

# Policy Recommendations: Training Smallholder Oil Palm Farmers in Good Agricultural Practices



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# Policy Recommendations: Training Smallholder Oil Palm Farmers in Good Agricultural Practices

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# Introduction

The implementation of Good Agricultural Practice (GAP) is a key component of RSPO certification. The uptake of GAP can improve smallholder yields and provide a financial incentive for certification. Currently, farmer practices are mostly not in line with GAP, and training is required to improve practices. But training large numbers of smallholders in an effective way is challenging.

In our research project, supported by IDH, we carried out a survey among more than 310 farmers in five research areas where trainings had been provided. Based on the survey data and our own experience in the field, we provide a number of policy recommendations on several topics:

1. The suitability of different GAP for smallholder oil palm farmers
2. Constraints to adopting GAP, and options to overcome these constraints
3. Options to improve the smallholder training approach

# Project scope and limitations

In this project, we carried out case studies in five different oil palm cultivating areas, where training programmes were previously implemented by Wageningen University and/or NGOs. Participants in our case studies were selected based on their training background and roles in the local network. In total, 310 farmers participated in the survey (approximately 60 farmers per research area).

While we found some clear recurrent themes, our recommendations are not automatically applicable outside our research areas, as we did not take a random, representative sample of Indonesian smallholder farmers. Nevertheless, we think we learned some valuable lessons about the effects and limitations of smallholder training.

# PART 1

## Methods

# Overview of GAP included in the survey

1. Harvesting every 10 days
2. Harvesting based on a loose fruit minimum ripeness standard
3. Collection of all loose fruits
4. Establishing and maintaining cleanly weeded circles (weeding at least three times/year)
5. Establishing and maintaining harvesting paths every other palm row
6. Selective weeding of woody and noxious weeds
7. Maintenance of a dense ground cover outside path and circle
8. Pruning every six months to the correct number of fronds
9. Placing pruned fronds in a U-box or along contour lines
10. Application of 1.5-2.5 kg/palm/year urea or equivalent
11. Application of 1.0-2.0 kg/palm/year rock phosphate or equivalent
12. Application of 2.0-3.0 kg/palm/year KCl or equivalent
13. Application of 0.5-1.0 kg/palm/year kieserite or equivalent
14. Application of Empty Fruit Bunches as organic fertiliser

# Research area: Kumpeh, Jambi

- **Villages:** Ramin
- **Description:** A transmigration and former plasma area that was abandoned by the company. Farmers are now independent. There used to be a cooperative, but it fell apart years ago. Farmers have good access to several mills to sell their FFB. They mostly sell through traders.
- **Training:** Six farmers were trained for three years (starting in 2014; ongoing) and are hosting an experimental demonstration plot (Wageningen University and SNV).
- **Sample:** Six trained farmers and 56 untrained farmers, who were in the direct network of the trained farmers.

# Research area: Tanjung Jabung Barat (TJB), Jambi

- **Villages:** Sungai Rotan
- **Description:** An area of local independent oil palm farmers. A farmer group with 86 voluntary members was initiated by Yayasan Setara Jambi in 2013, to prepare for RSPO certification. All farmers sell their bunches through traders.
- **Training:** Five selected farmer group members received a one-day GAP training from Asian Agri agronomists, in a classroom setting. The trained farmers then provided trainings to the other farmers in the group, and one Asian Agri agronomist remained available to the farmers for questions. Setara Jambi provided additional trainings about making a farmer group and about RSPO certification.
- **Sample:** 53 trained farmers and 12 untrained farmers, selected through the snowballing method. All the selected farmers were in the direct network of six intensively trained local leaders.

