山梨県
Yamanashi Prefecture

Efforts to Reduce Carbon Dioxide through the 4 per 1000 Initiative in Yamanashi Prefecture

～Global Warming Countermeasures in Orchards～

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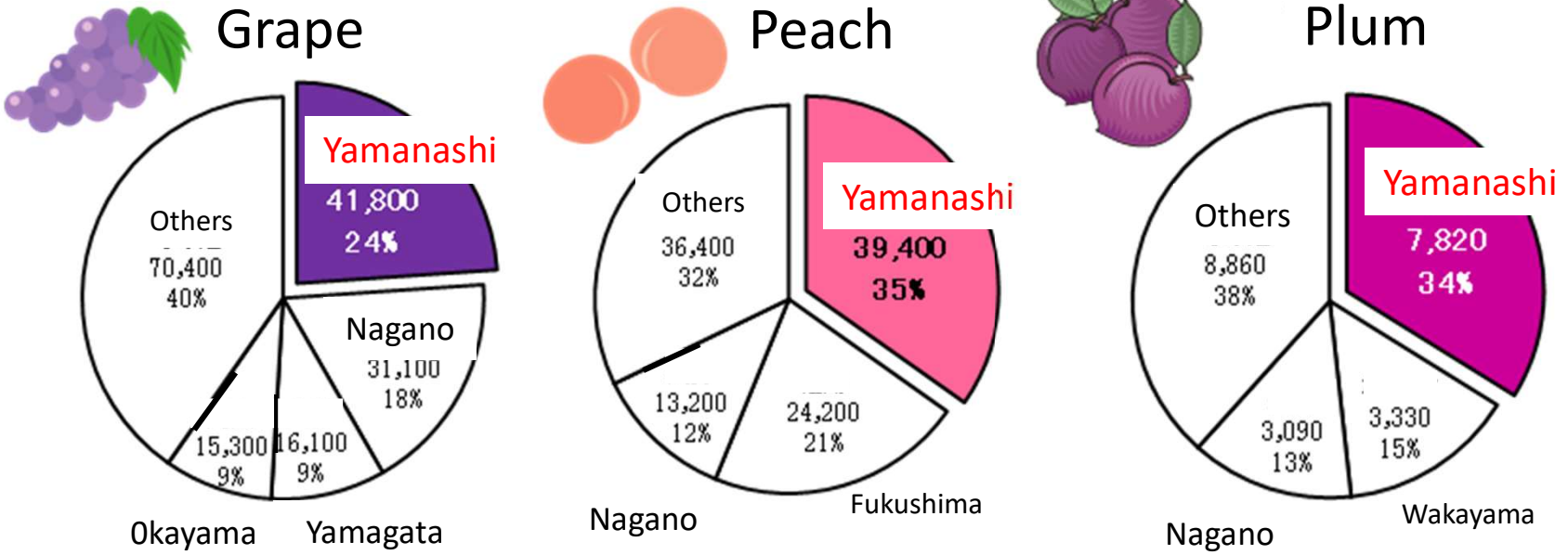
Yamanashi Prefectural Government

Yamanashi Prefecture is the Largest Producer of Grapes, Peaches, and Plums in Japan!



Ave. 0.7ha per Fruit Farmer in Yamanashi
Small, but Excellent Farmers!

As Japan's Fruit Kingdom, Yamanashi Prefecture aims to store carbon through the photosynthesis in orchards

Focusing on the large amounts of pruned branches from fruit trees every year

Soil Sequestration of Carbon Using Carbon Cycling in Orchards

Fruit Trees

Photosynthesis

Pruning, Trimming

Large Reservoir of Carbon

Input of Organic Matter (Compost, etc.)

