland rice research

- Bleeding
  - ⇨ no activity
- Genetic resource
  - ⇨ insufficient utilization

Techniques are required for

- Evaluation of characteristics of each variety
- Breeding

Research Activity

1. Variety evaluation

- Productive Rice
- Healthy Rice

  (anti-oxidant effect)
- Delicious Rice

  (texture analysis)

2. Evaluation method

- Drone-use evaluation
- Genome information

→ **New Variety Dev.**

Efficient utilization of genetic resources

1. Productive Rice

- **Farmer's preference** (71 villages from 9 province)

Before (1990s) Early maturity, Poor soil adapt. → **Now** Late maturity, Good soil adapt.

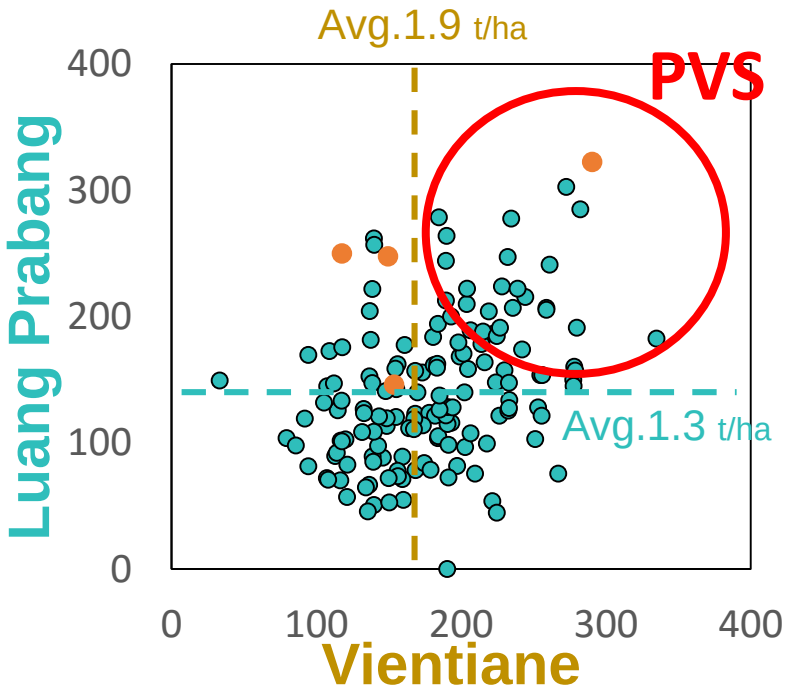
- **Variety trial**

Luang Prabang

Low yield
(Slope, non-tillage)

Vientiane

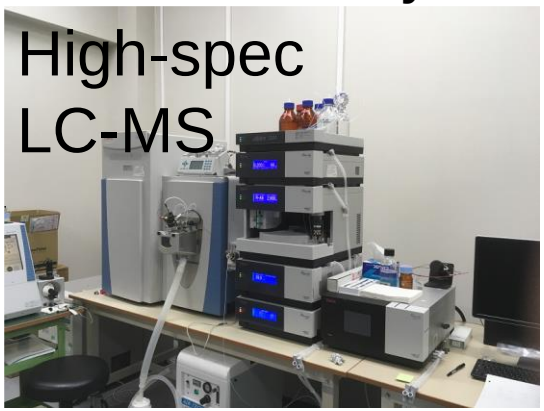
High yield
(flat, tillage)



2. Healthy Rice

- Medical use in Laos

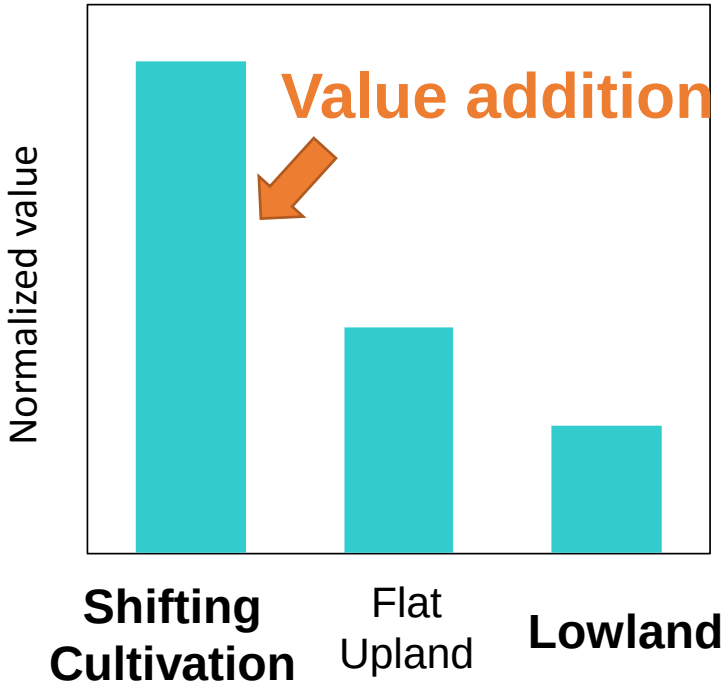
Metabolome analysis



Anti-oxidant materials

- Fat-burning,
- Anti-cancer, etc.

