Engaging with Academia and Research Institutions (ARIs) to support Family Farmers and Food System Transformation During and Post COVID-19 Pandemic in Asia

With technical assistance from the FAO Regional Office for Asia and the Pacific
Initiatives for development of integrated coffee system under market forces in the Central Highlands of Vietnam

Hue Tran, Maria Burkiewicz, Senthil Nathan - Enveritas.

Hoi Pham - CARES
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Large-scale and real-time surveys on coffee farming performed in three harvest seasons by Enveritas in partnership with leading Vietnam institutions.

**Enveritas**

- Operating in 20+ countries. **Lead in the VN project** of verification

**CARES**

- A R&D center within Vietnam National University of Agriculture
- **Co-ordination of the project** in VN.

**Dalat University** – located in Central Highlands
- **Leading the field coordination, recruitments and field-related administration** in the project in VN.
Background

- Coffee is an important commodity and **originally grown under shade** trees.
- In the 1990s/2000s: **cut-off of shade trees to maximize yield** due to demand and price increase.
- Recent years: **more intercropping** due to low price, low production efficiency and newly emerging fruit market.
- In the recent 2 years: coffee market price has increased again, and fruit-crop market dropped, some farmers started to **cut down fruit crops again**.

➢ Market-driven farmer’s practices: uncertain future for integrated coffee systems if **no adequate initiatives undertaken**.

Photos: mono vs diversified coffee farms
Artificial intelligence algorithm identifies farm sample using satellite imagery

Data collectors travel to points and use app-based survey tailored to local conditions

- Pin dropper & randomization
- Statistically robust
- Real-time survey
- Survey conducted at harvest time
- Backcheck
- Bigdata & Multi-layered QA checks
Intercropping is popular in CHs but varies greatly across regions. Light shade dominates in coffee farming.

### Popularity of intercropping on coffee farms in Central Highlands

<table>
<thead>
<tr>
<th>Crops</th>
<th>Central Highlands</th>
<th>Dak Lak</th>
<th>Dak Nong</th>
<th>Gia Lai</th>
<th>Kon Tum</th>
<th>Lam Dong</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durian</td>
<td>49%</td>
<td>52%</td>
<td>44%</td>
<td>47%</td>
<td>45%</td>
<td>51%</td>
</tr>
<tr>
<td>Avocado</td>
<td>49%</td>
<td>55%</td>
<td>43%</td>
<td>41%</td>
<td>54%</td>
<td>45%</td>
</tr>
<tr>
<td>Pepper</td>
<td>42%</td>
<td>55%</td>
<td>51%</td>
<td>35%</td>
<td>14%</td>
<td>14%</td>
</tr>
<tr>
<td>Jackfruit</td>
<td>14%</td>
<td>16%</td>
<td>12%</td>
<td>16%</td>
<td>25%</td>
<td>8%</td>
</tr>
<tr>
<td>Macadamia</td>
<td>4%</td>
<td>4%</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
<td>6%</td>
</tr>
</tbody>
</table>

### Shade levels breakdown by provinces in Central Highlands

- **Dak Lak**: 14% no shade, 19% light shade, 6% medium shade, 3% heavy shade
- **Dak Nong**: 15% no shade, 19% light shade, 6% medium shade, 3% heavy shade
- **Gia Lai**: 0% no shade, 3% light shade, 6% medium shade, 45% heavy shade
- **Kon Tum**: 0% no shade, 0% light shade, 0% medium shade, 65% heavy shade
- **Lam Dong**: 1% no shade, 1% light shade, 32% medium shade, 32% heavy shade

**Central Highlands**: 24% no shade, 32% light shade, 24% medium shade, 24% heavy shade

n=7310, data of 2 harvests 2019/20 and 2020/21
The two farmer groups: intercropping & monocropping have different profiles in terms of demography & farm characters.