Grass Cultivation, Green Manure

Pruned Branch Chips

Approx. Amount of Soil Carbon Sequestration

500kg/ha **400kg/ha** **300kg/ha**

Accumulates as Organic Matter

Microorganisms Help in the Decomposition of Organic Matter

Grass Cultivation

Grass Cultivation in a Vineyard

Grass Cultivation in a Peach Orchard

- ○ No-till farming

  Top soil is covered with grasses,

  preventing soil runoff caused by wind & rain

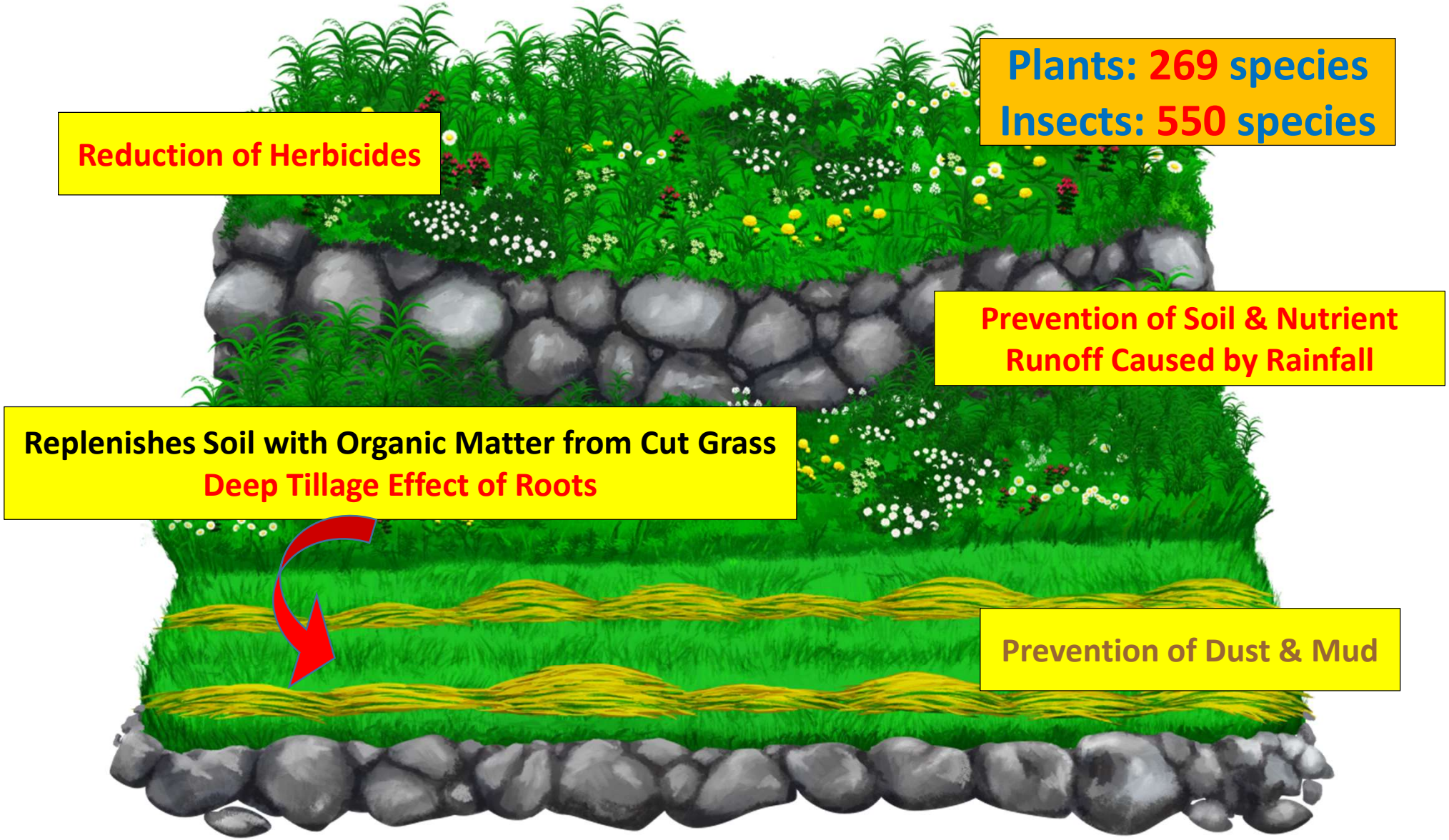
- ○ 300～500kg/10a of organic matter (grass) input per year
- ○ 80% of orchards in Yamanashi utilize grass cultivation
- ○ **No-till＋Organic Matter Input** contribute to soil carbon sequestration
- ○ Mostly weeds & grasses, with a variety of vegetation, fostering biodiversity

