Smallholder Farmer Innovations in Northern Vietnam
INTRODUCTION

A GROWING CULTURE (AGC)

A Growing Culture aims to create a global coalition connecting farmers with the resources they need to contribute to an ecologically sound food system and a prosperous planet. The mission is carried out through the three pillars of the organization: information exchange, outreach, and advocacy. A Growing Culture’s success will increase the use and understanding of ecological agriculture practices throughout the world while advancing appreciation for farmers and their work. By empowering local farmers to develop site-specific adaptations of sustainable agriculture principles that serve them, their soil, and their community, AGC will help build a prosperous future by connecting a global community of growers and creating a culture where these growers can thrive.

i-NATURE

i-Nature is a social enterprise that started in 2011 from inspiration and support of the Sustainable Product Innovation (SPIN) Project. The idea of i-Nature is to create sustainable agriculture through zero-waste farm applications. Since 2014, i-Nature has been functioning under the Center for Creativity and Sustainability (CCS). i-Nature has implemented projects in several provinces throughout Vietnam, and in Hanoi, successfully created one sustainable green community, in which 10 farms and 400 consumers were involved.

CENTER FOR CREATIVITY AND SUSTAINABILITY (CCS)

CCS was founded by the Vietnamese leading and experienced consultants and experts in the field of sustainability who desire to contribute to promotion of greener and SCP patterns of the national development. The objectives of the organization are to promote sustainability in Vietnam by applying creative methods, solutions, and development model. The mission is to: promote sustainability by creative methods and solutions and its vision is to become a leading R&D, consulting and capacity building organization on clean technologies, sustainable production and consumption models.
OVERVIEW

This document reviews several innovative farming methods that are used in Northern Vietnam. These methods are alternatives to conventional farming, which typically degrades the environment. Each farmer that contributed to this document comes from a different background and represents different needs or requirements.

METHODOLOGY

The facilitator/compiler of this document had members from i-Nature, Pham Trang and Tran Dung, reach out to farmers they knew who might be using innovative methods to produce their crops. The facilitator reviewed the “Best Practices” guide to farmer-led documentation and took note of the essential information required to get a fulfilling document. The facilitator met with the farmers and surveyed the farm, instruments and/or tools used for the particular farming method. Then, the facilitator’s colleague(s) would begin to speak with the farmer about their methods. The colleague would translate, and the facilitator would record the notes. Often times photos were used to capture the moment, and sometimes a video recording was used. Farmer input during the documentation process was always happily accepted, including what photos were to be taken for the final output. If the facilitator had additional information, she would ask her colleague in English, and the colleague would translate the question to Vietnamese.

POTENTIAL BIASES

The facilitator would like to make note of a potential bias that became apparent during the documentation process. She noticed that during the translation process, there seemed to be an inherent editing of the grammar, which made her wonder if that shifted the document from being farmer-led to being observer-led. Being aware of this potential issue, the facilitator tried to keep the language preserved as best as possible.
RAISING PIGS ON LIVING BIO-BEDS:

*Using microorganisms to process pig waste and create living bio-beds*

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<tr>
<th>Collaborators</th>
<th>Innovation</th>
<th>Location</th>
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<tbody>
<tr>
<td>Ms. Pham Nhu Trang</td>
<td>Creating a living bed for pigs or other livestock in their stable to process waste and later use for composting</td>
<td>Hanoi, Vietnam</td>
</tr>
<tr>
<td>Ms. Hue &amp; Mr. Thuan</td>
<td>Using dry weeds and rice straw to add in the living bed</td>
<td>Ba Vi, Hanoi, Vietnam</td>
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<tr>
<td>Mr. Viet</td>
<td>Use rice husks and sawdust for the bed</td>
<td>Yen Bai Province, Vietnam</td>
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Benefiting Provinces:

Ninh Thuan, Lao Cai, Hanoi, Yen Bai, Thanh Hoa, Ninh Binh

THE STORY

Trang was born in a remote rural area in Vietnam. When she was growing up, her family did not have enough food to consume. Trang’s dream at that time was to become a plant breeder to create a new high yield rice variety. Her ambition motivated her to study genetic-plant breeding at Hanoi Agriculture University.