# Research area: Siak, Riau

- **Villages:** Dosan, Teluk Mesjid, Benayah, Sungai Limau
- **Description:** A semi-plasma, semi-independent smallholder area established mostly on peat soils. All villages, apart from Dosan, had functional cooperatives at the time of the survey. Bunches were sold through these cooperatives.
- **Training:** In 2009, a three-day training was provided by a British oil palm specialist together with Wageningen University, World Wildlife Fund and Elang. During the training, mornings were spent in the classroom, while afternoons were used to establish a good practices demonstration plot. Most active participation was from Dosan farmers, and there was also some attendance from Teluk Mesjid. Standard Operating Procedures were drafted in Dosan village after the training.
- **Sample:** Farmers were selected through key informant suggestions, from four different villages (to achieve spatial separation). Nine trained farmers from Dosan and two trained farmers from Teluk Mesjid were selected; the remaining 39 farmers were untrained.

# Research area: Sintang, West Kalimantan

- **Villages:** Mrarai 1 to 4
- **Description:** An area with farmers from mixed transmigration and local (Dayak) origin. Farmers mostly own both plasma and independent fields. Plasma farmers sell their bunches through a cooperative; independent farmers sometimes use traders or mix their independent bunches with plasma loads. Trained farmers were all members of an independent farmers' cooperative, which traded directly with the mill. The independent farmer cooperative was initiated and supported by WWF since 2012. All bunches are sold to a company mill that processes smallholder bunches only. The mill is regularly overloaded.
- **Training:** Six farmers with both plasma and independent fields were trained for three years (starting in 2014; ongoing) and are currently hosting eight experimental demonstration plot (Wageningen University and SNV).
- **Sample:** Six trained farmers and 60 untrained farmers, who were in the direct network of the trained farmers.

# Research area: Sekadau, West Kalimantan

- **Villages:** Gonis Rabu, Gonis Tekam, Empring, Segori
- **Description:** A mixed area with plasma and independent fields. Most farmers sell their bunches through the plasma cooperatives.
- **Training:** Trainings were provided by an international and a local NGO (World Education and Credit Union Keling Kumang, supported by Solidaridad and Stichting Doen. In the project, a Training of Trainers approach was implemented through Farmer Field Schools, with a first round of classes in 2012 and 2013. The GAP trainings were either for mature or for immature plantations. Each course consisted of 13 classes divided over 13 weeks. Trainers were NGO staff who were previously trained by plantation agronomists, as preparation for the project. In addition to GAP trainings, financial literacy training were also provided.
- **Sample:** Six farmers trained in the first round of Farmer Field Schools, and 60 untrained farmers in the direct network of the trained farmers.

# Methods: survey

One survey was conducted among the participants in all five research areas. The surveys were conducted after the completion of the trainings, in the first half of 2016. In the survey, different management practices were discussed:

- Harvesting
- Weeding
- Pruning
- Fertiliser application.

Each of these practices had different aspects: frequency, amount of different inputs used (herbicides, fertilisers), labour for the activity, and approach (harvesting ripeness standard, weeding approach, number of leaves pruned). For each of these aspects, farmers were asked to indicate their current method, and where they learned about this method. They were also asked if they changed their methods recently (after training).

The answers of the farmers were triangulated with field observations in randomly selected plantations in three out of five research areas.

# Methods: data analysis

The data were organised in a single Excel file, with each column dealing with one survey question or sub-question. This data file is available for project partners upon requests.

The survey results were analysed in SPSS and R, where statistical analyses were appropriate. Where statistical analyses were not possible or useful, summary graphs have been created to extract the main messages from the data.

Farmer remarks were carefully noted by the interviewers in Jambi and in Riau. These remarks show useful insights into the reasons why farmers made certain (management) decisions. The remarks have been retained in the data file.

# PART 2

Summary of results,  
and recommendations

# Spontaneous dissemination

One of the key goals of the project was to follow how knowledge spreads through a community, from trained to untrained farmers.

The results of our survey show that the actual practices of trained farmers are not significantly better than the practices of untrained farmers. This can either mean that good practices are fully diffused and taken up where appropriate, or that good practices were not adopted by trained farmers and did not diffuse for that reason.