Plants: 269 species
Insects: 550 species

<Biodiversity>

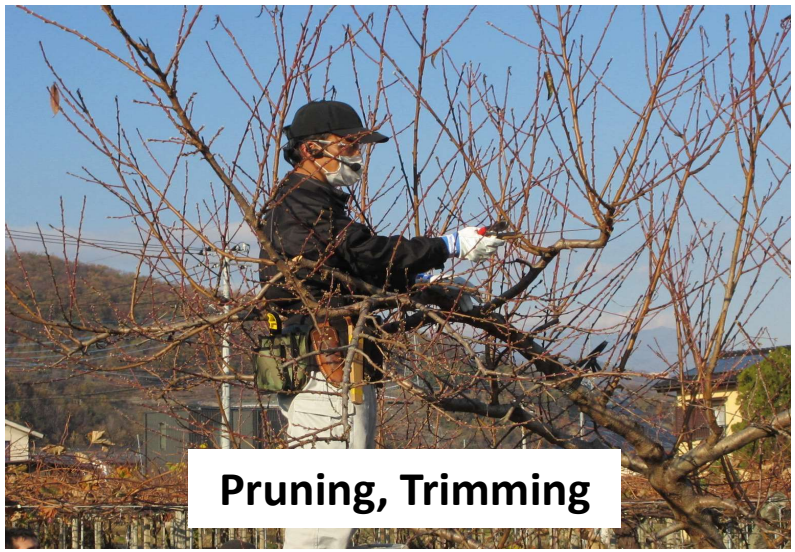
Benefits of Grass Cultivation

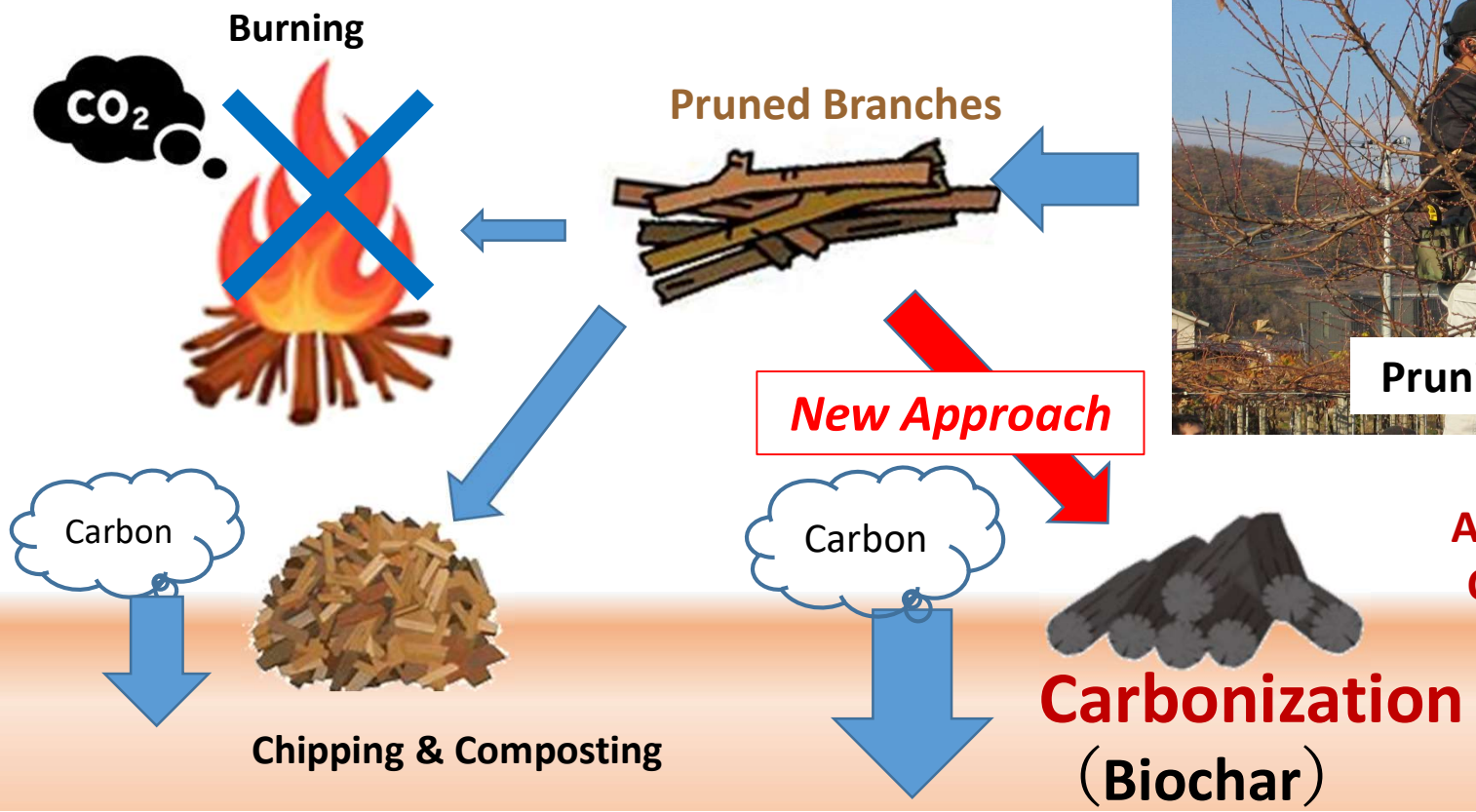
(An Environment that Fosters Biodiversity)