At the same time, a lot of pesticide had been used at a large scale in Vietnam since 1980s. The improper usage and handling of agrochemicals have been damaging Vietnam's ecosystem as well as the people’s health. Hence, since 2009 Trang started to study organic farming and transfer new clean technologies to farmers in order to reduce chemical residues to a minimal level as well as protecting the environment.
Pig Stable Requirements:

The stable must be ventilated, cool in the summer, warm in the winter, and meet the following requirements:

- Minimum area per pig 1.5 m²
- Stable height to the roof top 3 m – 3.5 m
- Surrounding wall’s height 0.8 m – 1.2 m
- Outside is covered by plastic sheeting to protect from rain, wind, and heat. Using vines to cover the stable is also a possibility.

Building the Base of the Stable:

The base of the stable is composed in two parts:

- The living bed section is two thirds of the total area and 70 cm deep;
- The concrete section is one third of the total area, and slopes at a 7° angle toward the living bed
* If the stable is already built: Use a concrete cutter to remove two thirds of the total area and dig down 70 cm. Keep the rest the same.

Materials for Living Bed:

- Sawdust, hull, biochar: for 1.0 m² of living bed, 1.0 m³ of a mix of 70% sawdust, 20% hull, and 10% biochar. For dry leaves, use the following ratio: 50% sawdust, 20% hull, 20% dry leaves, and 10% biochar.

Materials must be clean and non-toxic. Do not use sawdust from ironwood.

- Using corn powder, molasses, or both: corn powder: 0.50 kg/m²; molasses: 0.05 kg/m².

- EM: Prepare 50 ml/m² EM with 10 liter of water and 0.05kg molasses.
Process:

- **Layer 1:** lay 20 cm of sawdust and hull or dry leaves, sprinkle the corn powder, and then the biochar. Use watering can to spray EM solution on top. Mix to ensure 30% moisture.

- **Layer 2:** lay 20 cm sawdust and hull or dry leaves, sprinkle corn powder (0.10 kg), and lay biochar. Evenly spray EM on top and mix.

- **Layer 3:** Lay 20 cm sawdust, hull or dry leaves, sprinkle corn powder (0.10 kg), and lay biochar on top. Evenly spray EM solution on top and mix everything. Ensure moisture is about 30%.

Cover using plastic sheet for 3 - 5 days. Open the cover to check for humidity of the living bed. Mix thoroughly and leave the bed uncovered for 1 hour before letting the pigs in.

Taking Care of the Living Bed:

After the pigs are let in, the pig dung needs to be mixed every day. If the living bed is dry, spray water to ensure the moisture remains at 30%. If the living bed is compressed, add dry leaves, hull or sawdust to sustain the height of the living bed. Remember to spray EM and mix after adding more materials.

* Note:
- Use an automatic faucet water system with a pan underneath to prevent food and water spillage into the living bed.
- In the winter, the pigs can be let in after preparing the living bed.
- It is best to have pigs with similar age and weight.
- The living bed needs to be 30 cm higher than the highest water level to prevent water from getting into the stable.
- The living bed needs to retain 30% moisture, not too dry and not too wet.
- Each living bed can be used for 3 years. Repeat the process to make a new one.
IMAGES OF LAYERING PROCESS
Making Biochar Bokashi Compost

Benefiting Provinces:

Hanoi and Ninh Binh

THE STORY

Biochar compost provides great benefits to the soil, especially when it is added to some more effective microorganism varieties. It is called Biochar Bokashi compost which helps farmers improve soil faster. Farmers can easily adapt the method to produce this compost by using common and cheap materials.

Farmers can use Biochar Bokashi compost as a component of potting blends and also for soil treatment at time of seeding or transplanting seedling because it has plenty of good characteristics.

- Nutrient content of compost is balanced by the combination of many different materials such as rice grain powder, cow manure, rice-husk and rice-husk biochar.

- Reducing the toxic in the raw materials through composting process

- Humus, biochar and microorganism which store all nutrients.

