Baseline Report: Evaluation of the Early Impacts of Sustainability Standards on Smallholder Coffee Farmers in Lampung and South Sumatra, Indonesia

Demonstrating and Improving Poverty Impacts

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Table of Contents

Background

This baseline report presents the initial stage of a research project with the overarching goal to examine the impact on farmer livelihoods and poverty alleviation within Indonesian coffee-growing communities as a result of processes of verification or certification against different sustainability standards. These standards include the Common Code for the Coffee Community (4C) Code of Conduct, the Sustainable Agriculture Network/ Rainforest Alliance (SAN/RA) standard, and Utz Certification. The project, co-funded by the Ford Foundation (through the ISEAL Alliance) and the Australian Centre for International Agricultural Research (ACIAR), adopts an integrated, mixed-method, research design to address this overarching goal. The research team for this study is being led by researchers at the University of Sydney. This report presents the baseline survey results and preliminary findings for the project.

A research design to address the following questions has been prepared:

Primary Questions

1. What is the impact on farmer livelihoods as a result of being involved in a 4C-verified production unit?

2. What is the additional impact on the livelihoods of farmers, currently part of a 4C-verified unit, if they become further certified to the SAN/RA coffee standard?

Secondary Questions

1. What is the relative impact of sustainability standards on poverty alleviation in the **broader context of livelihood change** and rural development processes currently occurring in southern Sumatra? What role do coffee and sustainability programs perform in developing household livelihood assets? What narratives do farmers adopt to present their experience of coffee, poverty alleviation and sustainability?

2. What is the relationship between sustainability **standards and inequality** within the community? Do sustainability standards unintentionally target relatively better-off households? Are there any barriers that prevent the poorest households being involved in, or benefitting from, sustainability programs? Why do some farmers not become involved in sustainability programs? Do standards increase inequality by improving the livelihoods of some farmers, but not others?

3. What **services** (eg. training programs) and **inputs** (eg. credit, equipment, materials) are provided to farmers during the process of becoming involved in sustainability standards? How do farmers value these services and inputs? Who provides services and inputs to farmers and who finances this provision? What motivates the provision of these services and inputs?

4. What are farmer **perceptions of sustainability** standards and the processes associated with standards? What aspect of the standards do they consider the most beneficial to their well-being? How do perceived benefits compare with perceived costs of participation?

5. Does certification and verification provide additional market-related benefits in Sumatra beyond 'in-house' sustainability or training programs alone? What are the **current market dynamics** within southern Sumatra for certified and verified coffee, and how are these conveyed to farm households? What factors are driving (or acting as a disincentive for) the adoption of sustainability standards by private sector firms in Sumatra?
6. What role is, and potentially could, **local government** be undertaking to maximise the benefits of sustainability programs for Sumatran coffee farmers?
7. Are **producer groups** strengthened by certification, and do strengthened producer groups more successfully support smallholder farmers and their families? What are the intended and unintended **gender effects** (e.g. role in household financial management) of the organisational development of farmers associated with sustainability standards?
8. What **methods, techniques and indicators** are the most effective and appropriate to understand and evaluate the poverty impacts of sustainability programs?

Detailed description of methodologies

In this section we describe the methodologies that we have developed to address the objectives listed in the preceding section. These were originally proposed in the report '201504ResearchDesign_Sumatra' and follow the objectives described in the previous section and commence with a review of the fundamental processes associated with verification and certification. This is then developed into a broader Theory of Change in the Sumatran caase-study. We will then briefly discuss logistical and practical challenges that we faced in translating our objectives and Theory of Change into an implementable research design in the field. Sustainability Standards: Background on 4C Verification and RFA Certification.

Sustainability standards are meant to verify the ethical, social, environmental, and economic merits of coffee production, which can be promoted to final consumers. In Sumatra, these standards are implemented through four key processes:

1. The training process. Training materials are developed by independent standard setting organisations, by partner NGOs, or by private sector companies, to convey to farmers the practices necessary to meet the standards. This usually involves an intensive initial training phase with weekly or monthly training for a few months, and then ongoing supplemental training over a 3 or 4-year cycle. Training is often implemented by the companies who directly source coffee from farmers, since they have the best access and local infrastructure to reach the farmers, sometimes with the support of standard setting organisations. Training is commonly integrated within an Internal Control System (ICS) managed by the companies and implemented through trained agronomists;
2. The auditing process. Third-party, independent auditors are hired to travel to the field and verify the extent to which farmers are actually complying with the practices dictated by the standards. This is usually done by randomly selecting a small subset of farmers in a farmer group for detailed auditing on an annual basis. Farmers are

typically allowed to improve performance over time – e.g., for initial certification compliance with 50% of the standards might be sufficient, whereas after 3 years 70% compliance could be necessary.

3. The 'certification' process. Farmer groups that comply with the standards will hold certification (or verification, depending on the program). In the Sumatran context, this certification or verification is commonly held by the company on behalf of the farmers. Such coffee can then be sold as SAN-certified or 4C-verified coffee in the domestic and international market.
4. Marketing processes. These above processes are commonly associated with a new marketing channel and often the establishment of a new local-level buying station, whereby verified or certified farmers obtain certain market privileges. This new marketing channel involves price premiums at the farmer-level for both: i) certified / verified coffee; and ii) for higher quality coffee. The 'certification' premium in the Sumatra site is 300Rp (3c) per kg, whereas the 'quality' premium may be up to 2000rp (20c) per kg. In general, certification is associated with a more direct marketing chain for farmers.

The study described in this report will evaluate the impacts of the two sustainability standards. First, the 4C Code of Conduct is considered a baseline standard for sustainability, comprising a set of practices that could be considered a minimal package for sustainable coffee production. The Code includes a list of 10 unacceptable practices that must be eliminated, alongside 28 social, environmental, and economic principles for the sustainable production, processing, and trading of green coffee. 4C uses a 'traffic light' system to identify the level of sustainability (compliance with the standards), so that a farmer group must receive an audit score of at least yellow to receive a 4C premium.

Second, our studies will additionally focus on the Sustainable Agriculture Network (SAN) coffee standard, which is linked to the Rainforest Alliance label that is familiar across many consumer products. The SAN standard includes more advanced criteria for sustainability that extend on the 4C standard. The standard's key principles cover management systems, ecosystem conservation, wildlife protection, water conservation, working conditions, occupational health, community relationships, integrated crop management, social conservation, and integrated waste management.

The process of moving to sustainable coffee production can take a number of years, both in terms of discrete steps such as from not being involved in a sustainability program to an entry-level standard such as 4C, and then from 4C to a more advanced standard such as SAN, There are also frequently continuous steps up the compliance ladder within a given standard. This involves changes not only within a farmer household and on their farm(s), but also in farmer group governance, and the local socio-economic system around coffee production.

Linked to the four fundamental processes outlined above, we can develop a more encompassing Theory of Change for how standards might be capable of inducing livelihood improvements with coffee farming communities.

Theory of Change

The research team reviewed the following three Theory of Change documents.

- ISEAL (June 2013): *Working Together to Demonstrate & Improve Poverty Impacts*
- SAN / RA (February 2015): *Summary of the Sustainable Agriculture Network (SAN) / Rainforest Alliance Agriculture Theory of Change*
- 4C Association (June 2013). *For A Better Coffee World 1.0*

We then considered these documents in the Sumatran context, and propose a theory of change as outlined below.

Provision of Support Services

1. Support for organisational change amongst the producer community
2. Technical training of farmers
3. Provision of inputs (material and credit)
4. Audit and certification, linked to changes in the marketing chain

Short-term Outputs

1. Increased farmer knowledge about sustainable agriculture / Good Agricultural Practices
2. Adoption of better (and more sustainable) farm practices
3. Protection of biodiversity (RA/SAN specific)
4. Adoption of improved farm management / business systems
5. Strengthened producer organisations
6. Enforcement of labour rights / improved labour conditions
7. Support for community development infrastructure

Longer-term Outcomes

1. Biodiversity conservation (RA/SAN specific)
2. Better protection of natural resources (especially water and soil)
3. Increased farm productivity (at whole of farm level)
4. Increased farm profitability (at whole of farm level)
5. Improved well-being and livelihoods of farmers and farm communities

Based on the requirements set out by the Ford Foundation, this research activity aims to specifically answer the following 4 key questions, which have been adapted from earlier Terms of Reference:

1. What is the annual reach and market presence of the standard systems in southern Sumatra?
2. What types of producers and producer groups are engaging with the stndards systems? Are they reaching smallholders and marginalized farmers?

3. Are producer groups and producers making progress along the outcome pathways identified in the conceptual framework?

4. Do we see improvements in human well-being at the household level, particularly for small holders and marginalized producers?

Our study design responds to point 3 above, by monitoring indicators (at the individual household level) of the provision support services, practice adoption and short-term outputs, and longer-term outcomes for farmer livelihoods, based upon the theory of change outlined above. In doing so, the study should generate insights into the efficacy of the Theory of Change documents prepared by the three organisations.

A central theme within the Theory of Change documents is that engagement with the standards will induce practice change at the farm level – notwithstanding the other outcome pathways identified above (such as organisation strengthening, market access, and provision of inputs). There are some important subtleties related to factors likely to affect the adoption of new practices that should be emphasised. First, most obviously, we should expect little change in dimensions where most farmers are already compliant. Whether they emerged endogenously or as a result of prior training or capacity building interventions, the extent of already-compliant practices will limit the scope of observable change.

Second, it is important to consider the timing at which we might expect change to occur. In theory, adoption of practices could be limited by two key factors. One could be a lack of understanding – farmers may find it challenging to absorb the material that the trainers present to them. This may be particularly true of justification for certain practices that are based primarily on scientific logic that might be unfamiliar to the farmers. This perspective would predict that farmers should be most likely to adopt the practices that are easiest to comprehend and that are rationally acceptable to farmers.

A third factor could be that farmers need to make a decision about which practices to adopt and when, and some may not be considered worthwhile to adopt, at least at a particular point in time. This could be due to various reasons – the scale of the coffee farming operations, lack of necessary inputs (including time, additional labour, equipment), lack of incentive due to poor market access, or perceived irrelevance of the practice within a particular household's livelihood priorities. This latter reason might be particularly true in the case of highly diversified livelihoods, where implementing coffee-specific practices might detract from other farm or non-farm activities. This perspective would predict that we should see the practices that are the least costly to adopt to be taken up initially. It is possible that this could lead to an adoption ladder, as the adoption of certain practices makes others progressively easier to adopt. There could be many ways to construct such an adoption ladder depending on factors ranging from the nature of the baseline farming operation to proximity to markets.

Finally, the timing and quality of training provision (materials and instructors) will be critical. Although there have been some attempts towards the standardisation of training materials and curriculum, this is not always the case. Some trainers may be better than others, with varying capacities as educators and agronomists. The training methods will also vary (classroom, field schools, use of demonstration plots) and their intensity and regularity will vary enormously, and are all likely to affect practice adoption.