We observed that untrained farmers changed their practices less regularly than trained farmers, so it is likely that no full diffusion of practices took place.

But we also observed that more than 80% of the farmers discussed about their farming practices with family, friends, peers, and farmer group members, which makes it likely that some spontaneous diffusion took place.

We cannot draw a final conclusion about spontaneous dissemination based on our data, but we can say that farmers actively discuss farming practices. We can also conclude that relying on spontaneous diffusion only is unlikely to result in large-scale uptake of Good Agricultural Practices.

# Summary of survey results

- None of the trainings improved the complete range of farmer practices, but trained farmers changed their practices more regularly than untrained farmers, for all GAPs and in all research sites.
- All GAPs were implemented by at least 20 to 100% of farmers in all areas, indicating that they are feasible and relevant at least for some of the farmers.
- Good harvesting practices were adopted more often by trained than by untrained farmers; other practices showed little difference.
- Trained farmers applied relatively more straight fertilisers and less NPK fertilisers, but did not apply more nutrients overall.
- Fertiliser types and markets were the most important topic of discussion; fertilisers price and availability were key constraints to correct applications.

# Standard Operating Procedures

- Without the creation and enforcement of clear Standard Operating Procedures (SOP), the majority of farmers are unlikely to adopt Good Agricultural Practices on large scale
- SOP need to be enforced by customers (mills) or cooperatives/kelompok; writing the SOP without enforcing them is unlikely to be effective
- Enforcing SOPs is probably challenging in multi-stakeholder supply chains
- SOP need to be created in a participative process, and need to take local constraints into account (flooding, poor roads, limited fertiliser availability, etc.)
- The formation of cooperatives and farmer groups is beneficial for GAP adoption because:
  - Groups provide a feeling of cohesion and common interest
  - Groups facilitate information sharing
  - Groups improve harvesting frequency and bargaining power
- Relying on groups also introduces risks because:
  - Groups are vulnerable to corruption and disagreements
  - Unstable or poorly functioning groups lead to poor practice and neglect of plantations

# GAP: Suggestions for updates

- GAP weeding standards may be relaxed to 2 times/year to increase feasibility and prevent over-weeding
- Clean-weeding needs to be addressed by easy alternatives, such as:
  - Maintaining all weed cover on frond stacks
  - Mowing the interrow vegetation with hand mowers
- Fertiliser recommendations for Indonesian farmers should be based on subsidised NPK 15-15-15 fertilisers
  - Recommendations should focus on nutrient balance, to prevent the over-application of nitrogen, especially
  - The recycling of Empty Fruit Bunches back to the field needs to be promoted as an essential component of sustainable oil palm management

# GAP: Improved adoption

- GAP which depend on third parties (fertilisers, harvesting) can only be adopted when constraining factors are addressed. Mills, traders, fertiliser and herbicide dealers, and cooperatives are key stakeholders that need to be involved in any successful intervention.
- Improving harvesting frequency is one of the most effective way to increase yield, but requires involvement of cooperatives/traders, and the mill
  - Training alone is unlikely to be sufficient to induce traders/farmers to change their practice; real incentives are required
  - Mills can (and should) impose the 10-day rotation on all their suppliers, so that traders and cooperatives are stimulated to offer an optimal bunch pick-up schedule to their farmers
  - Good-quality bunches should fetch a higher price, both for traders and for farmers
- Mills should commit to making Empty Fruit Bunches available to smallholders
  - For every 5 tonnes of bunches delivered, about 1 tonne of empty bunches is produced
  - These should be available for the farmers to take back to the field, for a fair price
  - The practice of using all empty bunches for company plantations should be discouraged