New Approach to Further Increase Carbon Sequestration Effect in Orchards

- ○ Pruned branches from fruit trees store large amounts of carbon through photosynthesis
- ○ Carbon can be stored in chips or fertilizer and applied to the soil
  … but it'll eventually decompose and be released
- ○ **Carbonization allows for a lot of long-term, soil carbon storage**

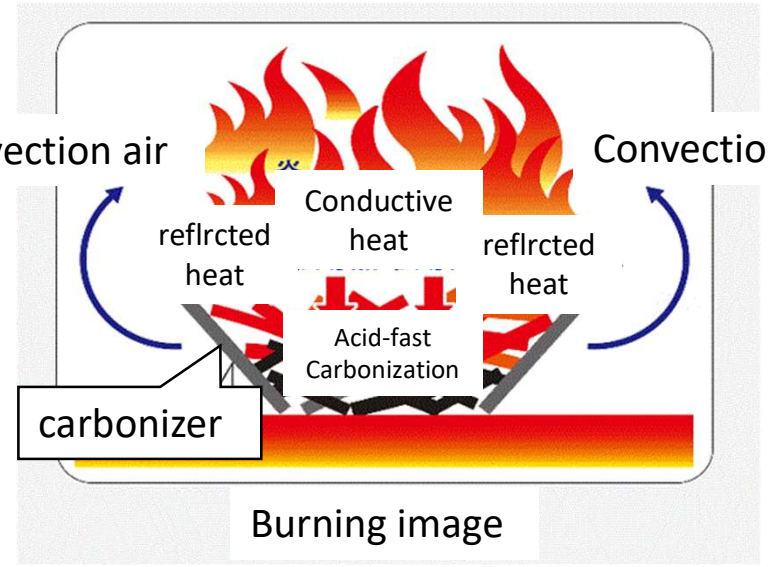




Carbonization of Pruned Branches (Explanation)

- Use a simple, portable carbonizer
- Carbonize pruned branches in the field
- Put the charcoal into the soil
- Successfully avoid carbon dioxide emissions almost entirely