Constraints in Study Design

In attempting to incorporate the above objectives and theory of change into a research strategy, we faced a number of practical challenges. Most importantly, while there had been rapid development of third-party sustainability standards across southern Sumatra over the last five years, there appears to have been somewhat of a stall over the last 12-18 months. Companies such as Mondelez and Nestle (identified in the ToR as partner companies for the study) suggested that they were reconsidering commitments to the further expansion of third-party sustainability standards (4C, RA or Utz) in southern Sumatra. Instead, these companies appear to be prioritising in-house sustainability programs instead (notably Coffee Made Happy and the Nescafe Plan). This has had two important implications for this study design:

1. It has proved difficult to identify a site with impending expansion of a third-party sustainability program that would enable a pre-intervention baseline and the follow-up research design,
2. Several existing sustainability programs are implemented as a combination of certification/verification along with additional firm-specific interventions, making it difficult to (quantitatively) tease out causation related to sustainability standards.

Methodologies

The research design we have adopted constitutes an impact evaluation using mixed method design, incorporating and integrating qualitative and quantitative methods to answer the above listed research questions. Furthermore, given the specific field constraints in southern Sumatra, the most effective design to address the questions also involves an array of study site locations with integrated, yet varying levels of research intensity. The entire design will cover the 8 leading coffee-producing districts (Kabupaten) of South Sumatra and Lampung provinces (Table 1), but with a high degree of research intensity in the Muara Enim District of South Sumatra (and the Semendo sub-districts located there).

District	**Approximate Area of Coffee farms**
Lampung	
Lampung Barat	59,000ha
Tanggamus	44,000ha
Way Kanan	22,000ha
Lampung Utara	16,000ha
South Sumatra	
OKU Selatan	71,000ha
Empat Lawang	69,000ha
Muara Enim	23,000ha
OKU	18,000ha

Table 1. Proposed Research Sites across Southern Sumatra

Experimental and Quasi-Experimental Quantitative Research Designs

In the preparation phase for the quantitative research components of the study, our main objective was to pursue research design(s) that would allow us to draw out rigorous causal inferences on the impacts of verification/certification on socio-economic outcomes. It is generally accepted in the impact evaluation community that the ideal way to do so is through an experimental approach ('randomized control trial'). In our context such approaches are most feasible when an implementation partner is already planning a certification roll-out, especially one that will be staged over a few years. In such cases the implementation partner only needs to agree to allow the researchers to randomly select which sites or units will be pursued for the certification intervention early in the roll-out and which ones later. Sometimes fully randomized designs are simply not feasible, so we also considered quasi-experimental approaches that do not involved explicit randomization but approximate full randomization to create quasi treatment and control groups that are as similar as possible.

Given the nature of the research opportunities that were revealed during Phase 1 of the project, we have focused our experimental and quasi-experimental quantitative activities in the Muara Enim (South Sumatra) site. There are two primary dimensions to these activities:

A. A randomized control trial (RCT) study that will involve a comparison between (i) a treatment group of randomly-selected farmer groups who will receive an upgrade from 4C verification to RA certification, (ii) a control group of farmer groups who will remain with 4C verification for at least 3 years. This design will allow us to clearly evaluate the impacts of moving from 4C to RA.

B. A quasi-experimental study that will involve a comparison between (i) a treatment group of farmers who have received 4C verification (the control group in the RCT described above) and (ii) a control group of farmers in the same region who have not received any form of verification or certification. The study will involve a method of propensity score matching (PSM) combined with differences in differences (DiD): PSM will be used to identify a comparable control group for this second study, to the control group in the RCT study, while DiD will exploit the panel data generated in the study to de-bias inferences from observed and unobserved sources of heterogeneity between (i) and (ii).

Details of the proposed RCT and PSM/DiD methodology in Muara Enim are provided in Appendix D.

Survey Tool and Data Collection

The key data collection method for the quantitative research is the household-level survey instrument that is used during the baseline and follow-up survey rounds. The survey instrument was designed to address many of the aforementioned issues.

The household survey instrument covers a range of topics, including certification and verification status, household demographic characteristics, household assets and expenditure, poverty status and well-being, power relations within the household,

household engagement with the farmer group, and extensive information on the household economy including occupational status of household members and detailed status of the household head, the scope of the household farming operation and detailed information on the household's primary coffee plot, from production practices to output to labour practices and use of inputs such as fertilizers, pesticides and equipment, and detailed information on coffee marketing and trade.

Preparation for the baseline survey ran from April to July, 2015. We hired a full-time research project manager who started in early May. We contacted candidate survey institutes in Indonesia, and settled on SurveyMETER, of Yogyakarta, after receiving two quotations for the baseline survey.

We developed the survey instrument in May-July from three main sources:

1. COSA household and coffee operations survey ("long" survey);
2. A household-level micro-enterprise survey from one of Toth's other projects;
3. The listing of core indicators provided in the ISEAL ToR.

There was also some additional work to develop some new measurement approaches. Perhaps most notable was the module for measuring household power relationships. A number of survey instruments employ a Likert scale (e.g., 1-5) to measure power that can be hard to compare across households. In pilot tests we found that an approach based on asking respondents to assign a fixed number of 'power points' (e.g., 10) across household members to enhance comparisons between households was difficult for respondents to grasp. Hence we developed an approach based on categories the degree of voice that a particular household member has in a decision, from no voice, to intermediate categories like having the opportunity to discuss the issue but no influence in the final decision or having veto power over a decision, to being the sole decision maker without any input from other household members. We found that respondents were able to understand this approach, and it generates categorical data that can be meaningfully compared across households.

The full survey development process began with the COSA instrument, editing and update with inputs from 2 and 3, weaving in additional measurement approaches along the way. In practice the main task was in paring down some of the detail in the long COSA survey instrument, especially around farm practices, while meeting the recommended list of indicators in the ISEAL ToR, while avoiding an overly fatiguing survey. The process also involved extensive and intensive piloting, fieldwork and revision over a number of weeks both in Semendo and Java, to adapt the survey instrument to the local context and ensure that each question is sufficiently easy to explain and properly adapted to the local context. Drawing upon SurveyMETER's 20 years of experience in conducting socio-economic surveys across Indonesia was critical for this process. In the end the survey ended up clocking in at around 2 hours, which was more than intended but seemed manageable in the field.

Implementation

The quantitative surveys had two main samples: candidates for the randomized control trial (RCT) (targeting 59 pre-existing ICC farmer groups), and additional candidates for the "control group" in the propensity score matching (PSM) analysis (targeting about 30 farmer groups not currently serviced by ICC). Furthermore, we sought to divide the 30 PSM farmer

groups into about 15 from villages that have existing ICC farmer groups, and 15 from completely external villages. This was done in order to be able to test for potential spillovers of the impacts of certification within villages, which would be a threat to the RCT.

The baseline sample is displayed in the following table, for the RCT and PSM samples, respectively. The bottom row displays the target number of respondents in each sample, based on initial sampling frames from ICC or local government. There were 1136 observations in the prospective RCT sample, based on a final database of 4C-certified groups from ICC. Column 2 accounts for the prospective respondents. 979 were successfully interviewed by SurveyMETER in 59 farmer groups. The remaining rows account for the remainder of the prospective sample. 13 respondents were contacted but refused to join the survey. 45 had moved and could not be contacted, while 26 were traveling away from Semendo and not available for contact. There were 36 cases of duplicate names in the database, and 37 cases where two household members were separately listed in the database, and hence the secondary household member was not interviewed. Column 4 reports on the sample contacted as a percentage of the target. Columns 3 and 5 provide the analogous information for the additional PSM sample, in which 609 out of 835 target farmers were interviewed. Keeping in mind that the PSM sample is drawn from farmer groups that are less likely to be involved in the group activities brought about by participation with ICC, the lower response rate is unsurprising. Overall this gives us a total of 979 + 609 = 1588 respondents across 89 farmer groups.

	RCT	**PSM**	**% RCT**	**% PSM**
Interviewed	979	609	86.2	73
Refused	13	16	1.1	1.9
Moved	45	29	4.0	3.5
Travel, unable to contact	26	32	2.3	3.8
Duplicate name	36	93	3.2	11.1
Member of household	37	56	3.3	6.7
Target	1136	835	100	100

Randomization of Treatment

ICC requested that the research team provide the final randomization of farmer groups in the RCT sample to treatment and control status in early September. Since the full set of raw data were still in process of being checked and cleaned, a somewhat limited set of variables was available. For example, variables on the details of farm labour allocation and coffee sales profiles were still in process of being checked and validated. Hence we used the data that were available at the time from the baseline survey to carry out stratification and check for baseline balance in the assignment to treatment. A particular innovation was to stratify the sample on livelihood status – to ensure that the RCT treatment and control groups had about the same number of members in each of four livelihood status categories that we developed (see next subsection), within each village. This categorization was done with the set of variables that were available at the time. By ‘baseline balance’ we mean that we

wanted to check that the 'randomization worked' – that the RCT treatment and control groups would be statistically identical across a number of baseline variables. While the laws of probability tell us that the draw of treatment and control groups should be balanced the vast majority of the time, we know that it is possible to get unbalanced samples from randomization. For example, if we flip a fair coin 100 times it is most likely that we will get a draw of heads and tails very close to 50/50, but not impossible to get outlier draws like 90/10. Baseline balance checks help us verify that the randomly drawn RCT treatment and control samples look more like the 50/50, even draw that will make our statistical analysis cleaner when we generate the first impact estimates after the first endline round is fielded.

Stratification on Livelihood Status

A key request of ISEAL in the research design phase was that the research team consider the potential differential impacts of certification for farmer groups with different socio-economic livelihoods. The ideal way to identify the impacts of heterogeneity (here, socio-economic heterogeneity) in an experimental context is to stratify the randomization on a set of categories that capture the different livelihood statuses. Critically for our context, we would need the categorization to be able to pick up heterogeneity between farmer groups within villages (i.e., within a single village, there would commonly be farmer groups falling in two or more of the different livelihood categories). ISEAL led a livelihood mapping exercise in August, 2014, that identified and classified livelihoods zones for much of Lampung and South Sumatra. While the livelihood mapping categories used for such a broad geographic scale were too general for our purposes, particularly to identifying within-village heterogeneity, we took up the underlying ideas of the earlier livelihood mapping exercise.

In implementing the randomization of treatment we stratify[1] the randomization according to village and livelihood status. By livelihood status we mean the nature of the household economy, which in the Semendo context means the extent to which the household farming operation is based around coffee farming, rice farming, fruit tree production (especially durian), or off-farm labour activities. Households within all farmer groups have some engagement in these various activities, but there can be significant variation in the extent to which certain farmer groups tend to specialize in certain livelihood mixtures. This is important relative to the earlier discussion, because it allows us to more precisely identify the role of livelihood status in the effect of treatment.