MatA

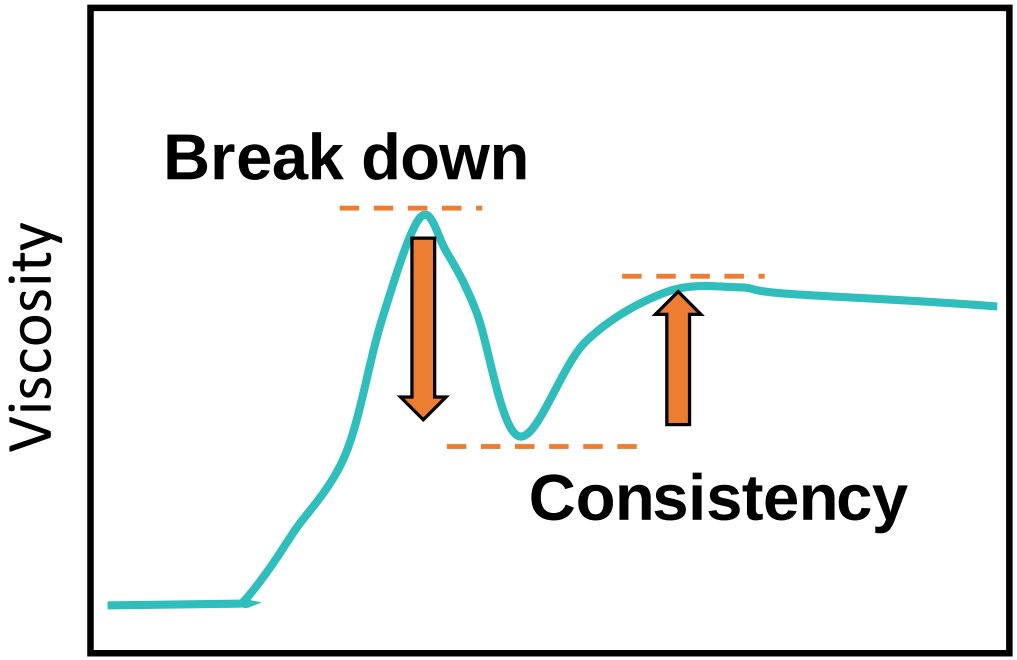


3. Delicious Rice

- **Texture Analysis by RVA**

Lao upland rice: 50 vars
（Glutinous rice)

(Rapid viscosity Analyzer)



Diversity: Laos >> Japan
But, very different

4. Genome information

Japan (Lowland rice)

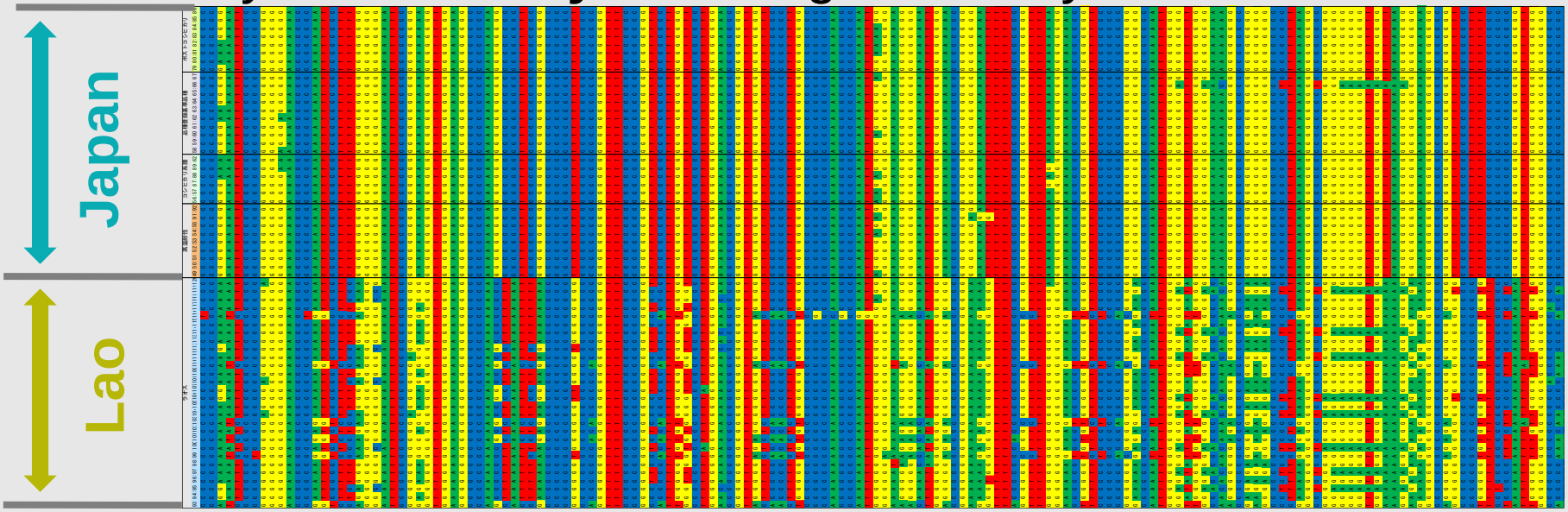
Lao (Upland rice)