# Farmer groups & cooperatives

- The formation of cooperatives and farmer groups is beneficial for GAP adoption because:
  - Groups provide a feeling of cohesion and common interest
  - Groups facilitate information sharing
  - Groups improve harvesting frequency and bargaining power
- Relying on groups also introduces risks because:
  - Groups are vulnerable to corruption and disagreements
  - Unstable or poorly functioning groups lead to poor practice and neglect of plantations
- Farmers will not automatically follow the group SOP unless it is enforced, or unless they are convinced of the usefulness
- The role and the functioning of a cooperative/group should be part of the training curriculum

# Training and dissemination

- During training, information from previous trainings or work experience should be specifically mentioned and discussed; the benefit of the proposed GAPs over the previous recommendations needs to be clearly explained
- If the training-of-trainers approach works with farmer trainers, then trainers should fully adopt the trained practices in their own plantations
- Written training materials are essential to prevent that lessons from trainings become distorted over time
- Trainings need to address local constraints (fertiliser availability, relations with mills, infrastructure) and provide farmers with tools to resolve these constraints; or relevant stakeholders (especially traders) need to be directly involved in the training process
- Practical trainings/field work should be included in all trainings to facilitate learning

# Measuring impact

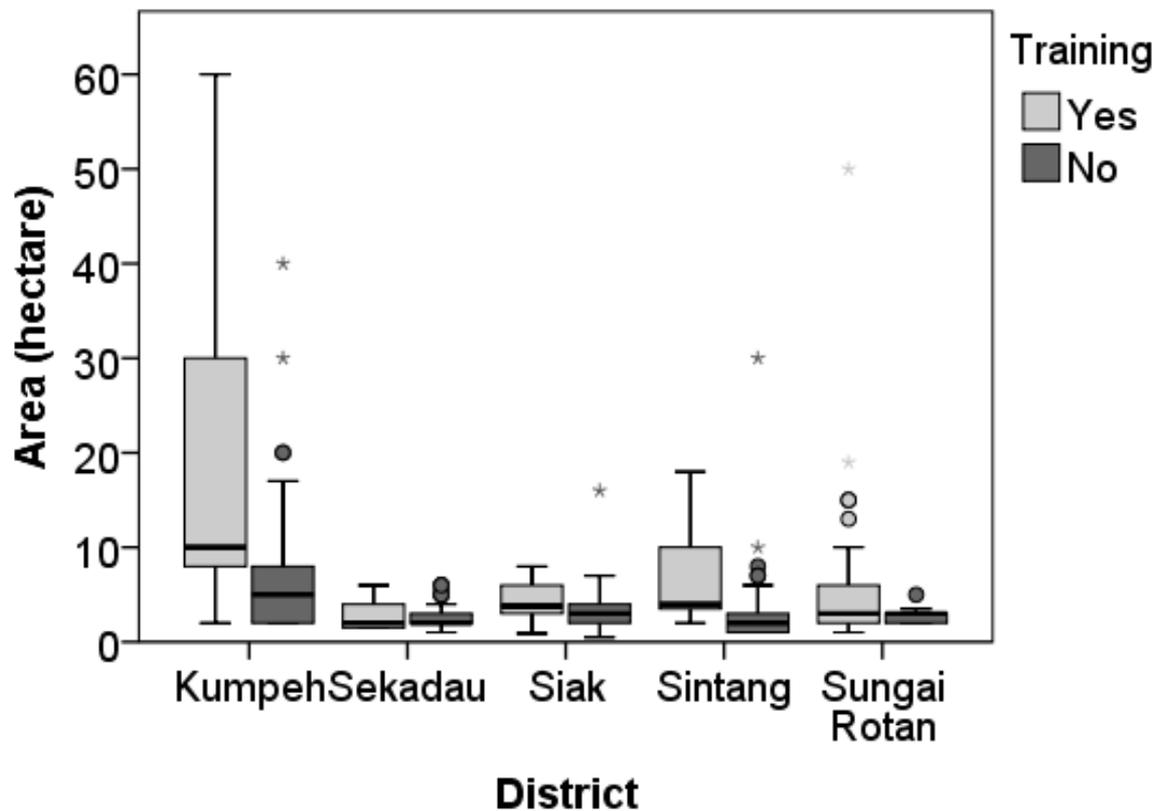
- Surveys based on farmer recall are not sufficient to measure the impact of GAP training on farmer productivity
- Each intervention should start with a good baseline, in which survey data are supplemented with yield measurements and plantation audits
- In order to measure the impact of trainings yield records are essential
  - A good yield recording system needs to be set up well before the start of the trainings
  - Traders or the cooperatives have to play a role in recording production and payments at every collection round; it might be necessary to provide incentives
  - Yield records need to be kept for at least three years to deal with climatic influences
  - Additional training in proper recording of input use and yields may be necessary, especially when farmers keep records individually