Collaborators

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<tr>
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<tr>
<td>Ms. Pham Nhu Trang</td>
<td>Using rice husks, rice straw, sesbania stems, and corn cobs and cornstalks</td>
<td>Hanoi, Vietnam</td>
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<tr>
<td>Ms. Thanh</td>
<td>Added fruit tree branches from around the house</td>
<td>Ninh Binh Province, Vietnam</td>
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DESCRIPTION OF BIOCHAR

Biochar has high porosity, allowing for high water holding capacity

-Biochar is porous with many small holes. Therefore it can absorb and store water and air

-Improves soil’s ability of nutrient storage

-Motivates microorganism’s activities

-Contributes to the formation of the soil structure

-Rice husk biochar is suitable for composting because of its small size, low alkali, and it carbonizes easily

HOW TO MAKE BIOCHAR BOKASHI COMPOSTING

Materials for Compost:

- Rice husk: 8-10 kg
- Cow/pig/chicken manure: 1 m³
- Rice husk biochar: 8-10 kg
- Rice grain powder: 10-15kg
- Wine yeast: 200-300 gram
Images and Process:

### Step 1:
- Mix rice grain powder with wine yeast and water
- After mixing, the moisture in rice grain powder is from 45-50 percent
- Put the mixture into the carton box. After three days the result is fermented rice grain powder

### Step 2:
- Mix the fermented rice grain powder with rice husk, cow manure, rice husk biochar
- Cover the pile with plastic

### Step 3:
- Turn the compost pile twice/week for three weeks
- Can use compost when the temperature inside the pile is similar to the temperature outside the pile and when there is no animal dung odor
- Store compost in dry areas
- The best time to use the compost is after 2.5 – 3 months
Ms. Thu learned how to farm turmeric from her mother-in-law from the Chi Tan village Khoai Chau District, Hung Yen Province, in Vietnam. This village is famous for its turmeric farming methods. Ms. Thu is originally the owner from a steel shop, the idea of farming turmeric came from her husband’s family because that was the traditional job of his family. The land fees were cheap, so Ms. Thu thought about investing in turmeric because the turmeric value and demand has gone up in Vietnam and the steel market is now more competitive. This farm just started in 2016, if it is successful, she wants to scale-up. Ms. Thu wants to provide safe food to customers.
HOW TO TRADITIONALLY FARM TURMERIC

Materials needed:
- Cow manure
- Rice husks
- Turmeric seeds
- Straw
- Soybean seeds

Instructions:
- Before planting, mix manure and husks and apply to soil. Then wait 10 days.
- Plant the turmeric seedlings, then cover with straw to keep moisture and prevent weeds
- When small shoots appear (about 5 cm tall)
- Start planting the soybean seeds
  *Note: Plant 1 soybean plant per meter squared (or per 2 turmeric plants) on the outside edge of the rows
- Allow the soybean plants to remain until the turmeric plant grows large enough leaves to photosynthesize

Taking Care of the Turmeric:
- After turmeric germinates, remove soybeans
- Apply harvested soybean to the top layer of the bed
- Use harvested soybean for new batch of compost

Image 1: Harvested soybeans to make organic mulch
Image 2: Cow manure to make organic compost
Image 3: Five shoots indicate turmeric root is an ideal size
Image 4: Two different varieties of turmeric. Left: Golden turmeric, used for cooking. Right: Black turmeric, used for medicinal purposes.
WORMS ARE A FARMER’S BEST FRIEND: USING VERMICULTURE TO FEED PLANTS

How to produce organic fertilizer using worms and EM

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<tr>
<td>Contributor: Dam Van Vuong</td>
<td>Using red worms and EM to decompose cow manure and turn it into organic fertilizer</td>
<td>Hanoi, Vietnam</td>
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<tr>
<td>Translator: Trang Pham</td>
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Benefiting Provinces:

Mr. Vuong has three consistent buyers that distribute his compost to the community of Hanoi.

THE STORY

Mr. Vuong grew up on a farm, but he studied to become a mining engineer. He used to lecture at a college in Quang Ninh Province. When he was mining, he recognized that they used a lot of TNT, and he destroyed a lot of forests and nature. He realized that what people get from mining is less beneficial than what they destroy and wanted to do agriculture instead.

Mr. Vuong first started farming in 2012. He decided to use vermiculture because the first thing people think about with agriculture is the manure, and people think that worms are friends of farmers. He gathered information from the internet about vermiculture, but the different thing that he decided to do is he is feed the red worms with EM. He studied the microorganisms.