After initial analysis of the baseline data, we categorized the farmer groups into four main categories, according to the extent to which their constituent households' engagement in the aforementioned activities was above or significantly above the averages for the overall sample (number of farmer groups in brackets):

1. Mixed livelihood (coffee dominant) (19)

[1] Stratification allows us to ensure that treatment is balanced within sub-groups of the population. For example, suppose in a different study we have 40 groups of men and 10 groups of women, and we want to stratify treatment on gender so that we can precisely identify the effect of gender on the treatment effect. Then rather than randomizing over the 50 groups overall, which could lead to allocations like 23 male groups assigned to treatment and only 2 female groups assigned to treatment, we randomize *within* the groups. I.e., randomly select 20/40 male groups and 5/10 female groups separately, and then merge them together to create an overall treatment sample with 25 groups.

2. Mixed livelihood (rice dominant) (20)
3. Mixed livelihood (fruit trees dominant) (7)
4. Mixed livelihood (off-farm dominant) (13)

Based on qualitative work in Semendo in preparation for the study, and intensive qualitative work in June, 2015, we expected that coffee-focused and rice-focused livelihoods would be prominent in Semendo. With this in mind, we primarily relied on baseline survey variables related to livelihood status, especially time spent working in various agricultural and non-agricultural occupations (during and outside coffee season). After selecting a number of variables related to time use in occupations, we collapsed down the dataset to extract farmer group averages. Then we generated variables to capture whether particular farmer groups seem to be particularly intensive in certain occupations (coffee, rice, off-farm activities, and a set of about 20 additional agricultural crops). We then decomposed the amount of variation in livelihood participation that could be explained by particular livelihoods using a simple linear regression. This helped us identify a set of 14 variables that were particularly important in explaining differences in livelihood status.[2] To further simplify, we created a correlation matrix out of these variables, to check to what extent they were correlated (if two measures of livelihood status are highly correlated, then it could be sufficient to just use one of the variables in categorizing livelihoods), while checking this matrix also allowed us to see to what extent certain livelihood patterns are connected, suggesting a potential joint category.

This left us with four key variables – weeks per year spent in coffee farming, extent to which rice is the most important crop excluding coffee, extent to which durian (a fruit common in Indonesia) is the most important crop excluding coffee, extent to which off-farm labour is the most important activity outside coffee season – to parse out four key livelihoods: coffee intensive, rice intensive, durian intensive, and mixed livelihood. Of course all farmer groups will likely show a mixture of intensity in these activities (indeed, we know that all are coffee farmers), but the "intensity" categories show particular dominance of a particular activity, whilst farmer groups in the mixed livelihoods largely show balance across two or more livelihood activities. Overall, we categorized 19 farmer groups as coffee intensive, 20 as rice intensive, 7 as durian intensive, and 13 as mixed. This fits with our qualitative perceptions of the region; indeed, durian was raised prominently as an important agricultural activity in the region, though it is perhaps surprising that fish farming did not receive greater emphasis.

Stratification and Final Randomization

Having stratified according to livelihood status, we are prepared for the final randomization, which stratifies on livelihood status crossed with home village. The result will be a treatment

[2] These variables were (code refers to question numbering in household survey instrument): HD08 primary livelihood status during coffee season, HD09 primary livelihood status during rice season, HD10 primary livelihood status outside coffee and rice season, AC5 occ1 hours per week worked in coffee during coffee season, AC5a occ1 weeks per year worked in coffee during year, HE20a non-coffee crop output, HE20b earnings outside coffee, HE21c binary variable for whether other non-coffee crops distract from coffee activities, HE3 binary variable for whether produce non-crop agricultural outputs (meat, bees), HE31a other non-crop agricultural outputs produced, HE31 number of non-crop agricultural outputs (animals, bees), PS6a (a-d) total coffee output, FL8ba, FL8bb total days of external male and female labour, MC3 time to travel to nearest commercial center from main plot, MC4 Distance from main plot to nearest commercial center.

assignment that has both treatment and control farmer groups in nearly[3] every village, as close as possible to an equal number in treatment and control in each village. Furthermore, the number of farmer groups in each livelihood category will as close to equal as possible across treatment and control *within* each village.

In order to do so, we divide the farmer groups into unique cells based on their livelihood status, within each village. E.g., if in village A there are 4 farmer groups, 2 coffee intensive, 1 rice intensive, and 1 mixed, then we would have 3 cells. We then generate random numbers for each farmer group and randomize the order of farmer groups within each cell. Given the sparseness of the cells (a large number of cells with a single farmer group, as in this example), we can't simply select the first-ranked farmer group in each cell for treatment. Hence we randomize the original list within livelihood categories, essentially to allocate some of the single-cell farmer groups to treatment, and some to control. In our example, this might mean that one of the coffee-intensive farmer groups ends up in the treatment group, and the other under control, while the rice intensive group is assigned to treatment and the mixed livelihood farmer group to control. Obviously in this case the rice intensive and mixed groups are not balanced across treatment and control in this village. However it is likely that there would be another village where the assignment is reversed (e.g., rice intensive to control, mixed to treatment) so that we achieve balance across the overall sample. This approach generates the final treatment assignment.

Outcome of Treatment Socialization

The final treatment assignment was shared with ICC on September 8, 2015, with 29 4C-certified farmer groups selected to be offered to join RFA certification. This treatment assignment was shared with ICC field staff in Semendo, who were assigned to socialize the upgrade to RFA certification amongst the 4C-certified farmer groups. The research team clearly communicated to ICC that it is essential to obtain as high as possible of a rate of uptake of RFA within the treatment group as possible, ideally above 90%. Fortunately, the ICC staff were very effective, reporting 100% uptake amongst 28 treatment farmer groups. This result is very promising for the study. It turned out that a 29th farmer group had been incorrectly assigned to the original candidate database, and had already joined RFA in a previous year. Hence the research team selected an additional farmer group, in order to increase balance in the stratification.

Village-based case-studies

A series of 4 village-based case-studies at the scale of the *desa* (administrative village) will be undertaken to contextualise the reach of sustainability programs within broader development processes taking place in rural Sumatra. Two of these case-studies will be in Muara Enim District and one each will be in Tanggamus and West Lampung. Sites will be chosen based on villages where a number of farmers are already participating in sustainability programs. These studies will help identify the relative position of participating households within society, assess the reach of schemes into the broader community, and identify how the poorest households interact with sustainability programs.

Although sizes can vary considerably, the typical *desa* in rural Sumatra consists of a few thousand individuals across maybe 500 households. Each case study will involve a profile of

[3] In a couple of cases a village only has 1-2 farmer groups so it is more difficult if not impossible to guarantee balance.

livelihoods and economic activities across the entire *desa*, including in-depth interviews with at least one of the each of the main livelihood categories found in the village. Researchers will stay in an appropriate host household (possibly the 'Village Head' or 'Village Secretary'), allowing extended interviews to be undertaken regarding local development trajectories, the role of migration and remittances, and the specific importance of coffee and sustainability programs to the village. An inventory of government infrastructure and spending in the *desa*, and the details of any broader rural development initiatives in the community will be documented.

The first village-based case-study was undertaken in Muara Enim from June to August, 2015, with field methods to be subsequently adapted and refined for completion of the other three sites in 2016. Key insights from that case-study are presented in this baseline report.

Two members of the research team spent an initial period of 20 days living in the village in June 2015, with a shorter follow-up visit of 6 days in late August 2015 by a third member. In total, the team interviewed 160 villagers. All interviews were carried out in an informal, semi-structured and conversational manner. Notes were taken during and after interviews, with transcripts drafted at the conclusion of the research period. Approximately 90% of these interviews were carried out in the case-study village, with the remainder conducted in an adjacent village or in a more remote village where some households from the case-study village had accessed new land for coffee planting.

Informants were mainly 'coffee farmers', although many of these pursued diverse livelihood strategies. Other informants included the Administrative Village Head, the Sub-district Head, local school teachers, head of the health centre, coffee traders, company sustainability program representatives, government extension agents and petty traders. We did not attempt to specifically interview farmers participating in the sustainability program (who were targeted separately in the quantitative study). Respondents were 'recruited' informally and opportunistically during our stays in the village. This involved some 'door-knocking' of villagers homes and street-side encounters, where we would often be invited into a villager's home or shop, upon which we would engage in an informal interview. Only 9 informants identified themselves as being involved in the program (although 23 said they sold coffee to the company buying station). According to company data, there were 183 individuals from the village involved in the 4C program.

Survey of farmer perceptions of sustainability programs

A survey of farmer perceptions will be undertaken in 2016 for 8 sustainability production units across 8 Districts, encompassing 4C, RA/SAN, and Utz. A randomly selected sample of 50 participating farmers from each production site will be selected, with a total of 400 respondents incorporated into the survey. This survey will ask questions related to farmer attitudes (male and female) towards the provision of services related to the sustainability programs, types of training provided, access to finance, and price premiums, and how they rate the impact of these services.

Survey of Sustainability Field Agents

Concurrent to the 2016 farmer perception survey across the ten project units, the research team will also undertake a survey of sustainability field officers ('ICS'). As frontline agents of change living in the communities, these officers possess first-hand knowledge of the challenges and benefits arising from sustainability standards within coffee-growing

communities. This will provide a better understanding of how farmers are recruited, and so who is targeted, who is marginalised, and why. Survey questions will be developed and informed by the 2015 baseline study, to response specifically to the research questions posed above. This survey will also collect information about how different project sites are institutionally structured (role, recruitment, payment, and education and skills of 'ICS'), and will be accompanied by the collation of existing data collected by those responsible for the implementation of standards programs (firms and producer organisations). Such data commonly includes farmer databases and sales data.

Key Stakeholder Interviews

The research team will undertake semi-structure 'stakeholder interviews', focusing on four sets of actors related to sustainability programs and the coffee industry: i) 'Sustainability Managers' and other leadership positions within coffee companies; ii) Government representatives, including District-level government agencies responsible for promoting development of coffee production across the 8 districts, as well as provincial and national level policy-makers; iii) National-level coffee industry associations (AEKI, GAEKI, SCOPI); and iv) Representatives of farmer organisations (SPI, HKTI, APKI etc). These interviews commenced in 2015 and continue throughout 2017.

The Study context

The Indonesian Coffee Sector

According to the Indonesian Coffee and Cocoa Research Institute (ICCRI), Indonesia had about 1.2 million hectares in coffee production in 2012, 96% of which is managed by smallholder farmers (ICCRI, 2012). ICCRI estimates that the number of smallholder farmers working in the Indonesian coffee sector reached 1.97 million in 2012, with an average of 0.6 ha of land ownership per farmer.