**Farmer’s age**
- Average Farmer Age $^{ns}$
  - G1: 48
  - G2: 47

**Farmer’s experience**
- > 15 years experience growing coffee
  - G1: 67%
  - G2: 62%

**Education level**
- high school, vocational, grad, postgrad $^{ns}$
  - G1: 25%
  - G2: 21%

**Farm size**
- Median farm size (ha) $^{ns}$
  - G1: 1.1
  - G2: 1.0

**Yield**
- Median yield (kg green bean/ha)
  - G1: 2,228
  - G2: 2,540

NS: non-significance & * significant difference at the confidence level of 95%
... and other social aspects as well as farming practices

### Above poverty (AP)

<table>
<thead>
<tr>
<th></th>
<th>G1</th>
<th>G2</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP1:</td>
<td>$1.90</td>
<td></td>
</tr>
<tr>
<td>AP2:</td>
<td>$3.10</td>
<td></td>
</tr>
</tbody>
</table>

### Key source of income

- Coffee is the main source of income

### Training access

- Training access in the past two years

### Farming practices

- Inorganic fertilizer use (1)
- Organic fertilizer use (2)
- Irrigation (3)
- P&D problems (4)
- Pesticide use (5)

### Above Poverty (AP)

<table>
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<th></th>
<th>AP1</th>
<th>AP2</th>
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<td></td>
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#### Progress out of Poverty Index (PPI)

- AP1: $1.90
- AP2: $3.10

All are significant differences at the confidence level of 95%.
Shade, fertilizer are strongly correlated with yield, but high fertilizer use leads to diminishing returns

- Shade level and yield are in a **negative** relation
- Fertilizer level and yield are in a positive relation. However, ROI analysis shows that at some level of amount of fertilizer applied the **positive relation of yield and fertilizer changes**.
Total household income is higher for integrated farmers

- Intercropping farmers achieve **lower coffee yields** thus lower income from coffee.
- However
  - Intercropping farmers apply significantly less chemical fertilizers
  - **Total household income** of intercropped farmers is **significantly higher** than mono-cropping.
Market driven making changes with uncertainties

The **targets** of development of "**crops of good cash return**" without attention to and understand of biodiversity roles /ecosystem services.

The **crops restructure** towards fruit trees at the expense of annual crops negatively influencing food/feed sovereignty and farming sustainability (at national and local levels).

The return to integrated coffee systems mainly **driven** by low coffee **market** and high market potential for other crops

There is thus uncertain farming future: either farmers continue with integrated systems or return back to mono-coffee.
Coffee system transition toward integration required PPP approach.

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<thead>
<tr>
<th>Government</th>
<th>Suppliers/roasters</th>
</tr>
</thead>
<tbody>
<tr>
<td>. National communication program and/or training on ecosystem services</td>
<td>. Buying mechanism</td>
</tr>
<tr>
<td>. Programs or policies supporting and sustaining integrated coffee systems</td>
<td>. Seedlings promotion and delivery</td>
</tr>
<tr>
<td></td>
<td>. Raising their awareness on ecosystem services/zero emissions</td>
</tr>
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</table>

Promotion of agroforestry systems

<table>
<thead>
<tr>
<th>Research/NGO</th>
<th>Farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>. Insights of the issue by data-driven approaches **</td>
<td>. Raising awareness and changing the mindset</td>
</tr>
<tr>
<td>. Designing the most suitable models**</td>
<td>. Collaborating in programs</td>
</tr>
<tr>
<td>. Disseminating knowledge**</td>
<td>. Performing practices.</td>
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</tbody>
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Specific initiatives for ARIs

**Data-driven approach** and agroecological transition monitoring
- Farming practices will be further **driven by markets, climate changes and pandemics**.
- Agroecological measurement **promotion and assessment** (i.e. by FAO-TAPE) → local adaptation, farming efficiency & resilience.

Participatory designing locally **suitable integrated systems** (pivoted on biodiversity and circular farming).

Educating on the **ecosystem roles** in the **economic** benefits and **health** impacts on coffee sectors & stakeholders, incl. consumers.

Disseminating agroecological **knowledge** & local successful case studies though ARIs network, mass media and policy dialogue.