# Discussion: incentives for intensification

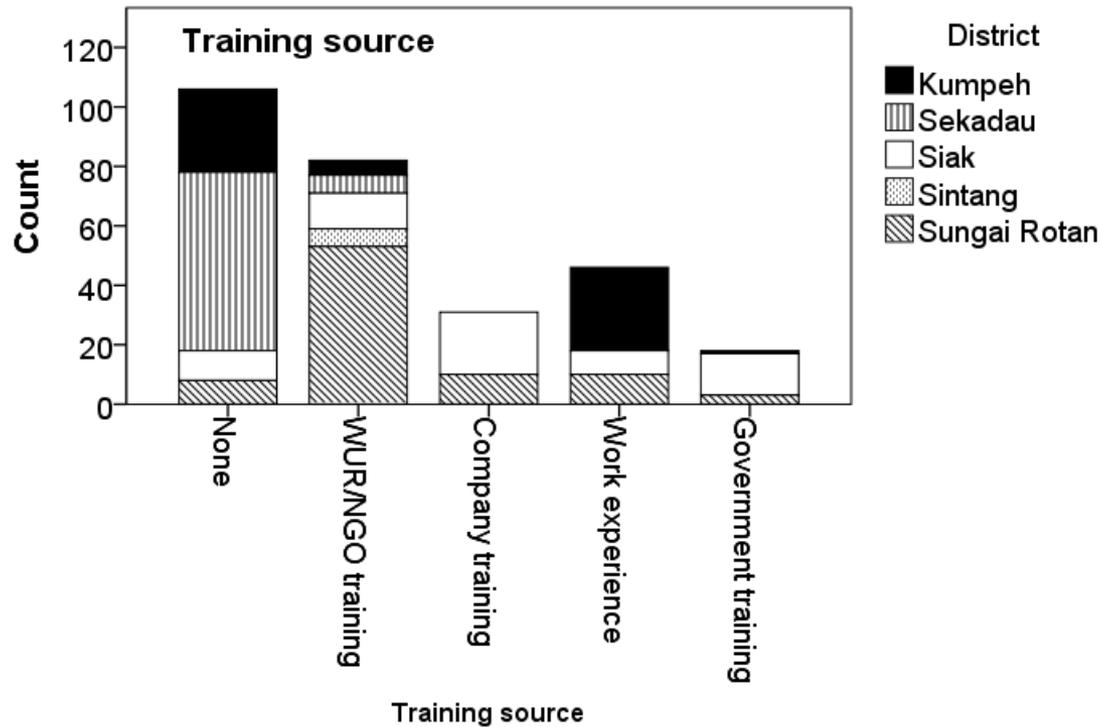
Ideally, productivity gain would be the key driver for farmers to take up GAP, but our experience is that productivity gain is not a given, and farmers are not necessarily convinced that they will achieve it. There is no evidence of a rapid productivity gain from practices such as doing good soil management; it is likely that these gains will occur over time, but the direct benefits to productivity are probably small. In addition, some farmers appear to be quite satisfied with their current levels of production, and do not feel the need to intensify. We noticed that some farmers we interviewed were sceptical about GAP because 1) they didn't see the point of the practices; 2) they couldn't afford the additional investments; 3) they felt that they already knew the best practices, and 4) they received many conflicting recommendations. In order to convince farmers of the sensibility of the proposed practices, demonstrated positive results (which require a time investment of at least three years), excellent and convincing agronomic staff, good cooperation between farmers, and clear rules/procedures to follow are required. Even then, the promise of productivity gain alone may not lead to massive uptake of GAP. Additional incentives could be a higher and/or a more stable price for traders/farmers implementing GAP, investments in infrastructure, and access to finance, fertilisers, agronomic recommendations, and machinery.