In 2012, the island of Sumatra was responsible for nearly three-quarters of coffee production in Indonesia (ICCRI, 2012). Within Sumatra, the provinces of Lampung and South Sumatra (at the southern end of the island, Figure 1) are the largest producers. International traders, roasters and brands have become increasingly prevalent in these regions in recent years, where production is dominated by Robusta coffee. This Robusta coffee is primarily sold into the global market to be processed as instant coffee, or else used as an inexpensive filler ingredient for commercial blends.

The typical coffee farmer in these regions is a smallholder with a small plot (usually around 1 hectare), running a low-input and low-return coffee operation. This can make it difficult for coffee farmers to support a family based on coffee production alone, raising risks of flight from coffee production. Institutions also tend to be weak, with land tenure insecurity in some areas, and relatively weak producer organizations to defend farmers' interests. In the absence of specific sustainability programs, smallholder farmers would tend to sell beans into a long supply chain. This would often originate at the farm gate or in the village, where farmers have little information or market power, and hence appear to receive a low price. In the case of Robusta coffee, beans typically pass through three or four different hands before reaching processing mills or exporters. Many smallholders depend on local traders to provide them with credit to get access to inputs and bridge periods between harvests.

Figure 1. The case-study regions in Sumatra

As of 2013, certified and verified coffee accounted for 40 percent of global production, though only 15 percent was actually sold as such (Panhuysen and Pierrot, 2014). According to the 2014 State of Sustainability Initiatives Report, about 11% of Indonesia's coffee production is certified organic or to a recognized sustainability standard (notably Starbucks C.A.F.E Practices, UTZ Certified, Fairtrade, Rainforest Alliance, or 4C). Three-quarters of certified production is Arabica, and concentrated in Aceh and N. Sumatra provinces. Such sustainability programs are less common in the Robusta regions of South Sumatra and Lampung (Neilson et al., 2015).

The Semendo Region in Muara Enim, South Sumatra

Both of our experimental studies (the RCT / PSM) and the first village-based case-study in 2015 were carried out in the Semendo region. This covers the three administrative sub-districts (*Kecamatan*) of Semende Darat Laut, Semende Darat Tengah, and Semende Darat Ulu). These are three of twenty *Kecamatan* found within the Muara Enim district (*Kabupaten*), located in South Sumatra Province (*Propinsi*). The Semendo region can be reached by a 7 or 8 hour drive from the provincial capital of Palembang. 'Semendo' refers both to the region (the three *Kecamatan*), the ethnic group that inhabits it (and who have also migrated extensively from it), and the Malay-influenced language this group speaks.

The Semendo highlands are situated on the eastern slopes of the Bukit Barisan Mountain range, which runs the length of western Sumatra along the Great Sumatran Fault System. The soil distribution of the area is complex, being strongly influenced by the degree of volcanic activity along the Barisan Mountains. These soils once supported vast tracts of lowland evergreen rainforest communities, which have been extensively cleared for agriculture over the last 100 years (Whitten et al, 2000).

The climate is characterized by a wet season from approximately December to May and a dry season from June to November. The coffee harvest commonly peaks in July and August. A nearby weather station (60km to the north) records approximately 2500 mm of annual rainfall (Climate-Data.org, 2015). At an altitude between 500-700 m asl, and located on the equator, temperatures in Semendo are constant throughout the year, with mild to warm days (average maximums of approximately 26^{o}C) and cool evenings (average minimums of approximately 16^{o}C). The study area is drained by the catchment of the Enim River, a major tributary of the Musi River, which flows east and then north through Palembang and into the Bangka Strait.

According to an archival study by Potter (2008), coffee was introduced to the Semendo lands in around the 1870s, where it was established as a smallholder cash crop alongside *sawah* wet-rice farms, dryland *ladang* fields and fish ponds. Compared to rice, coffee was, and indeed still is, of secondary cultural importance for the Semendo. Coffee farms were initially integrated within the dryland *ladang* fields previously cleared for food production, but as the trees and underlying soil became exhausted, new land was cleared for coffee, leading to a pattern of shifting swidden cultivation and ongoing forest clearing.

The 20th Century has seen an expansion of coffee growing further south into Lampung, mostly at the expense of natural forests. In the 1980s, however, the Ministry of Forestry defined 141 million hectares of land across Indonesia as belonging to a national Forest Estate and began limiting forest clearing by smallholders. This Forest Estate was based largely on remote sensing techniques available at the time, and through the application of biophysical criteria: customary tenure was not always taken into account. These formal forest boundaries were not widely accepted or recognised by the Semendo, and as a result, there has been ongoing encroachment of coffee farms into this forest estate (Verbist et al, 2005; Potter, 2008). Rapid devaluation of the Indonesian Rupiah during the Asian Financial Crisis in 1998 led to increased farm-gate prices for coffee, and coincided with the massive contraction of the non-farm economy across Indonesia, leading to another period of coffee expansion.

The Semendo lands are surrounded by Protection Forest (*Hutan Lindung*), managed by the forestry department. The contested boundaries of the state forest are reflected in official maps which show quite different boundaries established by the Forestry Department and Spatial Planning unit of the province. Several sites of recent forest clearing (for coffee-growing) can be found at the forest margins of Semendo (Figure 2), and the legality of such clearing is hotly contested. There is some evidence of soil erosion and field abandonment in older coffee farms, whilst recently-cleared farms are benefitting from forest rents and improved soil fertility.

Figure 2. Coffee-planting on recently-cleared lands

According to local government data (BPS, 2015), 15,440 ha of land in Semendo is currently cultivated with coffee, involving 8,698 households, mostly ethnic Semendo. 4,512 people (in 967 households) were recorded as living in the case-study village in 2013. The Semendo are strict adherents of Islam (village statistics claim that 100% of the case-study village is Muslim) and we were told that Chinese (non-Muslim) are 'not allowed' to live in the village. There are a few ethnic Javanese (7% of the village population) and Minang from West Sumatra (2%) living in the case-study village who have migrated from elsewhere. The Minang are mostly involved in town-based trading, local manufacturing or services, while the Javanese are also likely to work in agriculture. Significant out-migration from Semendo also occurs, spreading coffee cultivation across southern Sumatra in the process. This out-migration is often attributed to a peculiar matrilineal inheritance system, known as *Tunggu Tubang.*

Tunggu tubang is considered to be the backbone of local culture and traditions (*adat*): it is a matrilineal system of inheritance, whereby the eldest daughter of each generation inherits all family property, including the familial house, agricultural crops and any other associated property. The inheritance is closely linked with various social obligations for the daughter and her family, including the provision of food for other family members if needed. It was estimated by some informants that approximately 40% of the land within Semendo is held under *tunggu tubang* tenure. *Tunggu tubang* appears to encourage outmigration, as those children not inheriting land assets are encouraged to seek their livelihoods elsewhere. The expansion of coffee growing across southern Sumatra and associated ongoing forest-clearing by the Semendo is often attributed to the *tunggu tubang* system. *Tunggu Tubang* appears to

limit in-immigration, due to cultural prohibition against the sale of *tunggu tubang* land, and reaffirms the solid close-knit Semendo community. Due to the dominance of *tunggu tubang*, land titles are generally considered unnecessary for the village. It was also suggested by some informants that *tunggu tubang* is a barrier to economic development as it inhibits land transfers, and the allocation of land to its most productive uses.

Coffee farmers from 25 different Semendo villages (*desa*) are currently involved in the sustainability program described in the following section. Much of the following discussion of broader development trajectories draws on the village-based case-study activity.

The role of Government in village development

The Government is considered to be the primary agent of 'development' within the village, and informants were generally quite positive about government service delivery. However, many informants also voiced concerns about the level of nepotism and corruption present amongst civil servants, but noted that there was "little point complaining, as it won't come to anything". In the everyday lives of rural households, the state is the key actor that provisions households with basic social support provisions such as education and healthcare. Government support is crucial for many people, and obtaining a job with the local civil service is widely sought after within the village.

The agricultural department provides an agronomist to each *Kecamatan*, who advises on all major crops grown, not just coffee, and the primary focus of the local agronomist was rice production. This extension agent is coordinated through an integrated agriculture, fisheries and forestry extension unit (*Balai Penyuluhan Pertanian, Perikanan, dan Kehutanan* – BP3K) and most villages are nominally covered by a government agronomist. In addition, the District-level Department for Estate Crops (*Dinas Perkebunan* – DISBUN) coordinates activities related to coffee production in the village through a local Technical Implementation Unit extension (*Unit Pelaksana Teknis* - UPTD), which was established in a nearby village two years ago. This Unit coordinated an 'Optimalisation of coffee farming' program in 2014, whereby select coffee farmer groups were given free fertilizer and paid additional incentives to work on their farms. Other informants had received government assistance in 2012, when their farmer group was given free coffee seedlings from the extension office. Such programs are relatively small in scope. Farmers were happy enough to receive such material assistance, but they generally negative about the quality of service provided by the government extension agents, with some complaining that agents only visited their farms if they were paid a fee.

The government is involved in several poverty alleviation programs in the *desa.* These include the *Program Nasional Pemberdayaan Mandiri* (PNPM) or National Program for Community Empowerment. The program is targeted at poorer communities and aims to improve social and economic opportunities and conditions within these communities (World Bank, 2013). PNPM projects have traditionally provided funding for small-scale infrastructure development, such as a local road in the case-study village. The national government has also introduced a number of cash payment schemes for its poorer citizens over the last decade or so. These include a direct unconditional cash assistance known as *Bantuan Langsung Sementara Masyarakat* (BLSM), which translates roughly to 'Direct Community Assistance', and totals 300,000 rupiah (approximately US$22.41) issued every 3 months. In 2014, The Government introduced a conditional cash transfer program (*Harapan Keluarga*) paid to families whose children have completed the prescribed level of schooling. The

Indonesian government also runs the *Raskin* 'Rice for the Poor' program (up to 15 kg per family every three months), which works to ensure that those least well-off members of the community will have minimum food requirements. Targeting of genuinely poor households continues to be the key challenge for all of these programs.

A primary-level government school is located in the village, with a high school found in the neighbouring village. A technical college had recently been established in the case-study village, which enabled vocational skills to be developed in agriculture, mechanics and computer software.

Community informants were overwhelmingly positive in their views of the local *Puskesmas* (Primary Health Care Clinic), and were equally enthusiastic regarding a mooted upgrade of the facility to hospital status. In particular, the health clinic's maternal and neo-natal clinic was viewed positively, including several new mothers who had given birth in the last 12 months. The clinic was also reported to be active in providing information sessions to women during their pregnancy. The health clinic provides a free service for primary care, and collects basic health data. It conducts primary screening and provides referrals for specialist care. For emergencies, surgery, or specialist advice, community members must travel to Muara Enim town, two hours away. The Indonesian government is currently rolling out a universal health insurance scheme, which will make hospital admissions also free, although they currently fee-for-service. A local dietician at the health clinic expressed concern over the poor diet of the Semendo and the relative poor availability of fresh fruit and vegetables, which are rarely grown intensively by the Semendo (but are grown by Javanese migrants).