Smokeless Carbonizer

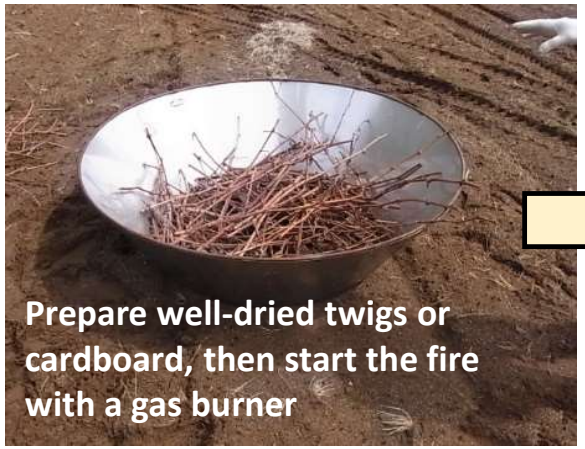


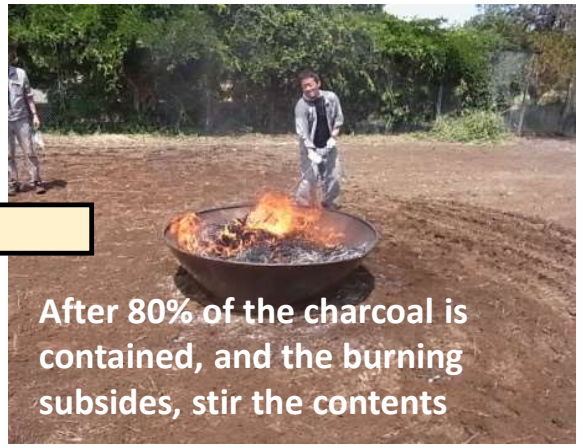
Burning image

Biochar Production Using a Smokeless Carbonizer

Biochar from Pruned Branches

Carbonization of Pruned Branches (Actual Process)





→ After being pruned, branches still hold a lot of moisture, making them difficult to carbonize, so they need to be dried for at least one month before carbonizing.

Charcoal - Used in Japan Since the Edo Period
Expected Soil Improvement Effects

- ***The Complete Book of Agriculture* (1697)** describes use of rice husk smoked charcoal
- Ground Power Improvement Law (1985) designated charcoal as a soil conditioner

① Soil Physicality

Works as Coarse Organic Matter

(**Improves Water Permeability & Retention**)

② Soil Microbiology

Promotes Growth of Microorganisms

(**Rhizobia or VA Mycorrhizal Fungi**)

Charcoal (from pruned grapevines)

In addition to improving the soil, it is resistant to decomposition, making it an effective material for storing carbon.

Carbon Dioxide Reduction (Trial Calculation)

Pruned Branches（per Hectare）

① 3000 kg → （50% Water Content） → 1500 kg

② 1500 kg → （50% Carbon） → 750 kg

③ 750 kg → （Carbonization Rate 40%） → 300 kg

Carbon: 300 kg → CO2 Conversion: 1100 **kg/ha**

Annual Emissions per Car **2300** kg

If all orchard farms in Yamanashi join the initiative (about 10,000 ha), reduced CO2 would be equivalent to about 5000 cars.

Certification System

Promoting Environmentally-Friendly Production Methods

Efforts

Initiatives (Plans) Certification

【Criteria】

Plans that are expected to achieve carbon sequestration

Step Up

Achievements

Performance (Results) Certification

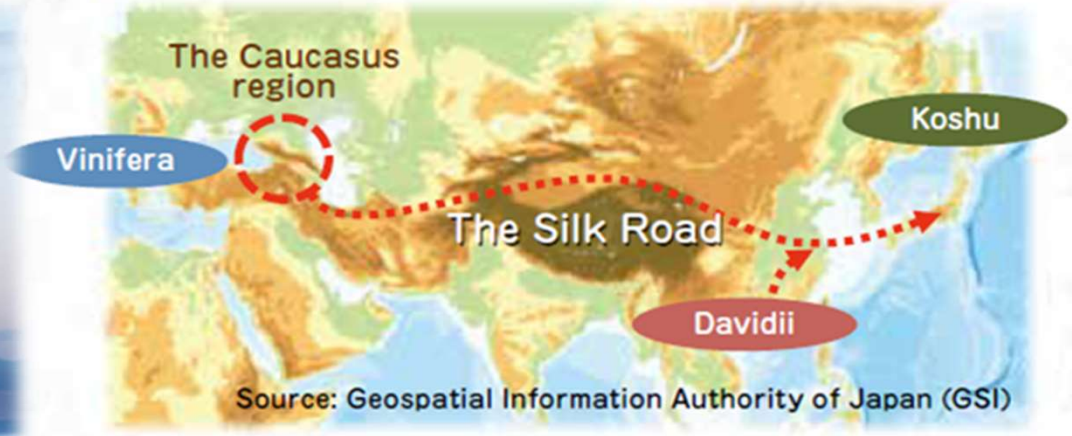
【Criteria】

Upon confirming the actual results of carbon sequestration, products are granted certification