## PART 2

Overview of results (with graphs)



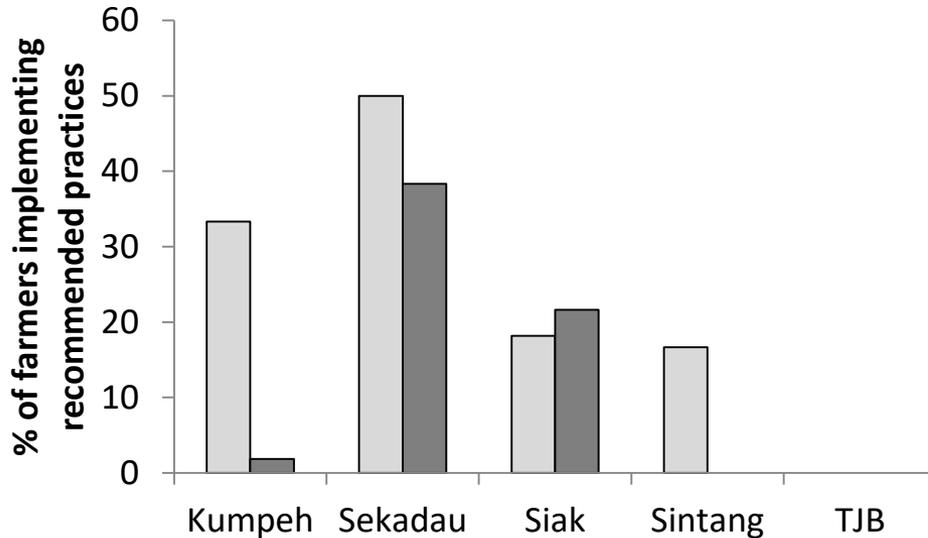
Distribution of plantation size in the different research areas. Most plantations in TJB, Siak, Sintang and Sekadau were less than 5 hectares, and in Kumpeh plantations were 5-10 hectares. There were some outliers, with the largest plantation (in TJB) consisting of around 80 hectares. In Kumpeh and TJB plantations of trained farmers were significantly larger than of untrained farmers (data not shown). This should be kept in mind because it can confound results, as the difference between trained and untrained farmers may be due to wealth, rather than training. Results from the trained farmers cannot automatically be extrapolated to untrained farmers if there is a large different in wealth status. This study also illustrates the risk of poorer farmers being left behind. It may be useful to develop some separate GAPs which are targeted specifically at resource-poor farmers.