The *Desa* water supply was originally sourced from the river that runs through the town. From data provided by the office of the *Kepala Desa*, approximately 547 households had access to government-supplied groundwater, while 250 had water supplied from either springs or wells. Irrigation water is sourced almost exclusively from rainwater. Rice is the major irrigated crop in the region, with simple gravity-fed irrigation channels dominating production. Producers can also access water collected in gutters, which were installed with the paving of major roads. However, these irrigation channels must be community-managed. While there were no concerns related to the quality of irrigation waters, some farmers expressed concern that climate change and deforestation were potentially endangering the reliability and volume of water utilised for irrigation. Data from the *Kepala Desa* indicated that 150 households had a 'sanitary toilet', 325 households had a toilet 'below sanitary levels', and 475 households had no sanitary facilities (defecating in river, drain, field or forest).

Approximately 63% of households in the village were linked to the state electricity provider (PLN), which is reliant on coal-fired power stations located downstream near Tanjung Enim. A further 8% of households are reliant on their own private generators (either petrol or diesel), and 29% were reliant on firewood and kerosene. Of those connected to the PLN electricity grid, however, blackouts are common as supply struggles to keep up with rising demand. Many villagers noted that they were happy to have any electricity at all, given its relatively recent introduction (10 to 20 years ago). There are two new geothermal power plants being constructed in the Semendo areas, approximately 30 minutes away from the

village, and residents expressed hope that this would alleviate the power outages in the future.

Mobile telecommunications towers were installed around 10 years ago and have played a pivotal role in increased information sharing. This has been used to good effect by coffee farmers, who are able to receive price information from Lampung, local traders, and also more locally from traders and ICC. Mobile phone technology is a primary means of contact with business, relatives and others outside the village. *Desa* statistics claim there are 3500 mobile phone numbers used by residents in the village, along with 650 televisions and 170 satellite dishes.

Livelihoods and Rural Change

Coffee was unanimously identified by civil servants, elected representatives, farmers and labourers, as fundamental to the village economy. Furthermore, the majority of our interviews indicated that, in living memory, coffee has always assumed this economic role. While the importance of coffee is likely to persist into the future, many residents expressed a strong interest in future economic diversification and the hope that this would lead to an improvement in living standards in the area. Many parents hoped that their children would attain improved education and access to off-farm employment. An important stage in household transition, desired by many informants, was to spend less time farming and begin engaging in petty trading activities in the village. Non-farm rural businesses are dominated by the ubiquitous grocery-style *warung*, often combined with coffee trading, but also include food stalls, child-care, and banking. In these instances, farm ownership was frequently maintained, but labour inputs were provided by wage labourers, share-croppers, or leasees. Further study is required to determine how the sustainability program is affecting this transition out of farming, and if it is altering the attractiveness of farming relative to petty trading.

Of the 967 households in the case-study village in 2013, 542 were involved in agriculture (361 in coffee farming, including 183 enrolled in the ICC sustainability program). While coffee farming is the single most important economic activity in the village, a large number of coffee farmers are also engaged in rice farming and various off-farm activities. Figure 3 presents data collected by the Village Administration, indicating the **most important** source of income for each household in the village. Whilst it is clear that agriculture is important to a large number of households, non–agricultural income was identified as more important by the majority of households, reflecting the relatively advanced stage of rural transformation in the village. Such data, however, does not help us identify which households and livelihood strategies are associated with higher levels of poverty. At this stage, we have been unable to obtain a more detailed breakdown within the village based on different socio-economic groups or asset holdings.

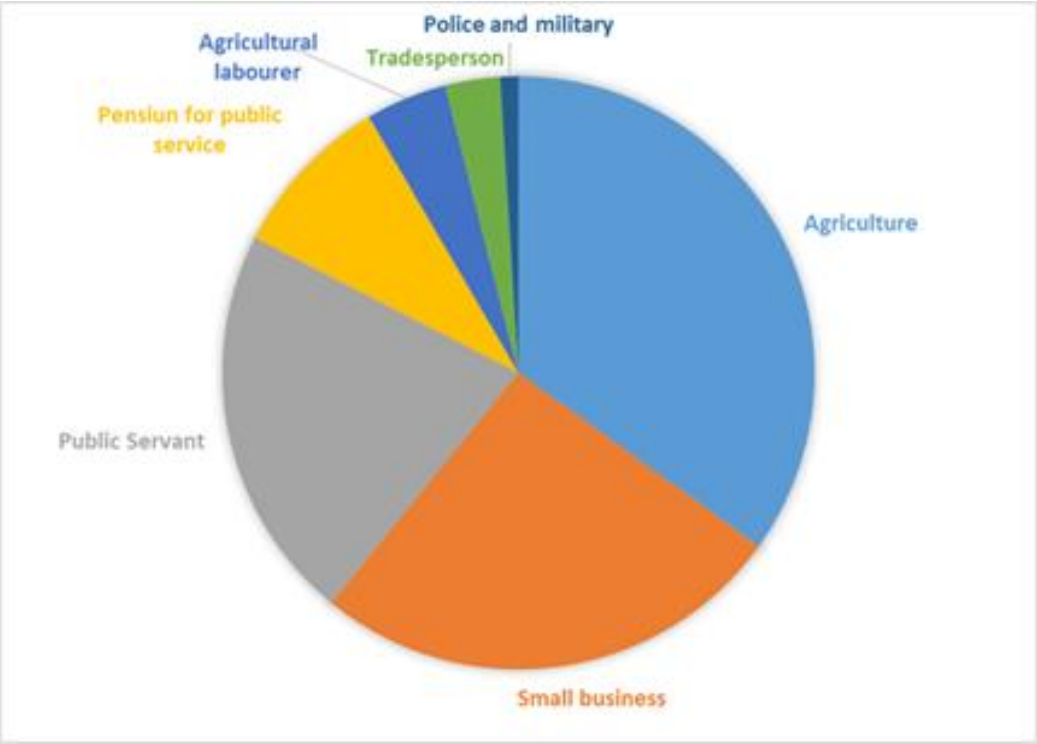


Figure 3: Most important source of income for village residents

While financial success is desired by village households, it is not the be all and end all of life in Semendo. As one respondent put it, "The Semendo people have three life aspirations. One is to go on the *haj.* Secondly, to educate their children. Thirdly, to see their children get married, so they will look after them in their old age". Many informants clearly valued their close-knit community, social values and current lifestyle.

There was limited information available for population and migration dynamics within the *Desa*. People migrate out of the village to places as close as Muara Enim (approximately two hours away) to as far away as countries in the Middle East for work. There was also some migration within Semendo, primarily for marriage or for accessing new farming opportunities at the forest frontier (Figure 2). Several participants indicated that they had returned to the village to help look after older family members, underlining the strong family ties within the village. The younger generation mostly indicated a desire to move to larger urban centres, or at the least away from agriculture.

Details of livelihood strategies in Semendo, obtained from the quantitative surveys are presented later in this report.

The Sustainability Program in Semendo

The main implementation partner in Semendo is PT Indo Cafco (ICC), the Indonesian subsidiary of ECOM Coffee Group. Prior to 2012, the coffee farmers in Semendo had not been exposed to any significant private-sector sustainability program, and the Government had only intermittently provided coffee-related support in the village, mostly in the form of direct material assistance (fertilisers, seedlings, equipment, and sometimes even cash payments for their own labour).

In 2012, ICC established a local buying station in Semendo and commenced enrolling farmers in a Common Code for the Coffee Community (4C) production unit. To encourage Semendo

farmers to participate in the production unit, ICC offers a 'certification' premium of 300IDR/kg (around 3US cents/kg), in addition to a variable quality that may reach 2000IDR (20 US cents/kg). A sub-set of the farmers involved in the 4C Production unit were subsequently 'upgraded' to meet the Rainforest Alliance standard in 2014, for which no further price premium is paid. Indeed, ICC had not yet made any sales of Rainforest Alliance coffee from Semendo. The program in Semendo builds on the experience developed by ICC in implementing similar programs elsewhere in South Sumatra and Lampung. The Semendo project was established with the direct financial support of Mondelez through their *Coffee Made Happy* program.

The Semendo 4C program involves 2,216 farmers (2013 data), organized into 95 farmer groups (*kelompok tani*) and living across 25 villages. According to ICC data, there are 8 farmer groups in the village case-study, with a total of 183 farmers. Farmers are enrolled in the program through local farmer groups, some of which were formed through past government programs to facilitate distribution of agricultural inputs. Some groups were formed specifically in response to the ICC program. Most groups have around 25 members. Membership of a farmer group constitutes the first basic requirement for inclusion within the sustainability program. For farmers wishing to sell coffee directly to the ICC warehouse, famers need to get a letter from the chairman of the local Kecamatan to sell to ICC, and farmers, or farmer groups, need to have a bank account.

ICC pays the cost of obtaining certification, including the cost of training farmers and undertaking audits. This comes at an estimated cost of around $50 per farmer per year over the three-year life of the project. Participation in the ICC programs is voluntary. ICC will initially hold a socialization event in villages, introducing ICC and the benefits of certification. After such events, ICC staff will ask farmer groups (led by a farmer group head) if they are interested to partner with ICC and be involved in the program. If they agree, then ICC will carry out an internal audit to confirm if the farmer group is a good prospect for certification. This includes verifying that farmers don't have coffee plots in protected forest zones.

ICC has established a Farmer Training Centre in the Semendo area and recruited a team of locally-based agronomists who manage the Internal Control Systems (ICS) for the program. This team undertakes farmer training to those groups involved in the program, and includes advice on how to apply fertilizers, composting, pruning, harvesting advice, pest management and marketing. Sometimes training is offered only to representatives of groups (ie. group leaders) in the expectation that the knowledge gained will be shared with other members. ICC agronomists also undertake occasional farm visits, which are highly sought after by enrolled farmers.

The farmer training model in this setting is predominately a training of trainers approach: consultants are hired by the implementer to provide training to ICC extension officers, who actually provide the training to farmer groups. During the 4C training, farmers get 10 training sessions that cover unacceptable practices, use of equipment, safety procedures, and quality assurance, although some farmers suggested that only farmer leads received this training (requires further verification). Some sessions are seasonally targeted so that relevant issues are addressed when they are most salient (e.g., quality assurance around the harvesting season). The ICC agronomists also provide various follow-up services, as well as internal audit support to review farm conditions and compliance with standards. After completion of the training program, ICC will arrange for an independent audit. If the farmer group passes the audit then they receive 'certification'. At this point ICC will integrate the farmer group

into their certified supply chain, providing them with regular updates on market prices for coffee (through mobile phone services), and allowing them to sell coffee at the Semendo buying station with the associated premium. At the same time, farmers are not obliged to sell their coffee to ICC, and are free to sell through local traders if they desire. In practice, many farmers do both.