Genome sequence

Open-access database

- ☐ Molecular study
- ☐ Breeding use

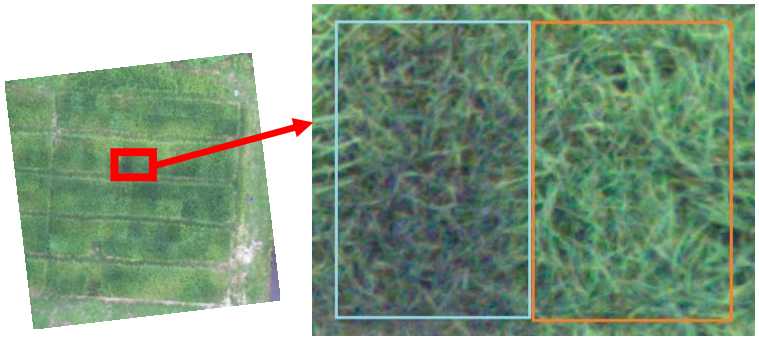
Diversity in **Starch Synthesis** gene family



5. Drone-image analysis

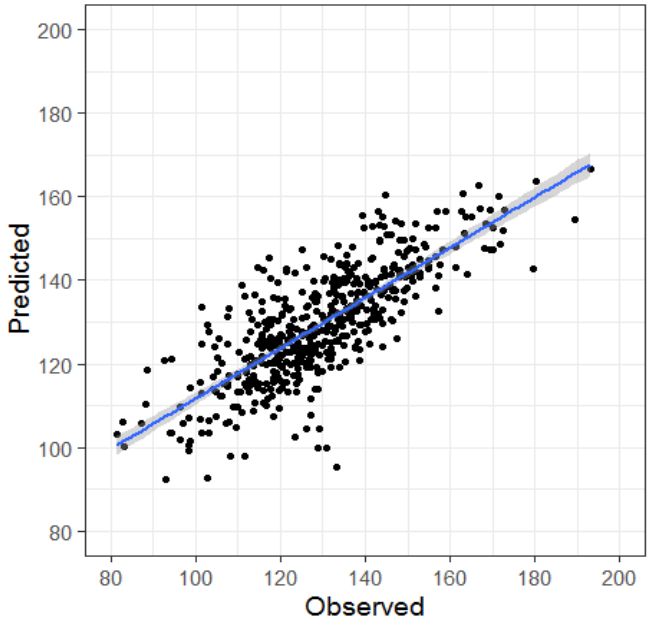
Growth monitoring

Diverse genetic resource



1m x 2m plot

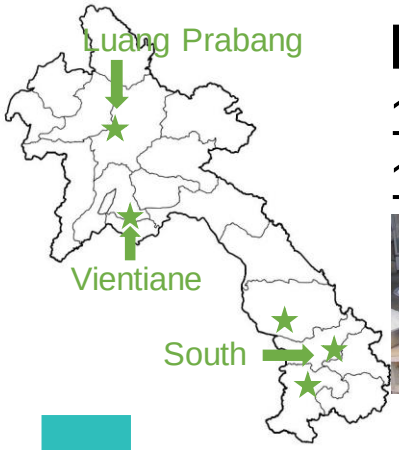
Ex. Plant height Est.



- Biomass,
- Initial growth,
- Nutrient condition etc.

First screening

6. Other activities



Market rice survey

100 rice sellers
1000 samples

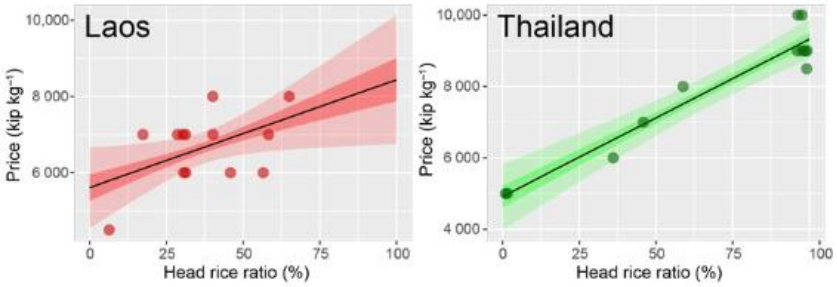
(At present)

Upland rice
Lowland rice

Nutrient assessment

	Fe (mg/100g)	Zn (mg/100g)	Folic acid (µg/100g)
Min ～ Max	0.20 ~ 1.00	1.10 ~ 3.00	15 ~ 36
Avg. Lao	0.48 ∧	1.83 ∨	24.6 ∨
Avg. Japan	0.80	1.40	12

Price – Grain quality



Ex. Savanaket market

Thank you very much for your attention

Grain quality analysis

Chemi. Analysis

Drone flight