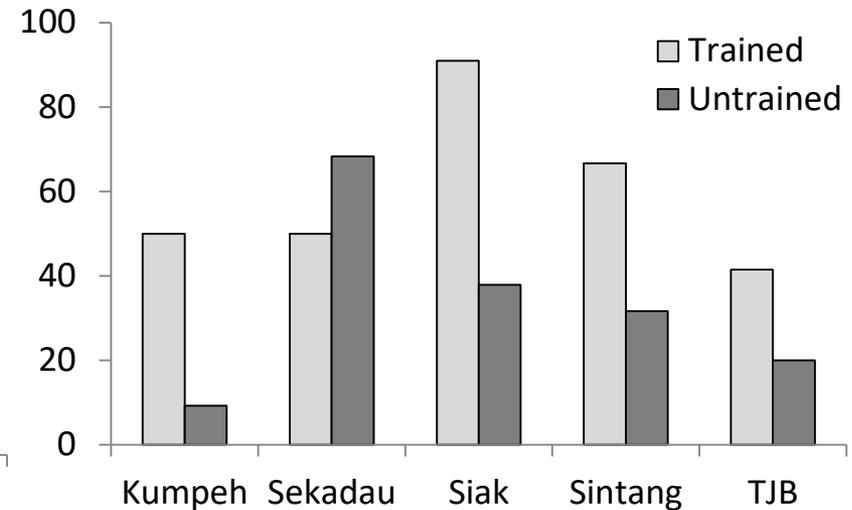
The distribution of training sources. A number of farmers received no training whatsoever; especially in Kumpeh and Sekadau area (~90%). Some farmers received trainings from multiple sources. Government trainings were provided by extension agencies or by government-owned companies (especially SPN in Siak) which were created specifically to support smallholders. Companies sometimes provided trainings to their plasma farmers. And about 15% of the smallholders reported to have worked in plantation companies in Indonesia and Malaysia. Those farmers often referred to their working experience as an important source of knowledge, and they shared their knowledge with other smallholders.

Many farmers mentioned that they received conflicting information from different (training) sources, for example with regards to pruning, the use of herbicides, and fertiliser application.

**Harvesting frequency:  $\geq 3$  times/month**



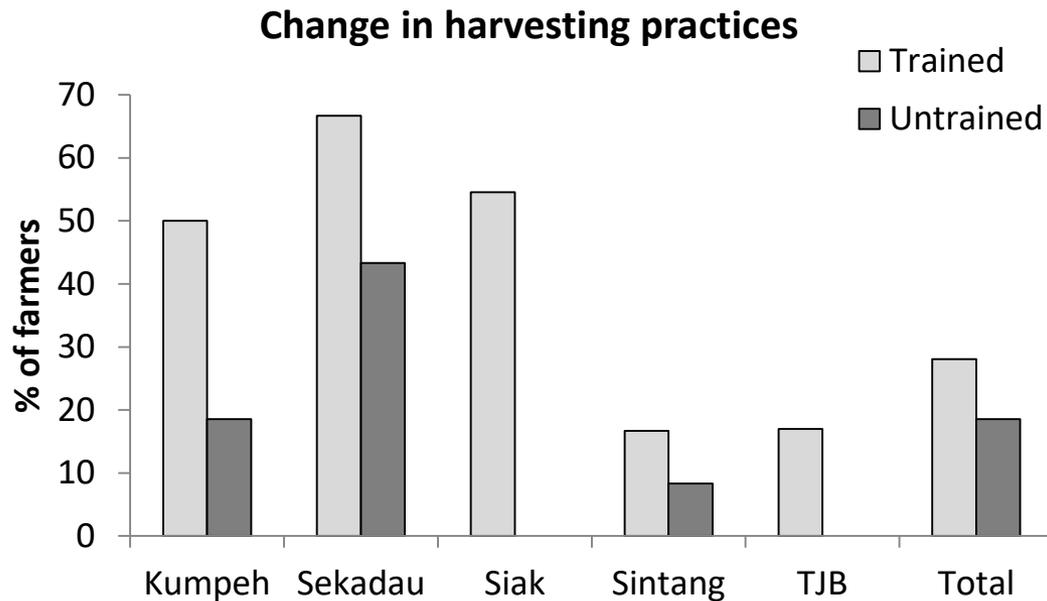
**Ripeness standard: based on loose fruits**



Harvesting practices among trained and untrained farmers: frequency (left) and ripeness standard (right). Trained farmers overall increased the harvesting frequency and the reliance on loose fruits as ripeness standard, especially in Kumpeh and in Sintang. In TJB, neither trained nor untrained farmers harvested three times per month, because of dependency on traders and a perception of not having enough yield to increase harvesting frequency.