As farmers become compliant with 4C standards and develop a trading relationship with ICC through the local buying station, they may be recommended by ICC to upgrade to RFA certification. The ICC extension officers, now having a relationship with the farmer group, will approach the farmer group head about upgrading to RFA. If the farmer group accepts, then they will initially be audited internally by ICC prior to an actual RFA audit. There is not always dedicated training given prior to RFA certification, though ICC uses RFA online training materials to make presentations at ICC events with the farmer groups. Pending the results of the internal audit, the group may require further training and capacity building to meet the standard (especially in relation to conservation practices).

ICC also produces a calendar with tree, pest and soil management tips for each month. The calendar had a wide distribution across Semendo, with both ICC-enrolled and non-enrolled farmers in possession of the calendar. ICC also advises farmers on post-harvest handling, strongly encouraging improved quality and the use of tarpaulin for drying.

Preliminary Analysis of quantitative baseline data

In this section we discuss the baseline data in detail, providing descriptive evidence on a range of variables across household profiles and poverty status, farm production profiles, and group-level outcomes.

These numbers are derived from Appendix E, which provides the summary statistics:

1. Appendix E1 present key summary statistics for variables in the Farmer household-level survey. This is generated because the variables in the household baseline are quite extensive, and so for initial perusal it may be easier to focus on the shorter version. We also report on these variables broken out by sub-group, which will be described in further detail shortly.
2. Appendix E2 presents summary statistics for each variable in the Farmer group-level survey.
3. Appendix E3 presents summary statistics for each variable in the Village-level survey.

To see the questions that generated the individual variables in the original survey instruments, please refer to the attached survey booklets in PDF format:

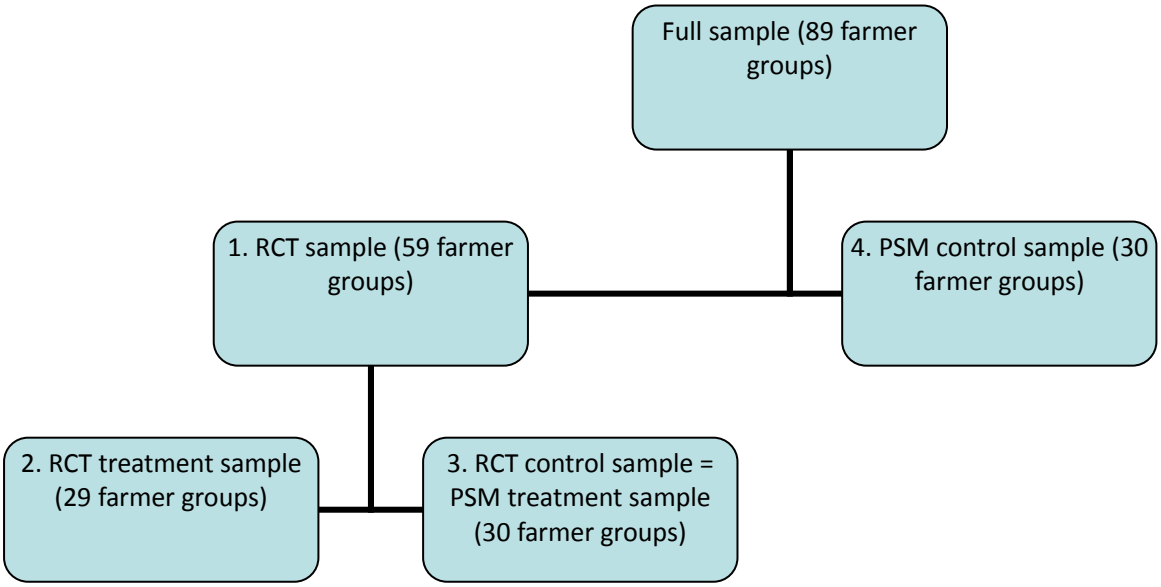
1. Village Book
2. Farmer_Group_Book
3. Farmer_Book

A number of variables are constructed out of variables from the baseline survey. Further explanation of these variables is given in Appendix F, which provides the details of variable construction for the quantitative baseline survey.

As noted, we break out the household-level data into a number of columns, presenting means and standard deviations of variables from:

1. RCT baseline sample (4C verified farmers) (“4C sample”);
2. The farmers selected for treatment in the RCT (subset of 1.);
3. The farmers not selected for treatment in the RCT (subset of 1.);
4. The farmers selected as the control group for the PSM study (“non-4C”).

These allocations are summarized in the following figure:



There are a couple of useful comparisons that we draw out of these groupings, by presenting p-values for the t-test for differences in means of key variables (we consider the differences between two means to be statistically significant, i.e., we reject the null hypothesis of equality in means, when the p-value is 0.05 or less).

First, we compare groups 2 and 3. In principle, by virtue of randomization, these groups should not be statistically different for any variable. In practice, however, due to the large number of comparisons, and the presence of some variables with very little variation in the sample, it is conceivable that there will be cases where variables do not satisfy baseline statistical balance. To go back to the coin flipping example of the methodology section, if we flip a fair coin 100 times it is very likely we will get close to 50/50, but not be exactly at 50/50 – e.g., 55/45 or 57/43. Analogously, it is likely that the RCT treatment and control groups will not be statistically balanced on *every* baseline variable that we test. While not ideal, such imbalances can be controlled for in the impact evaluation analysis once endline data are available. In any case, statistical balance holds in the large majority of cases as expected under randomization, so we will only highlight such statistical imbalances when they are present. In other words, in what follows we will only discuss comparisons between the RCT treatment and control groups when the groups are (unexpectedly, due to randomization) statistically imbalanced on a certain variable, so when such discussion is omitted it can be inferred that balance holds as expected.

Second, we compare groups 1 and 4. This can be considered an *uncontrolled* test for differences between farmer groups with and without 4C verification. It is *critical* to note that this comparison does not control for factors that may drive differential selection into 4C, so while the results might be suggestive, we cannot claim that they are “caused” by 4C. If anything, such an uncontrolled comparison is most relevant for thinking about how the

groups of 4C verified and uncertified farmers might differ at baseline, particularly with reference to variables that aren't plausibly affected by certification. Such differences may be just as likely to be driven by the choices of ICC in selecting particular farmer groups, as being caused by the 4C intervention. Hence we should withhold strong value judgments about the efficacy of the 4C program at this stage. One of the expected project outputs for 2016 is a detailed econometric analysis of the difference between 4C and non-4C farmer groups, allowing us to control for factors that might have differed between the two groups at baseline. Such analysis, and improved versions that will be possible when endline data are available, will allow us to make statements about the causal impacts of 4C with much more confidence.

In the cases of monetary values, the following 2015 exchanges rates should be considered: 1 USD = 13,643 Indonesian Rupiah (Rp) = 1.38 AUD = 0.652 GBP.

Farmer Household Profile and Characteristics

Household demographics, assets and indicators of well-being

Looking at basic demographics, farmers in the 4C sample have smaller households, with slightly older and more experienced lead farmers. At baseline the average household in the 4C sample has 4.6 members, while the non-4C sample has 5.05 members and the difference is statistically significant. Similarly, there are significant differences in the average age of the lead farmer (45.7 to 42.6, respectively), and years of experience of the lead farmer in coffee farming (17.4 to 15.4). However, there are not significant differences when it comes to the gender of the lead farmer (about 94% male in both samples), propensity to be from the Semendo ethnic group (about 87% in both samples), or the extent to which one's father's primary occupation was as a coffee farmer (about 86% in both samples).

We also see few significant differences when it comes to asset- or endowment-based measures of household well-being: having a toilet (49%), having a television (75%), having electricity (92%), having running water (36%), the number of minutes of walking to get water if clean water not available at the house (21 minutes), the total of the monthly expenditure items (about 2.2 million Rp), and having some kind of transport vehicle such as a motorbike or car (81%) are all statistically balanced between the two samples. There are two notable exceptions. First, the propensity to have a refrigerator is nearly double in the 4C sample (26% to 13%), which may suggest that owning a refrigerator is a leading indicator for changes in well-being (given that access to appliances such as electricity and TV is balanced in the two samples). Second, total household income reported as a single number, while technically not statistically different at conventional levels, is nearly so, and there is an economically-meaningful difference of 1.7 million Rp per month in the 4C sample and 1.4 million Rp per month in the non-4C sample.

As an additional indicator of economic well-being, we turn to landholding. The summary statistics on landholding are driven by a very small number (<10) of households reporting extremely large landholdings (>100 ha).[4] If we truncate the sample to focus on households with 10 ha or less of land, land allocations are much more in line with expectations. Average landholdings in the 4C sample are about 2.2 ha, while they are about 2.05 ha in the non-4C

[4] Table reports in terms of m^2. 1 hectare = 10,000 m^2

sample (the median in each group is exactly 2 ha). The proportion of land held specifically for coffee is similar in both samples, at around 72%.

Turning to land ownership status, we do see some meaningful differences in land tenure. These outcomes, while malleable in principle, are not as likely to have changed over time as a result of the 4C intervention, due to the complex nature of the land market in Semendo and various constraints on changing land status and title. Hence it is probably better to think of these differences as more reflective of the types of farmer groups that were selected by ICC for the 4C intervention, rather than outcomes of 4C.

Here we focus on data on the primary coffee-growing plot. Farm families in the non-4C sample are about 5% more likely to own their primary coffee plot (92% to 87%), while 4C farm families are more likely (6% to 2%) to rent their primary coffee plot. The propensity to mix tenure (own and rent), get free land access, or sharecrop is not common (around 2-3% in each case) and not statistically different between the two samples. Turning to the nature of land ownership status, we distinguish between having a formal land certificate, having SKT (a form of local landholding status), and not having formal or semi-formal status (though having recognized land tenure due to local inheritance norms), and see significant differences in all three categories. First, the 4C sample is more likely (8.4% to 6%) to have a formal land certificate. Second, the 4C sample is more likely to hold SKT (36% to 22%). Unsurprisingly, then, the non-4C sample is more likely to only have informal status (72% to 56%).

These initial demographic and household characteristics are consistent with the story of 4C farmers being better off early in the 4C roll-out. As already noted, at this stage it is too early to say whether this was caused by the 4C intervention. It is possible that ICC is simply more likely to select better-off households, with smaller family sizes and greater asset holdings. This will be something to look at in more detail in subsequent analysis.