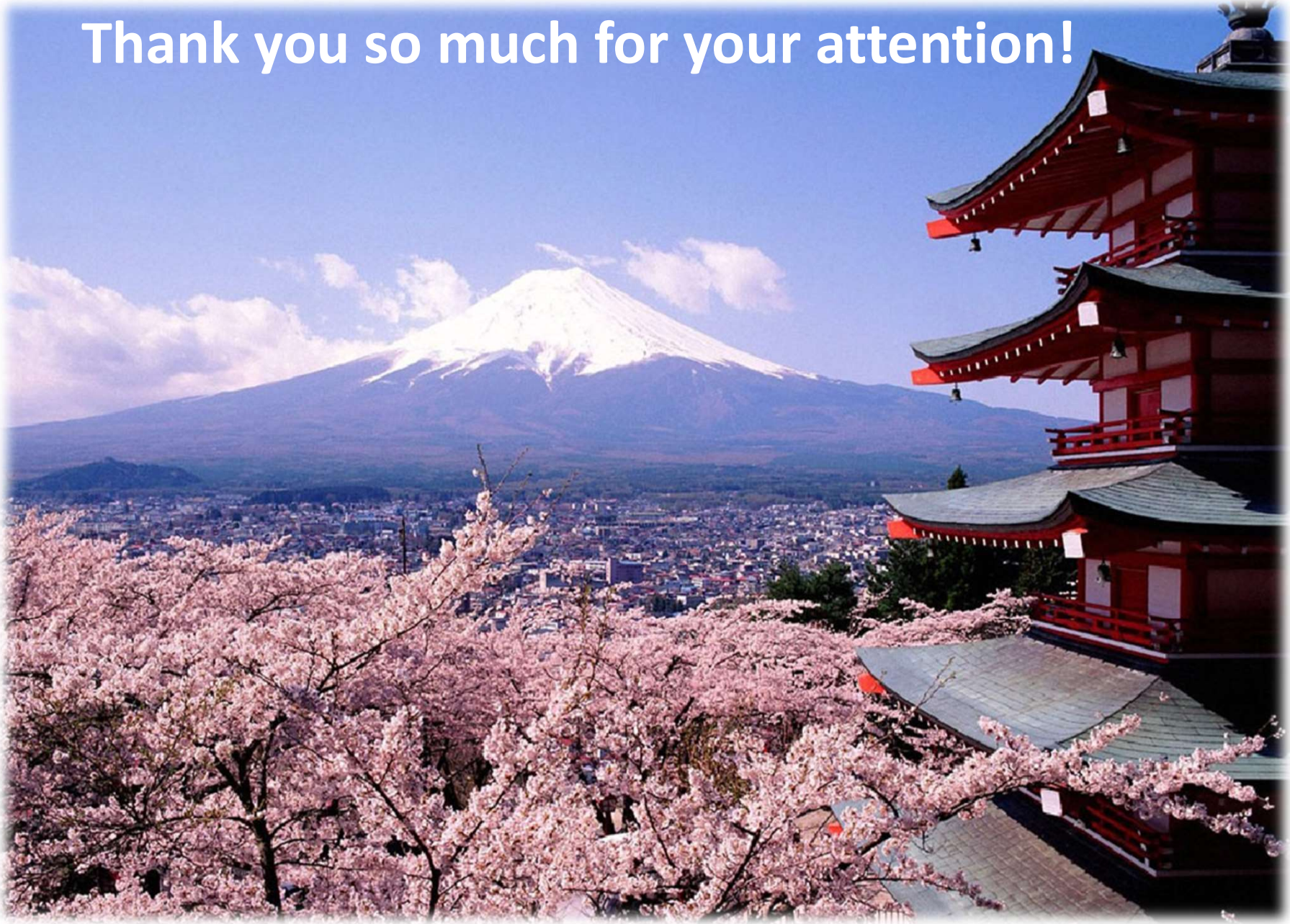
We hope that consumption of these '4 per 1000 fruits' can make both humans & earth happy!

Major Initiatives with Carbon Sequestration Effects Recognized by Yamanashi

Herbiculture & application of organic matter such as: compost, pruning chips inputs, pruned branch biochar inputs



The route Koshu came to Japan


Thank you so much for your attention!