Mr. Vuong is a member of a Forum for Agriculture in North Vietnam, and he believes that we need to move from chemicals to organic to help people increase health and improve the environment. Especially the soil. Right now Mr. Vuong’s worm farm is only 800m², but he would like to expand to 2,000m² in the future.
ABOUT EFFECTIVE MICROORGANISMS (EM)

- Mr. Vuong buys EM from a company, Viet Nhat, and uses the EM to make a second generation of compost.

- EM 1 is stock solution. After he purchases the EM one time, he can grow them to multiply to be used over and over.

- To make EM 1 → EM 2, put it in molasses for 4-7 days, at 30-37°C, and it can be stored for three months.

- To feed the red worms of 800 m², need 60 L of EM 2 a month

HOW TO MAKE RED WORM COMPOST WITH EM

Materials for Compost:

- Cow manure

- Organic waste (Mr. Vuong uses Water Hyacinth)

- Red worms

- EM

- Tank

- Pump machine (optional)
Making Vermicompost Fertilizer

Process:

1. Mix manure and organic waste with the EM in the tank. Let it sit for one week.

2. After one week, use a pump machine to feed the red worms the mix. Or, if you don’t have a pump, manually deliver the compost to the red worm container. Pump to the surface. There is no need to mix the worms and the compost mix.

3. Every 3 days, feed the red worms with the compost mix.

4. Once you have enough vermicompost, then you use EM to compost again. This will get rid of the smell. EM reduces fungi and other bacteria which is harmful for plants.

RED WORM PRODUCTS

If you need to contain the growth of the red worms, there are two products you can produce:

- **Red worm powder**: Mix bokashi with red worm, dry. Use to feed shrimp.

- **Red worm liquid**: After harvesting worms, put 1 kg of red worms in the 1 L of EM in a container for 10-15 days. The liquid can be used as a foliar fertilizer and EM supplement for plants.

IMAGES

1. The red worm farm
2. Inside the worm tents
3. Mr. Vuong’s wife entering the tent
4. Shoveling the fresh compost for a customer
5. A full bag of fresh compost
6. Mr. Vuong sealing the bag
7. A happy customer leaving
Soybean Powder for Fertilizer

USING SOYBEAN POWDER AS ORGANIC POTASSIUM FERTILIZER FOR FRUIT TREES

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<tr>
<td>Creators: Phu Dien Commune</td>
<td>Using soybeans as an organic potassium fertilizer to increase the sugar content of guava, pomelo, and oranges</td>
<td>Phu Dien commune, Tu Liem district, Hanoi</td>
</tr>
<tr>
<td>Contributor: Mr. Troung</td>
<td></td>
<td>Lo village, Gia Lam, Hanoi</td>
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<tr>
<td>Facilitator and Translator:</td>
<td></td>
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<tr>
<td>Dung Tran</td>
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Benefiting Provinces:

Hanoi and surrounding area

THE STORY

Mr. Troung was born into a farmer family. He has been farming for the past 20 years after he inherited the land from his parents. He currently farms fruit such as guava, oranges, pomelo, papaya, langon, and more. Mr. Troung currently uses local, specialty cultivar: Cam Canh (orange) and Buoi Dien (pomelo).

The method of using soybeans as organic potassium fertilizer originated from the Phu Dien commune, Tu Liem district, Hanoi. In the beginning, farmers in Phu Dien used this technique for a specific fruit tree, Buoi Dien, a Vietnamese pomelo cultivar. Now this method can be applied to many different kinds of fruit trees, and especially the orange tree.

The nutrients from soybeans, and in particular, potassium, increase sugar content in order to produce sweeter, more profitable fruit.
Soybean Powder for Fertilizer

HOW TO MAKE SOYBEAN FERTILIZER

Materials for Fertilizer:

- Soybeans - 1 kg per plant
- Grinder

Instructions:

- Plant each tree 3 meters apart, and each row 3.5 meters apart

- Grind soybeans into powder form. Each plant needs 95.2 grams/m²

- During the flowering stage of the tree, apply directly to the bed of the tree

- Cover the powder with a layer of soil

- Water

*Note:

- Applying more than 1 kg (100 g) powder/plant will not further improve the quality of the plant. Use an excess of 1 kg is not necessary.