Poverty status

We consider poverty status on two dimensions:

1. Simple income-based poverty.
2. Progress out of Poverty Index (PPI).

Income-based poverty is summarized in a pair of variables of income per capita. fp_totalincome_pc records income by summing across a number of income categories within the household, including the value of agricultural output that is self-consumed or given away rather than monetized. hs_income_congive_pc is a more basic measure; it takes the overall monthly income that a household reports as a single number, then adds on the value of agricultural output that is self-consumed or given away rather than monetized. By both measures, we find that income is quite substantially higher amongst the 4C sample. This is further confirmed in the variable hs_inc_cap, which is generated by taking the single household income report and divides by number of household members. Again, we see that the 4C sample is significantly better off. hs_inc_cap_line then takes the proportion of households in each sample falling below the income poverty line of 278,764 Rp/ month. Again we see that the 4C sample has about 8% less households falling below this income poverty line.

The PPI generates "the likelihood that the household is living below the poverty line – or above by only a narrow margin" (Social Performance Management Centre at the Grameen Foundation, 2012). It is generated by asking a short series of 10 questions about livelihood and assets, which have been shown to be capable of predicting poverty status with a high success rate based on validation in much more complex survey instruments.[5] Once PPI scores are aggregated to the level of a sample group, they can be used to generate the percentage of poor in the group.

According to the PPI, the 4C sample is doing slightly better than the non-4C sample. The average PPI in the 4C sample is 29.4 (with a maximum of 70) while for the non-4C sample the average is 26.3 (maximum of 67). This translates into a poverty rate of 18.2% for the 4C sample, and 21.9% in the non-4C sample. To put this into perspective, according to the last Indonesia census the average poverty rates in Muara Enim district and South Sumatra provinces are both around 13%. The local poverty line as of 2012 is 278,764 Rp/per capita/month.

Hence across a range of measures the story is quite clear: the 4C sample is less likely to be in poverty than the non-4C sample, but at the same time both samples have higher poverty rates than the overall population. The first fact could of course be simply driven by differential selection of farmers by ICC, but it is also possible that 4C has already begun to contribute to improvements in livelihood status amongst participants. This will be analysed in more detail in subsequent work. Meanwhile, these baseline results confirm that participating households are more likely to be in poverty overall. This seems to indicate that the program is managing to reach relatively poorer segments of the population, though it could of course be that coffee farmers tend to be in the poorer income segments overall.

Farmer Household Production Profile and Practices

In this section we give a snapshot of households' agricultural activity, with a prime focus on their coffee-growing operation. In the previous section we saw that over 70% of households' landholdings are devoted to coffee. On average the lead coffee farmer in the household spends about 25 weeks per year focused on coffee farming, and this amount is very similar across our key sub-groups. Coffee farming is clearly a crucial economic engine in the Semendo region, and here we delve further into households' coffee growing activity, as part of their broader agricultural activities.

Farm activity portfolio

We characterize the farm activity portfolio by first discussing non-coffee activities, and then focusing on coffee in more detail. As noted earlier, about 72% of households' land, on average, is devoted to coffee farming. Hence while coffee appears to be the dominant activity for most households, there is also significant room for other agricultural activities, especially if the average masks heterogeneity in the sample. We see that households tend to diversify into a number of other crops. 1-3% of the sample produce bananas, 2.5-4% grow rubber, and 7% grow other fruits (apart from durian), however these differences are not significant. Interesting, the difference between treatment and control in the RCT is significant on 'other fruit' production, with the control group having about twice the output as the treatment group.

[5] http://www.progressoutofpoverty.org/

However, we also see a number of significant differences. Farmers in the 4C sample are more likely to farm chili (5% to 3%), spices (8% to 3.5%), and durian (a notable 22% to 4%). 4C farmers are also more likely to store their coffee to sell it later (34% to 23%). Crop *revenue* from all non-coffee crops is also quite different in economic terms, if not statistical terms, with the non-4C sample leading by about 9.3 million Rp per month to 6 million Rp per month. This compares favourably with coffee income.

Farm productivity

A key factor behind coffee productivity is the commitment of the lead farmer. We see that this is important in our sample: farmers in all sub-groups spend about 25 weeks per year with coffee farming as their primary activity. As noted above, lead coffee farmers have more experience in a supervisory role in coffee farming, and this also holds up when we look at their total experience in coffee overall, at 24 to 21 years.

Coffee productivity is notably higher in the 4C sample. The most obvious measure is to consider coffee output (in kg) per hectare. Somewhat surprisingly, on this dimension the non-4C sample comes out quite significantly ahead of the 4C sample, at about 993 kg/ha to 663 kg/ha. However on further analysis it appears that this gap is primarily driven by a very small number of outliers in the non-4C sample, and if we truncate the sample to households with less than 2000 kg/ha, for example, the gap greatly reduces, though still favours the non-4C sample. Another measure is to look at coffee output in kilograms produced per capita at the household level. On this measure 4C households out produce the non-4C by 226 to 155 kg per year. If we instead focus on time investment by the lead farmer, dividing total coffee output per week invested per lead farmer, the 4C households are ahead 61 kg to 40 kg per week invested.

Farmer Perceptions and Expectations

Finally, in our household surveys we asked a few questions on subjective well-being using a Likert scale (1-5). Interestingly, perceived well-being and sense of control are higher in the non-4C than 4C sample, though the differences are not too large. When asked about the family's economic situation in the last year, the non-4C sample leads 2.66 to 2.61, though the difference is not statistically significant. When asked about overall quality of life in the last year, they again lead 2.59 to 2.51 and the difference is significant. Similarly the score is 2.37 to 2.27 when it comes to sense of control over one's family's situation. It could be that these differences are simply due to the 4C sample facing greater disruption or uncertainty due to the certification intervention, or perhaps reported well-being is calibrated differently in the two groups, for example if the non-4C sample is less connected to the broader world.

Preliminary findings from the baseline study

Based on the qualitative village case-study, several preliminary findings will be discussed in relation to the apparent impacts of the ICC sustainability program in Semendo. The program appeared to have a surprisingly low-profile in the case-study village. Considering that there were 183 individual farmers from the village recorded by ICC as being involved in the program, only 9 from a total of 160 informants informally interviewed identified themselves as being involved in the sustainability program. A surprisingly large number of villagers were completely unaware of ICC's existence, although most knew of the ICC buying station, which was located in an adjacent village. But still, only 23 of the village informants claimed to have sold their coffee directly to ICC. The buying station appears to have had a greater impact on

farmers' lives - at this stage - than the 4C program itself. Many individual farmers were likely to have sold coffee indirectly to ICC, either through representatives of farmer groups or village traders. Even still, this relatively low profile highlights the challenges of reaching dispersed smallholder farmers in a region with poor road infrastructure. This raises another important question for impact assessment studies of sustainability programs: how long should we reasonably expect before the effects of a program could be observed at the farm-level? Is a 3-year period sufficient? Is 5 years sufficient?

Program Targeting: processes of inclusion & exclusion

A key aim of the village-based case study was to determine who was included and who was excluded from the program. Based on the standard procedures used for recruitment, it is likely that the 4C program is not targeting the poorest farmers, and the quantitative survey suggests that 4C farmers had greater assets than the control group. This, however, is hardly surprising given that the program never attempted to specifically target poor farmers. This is primarily a result of ICC's method of roll-out into the community, which was understandably through existing farmer groups. The most impoverished members of the community were poor for reasons including landlessness, small plot size, distance to farm and lack of social capital, and these individuals tended to be excluded from farmers groups for the same reasons. On the other hand, those relatively well-connected producers that were already meeting the 4C (or indeed RA) requirements, or who were larger producers, were more readily identified as potential participants. Based on village data, it appears that approximately 50% of coffee-growing households in the Semendo case-study village were engaged with the sustainability program. Of those not engaged, most were either not listed in a farmer group of are listed in an inactive group. It is debateable whether it is reasonable to expect a program such as 4C to be intentionally pro-poor given the likelihood that this would entail significant costs for program implementers.

While it was apparent that the level of economic wealth varied across the case-study village, many participants emphasised the absence of significant social stratification within the village, with all people treated relatively equally regardless of their stature. However, our interviews and observations of the *Desa* indicated that the availability and access to both technical and administrative assistance differed greatly across the *Desa*. As noted by Ribot and Peluso (2003, p169), "The holders of specialized technical information can use this information to maintain their access to labor opportunities or income when they have skills or specialized knowledge that is in demand." Specialised technical information includes the social capital required to access government services and programs, many of which are distributed via patronage networks. Farmer groups were frequently formed to access such patronage, and there was a perception that government approval was needed to sell to ICC.

For those participants that knew of ICC, but did not sell to ICC, a number of barriers were identified. In order to sell to ICC, some farmers believed that they needed to own their own land, have a minimum of 50 kg of coffee available for sale (some participants considered a minimum of 100 kg was necessary), and that coffee needs to be of relatively high quality. While ICC maintains that there is no such stipulated minimum, there are clear logistical constraints that would make small volumes prohibitively costly to transport. 'High quality' is generally taken to mean the harvest of mostly red or yellow cherries, which are then dried to at least 23% moisture content with few defects. Stringent quality requirements were widely considered to be a major barrier, and some farmers doubted that the additional labour costs

for harvesting mostly ripe cherries would be recovered through the available price premium. There is also an expectation that producers selling to ICC would keep written records of their on-farm management and practices throughout the year (although very few would actually do this). Addressing each of these points, it is apparent that each barrier may be a stand-alone reason for not selling to ICC, and that some producers may not have the capability to overcome each.

Another commonly cited barrier was ICC's method of payment. While the majority of local traders pay cash in hand at point of sale, ICC requires sellers to have a bank account, as all payments are electronic. Some farmers, in turn, reported that this could result in a three to five day delay in payment, which is often unacceptable to smallholders, particularly those with one source of income only. ICC, however, reported that most payments went through within 1-2 days, so this may be a matter of perception only. One solution to this, apparently initiated by ICC, is for farmer groups to form a joint bank account, which can then be accessed by bank members. This payment method encourages greater use of the formal banking system, which might improve financial literacy and eventually access to formal credit in the community.

4C farmers are also expected to maintain written documentation of coffee tree management throughout the year, which presents a considerable challenge to illiterate farmers. Even so, the examples of written requirements that were observed were reasonably simple, consisting of one or two sentences each month recorded on an ICC-supplied calendar. It is likely that farmers with greater cash reserves and therefore more economic resilience would find it easier to adopt the measures detailed above, particularly given the increasing economic benefits apparent in meeting ICC production requirements.

Labour Issues

Almost all hired labour in the *Desa* was casual, with work contracts verbal or informal. As such, rural workers are not protected by national labor laws. Agreements to hire labour are generally completed on a monthly or yearly basis, with payment rates negotiated verbally. Whilst a minimum wage is formally set by each provincial government, no villagers were able to specify this minimum wage, which is evidently rarely enforced. The minimum wage (in 2013) was actually 1,630,000 / month (160USD) (BPS, 2014). Assuming a 5-day working week, this would equate to approximately 75,000 IDR / day. This makes compliance with 4C principles problematic. For example, the 4C Principle 5a (p8, 2010) states that "*working conditions and wages are defined in a mutually agreed written contract between the employer and the worker*". It appears highly unlikely that any sustainability program would be able to significantly change the nature of labour contracts in Semendo, at least in the short term. Considering that labour is a significant input cost for coffee production, any changes could significantly affect farm income, and subsequently the attractiveness of coffee farming as a livelihood.

Based on most village informants, the rates for casual agricultural labour during the harvest varied between 25,000 IDR/day and 40,000 IDR/day, although in the best case noted, farmers received 50,000 IDR for an 8 hour day, with food, water and cigarettes included (it appears that such in-kind contributions are commonly counted towards the paid wages by RFA/4Cauditors). Rates for construction workers varied similarly between 40,000 IDR/day and 60,000/IDR. So while skilled workers might receive near the minimum wage, it is unlikely that landless or poorer producers, who work on other farms, receive the legal minimum

wage. One informant noted that there was little scope for bargaining when it came to negotiating labour agreements, claiming that there is an abundance of locally available labour. It should also be noted that some of the labourers (or in the case of men, their wives) were likely to own farms, but many were also likely to be landless. Further research is required to determine the status and working conditions of rural labour in the coffee regions of southern Sumatra.

Altered trade practices

There was evidence that trading practices had changed as a result of the presence of ICC in Semendo. Informants generally noted that prior to the presence of ICC, local traders were less likely to differentiate the quality of coffee, but have recently been more likely to offer higher prices for higher quality coffee. Several large traders (*to'ke*) of coffee and other commodities were operating in the village with the capacity to transport coffee to Lampung. We spoke in detail to three traders who indicated that they didn't offer farmers any services beyond a point of sale and only limited financial support. It was common for the larger traders to sell a range of farm related goods such as tools, chemicals and construction materials. No traders offered any training or development assistance to farmers, and only one trader that we spoke to offered finance and loans to producers.

Most interviewed traders were concerned that their businesses would suffer a loss of clients following the arrival of ICC, and one trader aired concern that under the current regime, ICC could become a monopolist in the region. In late August 2015, several local traders protested the presence of ICC in Semendo, although it is difficult to ascertain how much support these disaffected traders have. The *Kepala Desa* we spoke to, and most farmers, are highly supportive of the buying station, noting that they now have the potential to sell coffee direct to a global market. ICC consistently pays a higher price locally, and the focus on quality was also reported to support government initiatives. Interestingly, some traders actually claimed that ICC had opened up a new market opportunity for them too as they saved transport costs to Lampung by selling to a major exporter located in Semendo. Some non-traders observed that the traders were likely to benefit *the most* from the presence of ICC, because of their ability to sort or improve the quality of beans, and on-sell the best beans to ICC. Somewhat unexpectedly, one trader reported that ICC's higher quality demands had resulted in a *reduction* in his quality standards in order to maintain supply. The impact of ICC on the livelihoods and business models of local traders requires further research.

In order to access the ICC market, many farmers not enrolled in a farmers group, but meeting the other quality requirements of ICC, have begun selling to family members or friends who are part of a farmers group. ICC sets individual quotas based on land size and fruit monitoring to avoid such selling. However, farmers who exceed their quota (which was reported to be around 700 kg-100kg/annum) sell their excess coffee to other enrolled farmers who have not reached their quota. Some informants suggested that the quota was set at the level of the farmer group. This appears to have led to a small degree of sorting of coffee quality, and a strong utilisation of existing familial ties (e.g. buying and selling between brothers) across the village. One interpretation of this is that the sustainability program has created a new economic 'rent' for certified farmers, who are able to benefit from their position *vis a vis* other farmers and traders.

Changes in Agricultural practices

As previously mentioned, ICC has commenced working with the farmers to improve their practices, including tree management, ground cover management, and shade tree implementation. The survey data collected in the baseline appears to suggest that the reported differences between 4C farmers and non-verified farmers is - at this stage - minimal. This is a long-term endeavour. There is little evidence of superior farm practices in the 4C group, with somewhat inconsistent results. For example, while 4C farmers reported using more soil ridges, terracing and check dams, non-4C farms reported having more shade trees.

While ICC has also started working towards limiting the use of dangerous chemicals, there does not appear to have been substantial change in pesticide management throughout the village. An ICC employee noted that while farmers using pesticides acknowledge the ICC requirement of reduced pesticide use, this was difficult to enforce in the absence of national laws, and local vendors of pesticide did not report any substantial change in pesticide use, possibly reflecting that on a village-level scale, farmers have not substantially changed their pesticide regimes. Local shops selling agricultural inputs stock several herbicides using *paraquat* (a chemical prohibited by 4C), and none reported reduced sales of these products in recent years.

For the groups as a whole there are some interesting outcomes. Pruning and grafting of new planting material were the most widely implemented crop management practices. Across the board agricultural practices do not appear to be sustainable, and there is little attention to organic soil nutrition, abandoned coffee fields were widespread, and many farmers reported a reliance on chemical inputs.

Post-harvest handling

Improved post-harvest handling appears to be one of ICC's most significant early impacts in Semendo. Where the roadside or bare ground was used previously, drying of coffee now frequently occurs on tarpaulins, thereby reducing the amount of both foreign debris and cracked or damaged beans in the final product. Coffee drying still occurs on the roads, however, meaning that animals and people are able to walk across the coffee without hindrance, as well as the occasional vehicle. Several houses had converted their rooftops to drying areas, further reducing the possibility of contamination. The exclusion of foreign debris is particularly important given the buying station collects samples for testing and offers price incentives for low waste levels. There are frequent rejections of coffee at the ICC warehouse for this reason, and this level of scrutiny was also apparent at ICC's warehouse in Lampung.

The most telling sign of the degree of impact this has had on the village was the apparent absence of tarpaulins in the use of drying in areas immediately surrounding Semendo, including those further south towards Lampung. The farmers in Semendo appeared to have a good understanding of the value the tarpaulins could add to their coffee. The other major focus of ICC appears to be a push to limit harvest to ripe cherries only, although this has only been adopted by farmers willing and able to meet ICC requirements. These apparent changes (waiting on survey data verification) appear to support the observation that the ICC buying station (possibly linked to 4C and RA price premiums) has had a greater impact locally than the sustainability program itself.

Community Attitudes towards ICC

The majority of participants who were aware of ICC held a generally positive perception of the impact the company had made on both farming and market practices in the area, since 2012. Several farmers claim to have actively changed their methods in pursuit of the price incentive offered by ICC. One farmer indicated that he was readily able to make the on-farm changes requested by ICC, such as improving pruning practices and picking red cherries only, but noted that most other villagers would have difficulty changing their practices. Improving yields was rarely given as a reason for program participation. However, several farmers anecdotally reported yield improvements (of up to 1.5 kg/tree), having acted on ICC technical advice.

Villager understanding of the function and philosophy of ICC was quite mixed. For example, some participants considered that ICC would, and should, push for government assisted land clearing, as this would increase the overall yields and therefore supply for ICC. This overlooks the fact that while ICC would like to increase supply, it also has a specific focus on higher coffee quality and improved production practices, and is actively trying to reduce forest-clearing.

There was a wide range of positive impacts anecdotally attributed to both the ICC buying stations and their sustainability programs, including higher income, improved family life, increased enthusiasm for farming, and making the wider community more receptive to change. Several respondents also mentioned that ICC provided suppliers with boots and other clothing for general farm use.

Interestingly, several participants complained that they had been subject to a complete household inspection by ICC (the entry of ICC staff into household kitchen areas caused particular consternation). It's possible of course that the equally intrusive survey carried out under this study may have raised similar concerns.

Beyond Coffee

Beyond coffee, the primary concerns of the village include the yearly rice harvest, health care and education levels. ICC sustainability programs cannot be reasonably expected to have a significant impact in these areas. Rice is primarily produced for local consumption, and very little rice is brought or sold in the village, with many villagers supplementing own production with the government's rice program (*Raskin*). Health care, education and other essential services, such as electricity and water are supplied by the government, and there was no suggestion among the participants that ICC, or other private industry, could substantially change the status of these services in the village.

Given that government resources appear to be stretched or inadequate to meet community demand across Semendo, there certainly appears to be space for private industry to improve resilience and capability of the farming community. It is reasonable to suggest that ICC has built community awareness of natural resource management issues.

Future Research Agenda

For further discussion, but refer to Appendix B.

References

BPS (2014). *Muara Enim Dalam Angka 2014*. Muara Enim Statistics Agency (Badan Pusat Statistik – BPS), Muara Enim. http://muaraenimkab.bps.go.id/data/publikasi/publikasi_50/publikasi/index.html

ICCRI (2012). "Challenges of Sustainable Coffee Certification in Indonesia" Indonesian Coffee and Cocoa Research Institute (ICCRI). Seminar on the Economic, Social and Environmental Impact of Certification on the Coffee Supply Chain, INTERNATIONAL COFFEE COUNCIL 109th Session, London, United Kingdom 25th September 2012.

Neilson, Jeffrey (2008). "Global Private Regulation and Value-Chain Restructuring in Indonesian Smallholder Coffee Systems." *World Development* Vol. 36, No. 9, pp. 1607–1622.

Neilson, J., Labaste, P. and Jaffee, S.. (2015). *Towards a more competitive and dynamic value chain for Indonesian coffee.* Working Paper No. 7. World Bank, Washington DC.

Neilson, Jeffrey and Russell Toth (2015). "Research Design for ISEAL study in Southern Sumatra." Research proposal prepared for ISEAL.

Panyuhusen, S. & Pierrot, J. (2014) *Coffee Barometer 2014.* Hivos, The Hague.

Potter, L. (2009) *Production of People and Nature, Rice, and Coffee: The Semendo People in South Sumatra and Lampung*. In, "Taking Southeast Asia to market: commodities, nature, and people in the Neoliberal Age". Edited by Nevins, J. & Peluso, N.L. Cornell University Press, New York.

Potts, Jason, Matthew Lynch, Ann Wilkings, Gabriel A. Huppé, Maxine Cunningham, Vivek Voora (2014) The State of Sustainability Initiatives Review 2014: Standards and the Green Economy, IISD and IIED.

Social Performance Management Centre at the Grameen Foundation, The. 2012. "Piloting the PPI: A handbook for first-time users of the Progress Out of Poverty index." Grameen Foundation.

Verbist, Bruno, Andree Eka Dinata Putra, and Suseno Budidarsono. (2005). Factors Driving Land Use Change: Effects on Watershed functions in a Coffee Agroforestry System in Lampung, Sumatra. *Agricultural Systems* 85, pp: 254–270.