In Kumpeh, most trained farmers were traders or were closely related to traders, so they were not dependent on external traders for selling their bunches to the mill. Nevertheless, only two trained farmers implemented the 10-day harvesting interval as a regular practice.

In Sekadau, a harvesting frequency of  $\geq 3$  times/month was implemented by half of the trained, and 40% of the untrained farmers. This implementation was facilitated by the cooperative and the mill; for example, in one village all farmers were cooperative members, and most harvested 4 times per month.



In all case studies, more trained than untrained farmers indicated that they changed their harvesting practices recently. They made changes in the harvesting frequency, standard, or collection of loose fruits. Several farmers also changed harvesting tools because the palms became taller, but this was not a component of the GAP training.

Many farmers indicated doubt about the financial benefit of harvesting more regularly, especially at times of poor yield. Using the loose fruit standard is less beneficial when harvesting is done every 15 days, so optimal ripeness can only be achieved when the 10-day rotation is adopted. Full adoption of good harvesting practices is unlikely unless mills, traders and/or cooperatives change their procedures to facilitate this. For mills, there is usually a sorting/grading procedure, which incentivises the harvesting of ripe bunches. But traders generally pay the same price for any quality, so the incentives from the mills do not trickle down to the farmers. To improve harvesting quality, a sorting procedure should be in place when farmers sell through a trader or through the cooperative.

About the harvesting, farmers remarked:

“I follow the rules from the mill” (Kumpeh)

“The frequency of harvesting depends on the trader” (Kumpeh)

“I use different tools; I am now harvestings with a sickle” (six farmers in Kumpeh)

“I only used loose fruit criteria for harvesting in the field twice: it is not easy and practical, not enough time to do it, and not enough production” (TJB)

“One of my friends worked in a company and he knows that loose fruits are a better criteria” (TJB)

“I needed the production, so before I only used the colour as criteria” (TJB)

“The trader set the loose fruit criteria: he doesn't want to buy unripe bunches, only bunches with loose fruits” (TJB)

“Loose fruits are food for the pigs, so we don't collect them” (TJB)

“When the cooperative was active there was a harvesting schedule, now not anymore” (Siak)

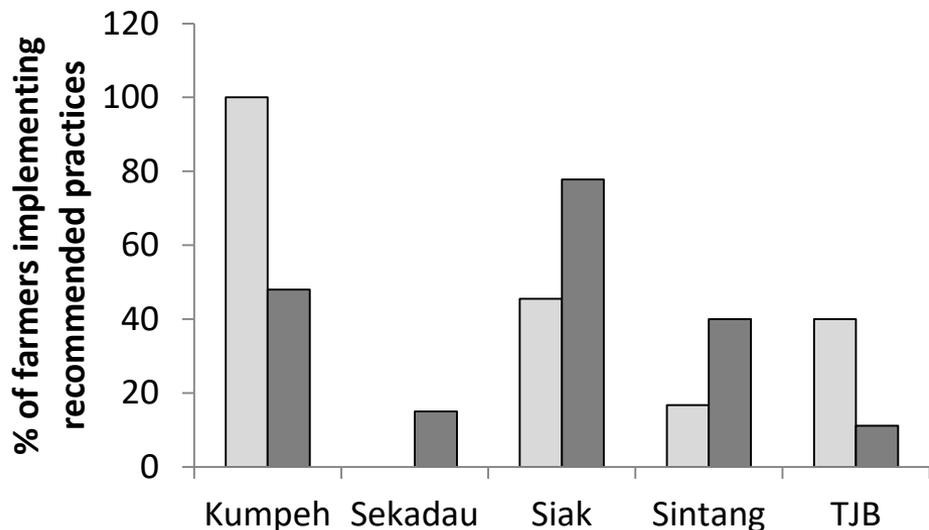
“In the coop we harvest 3 times per month, outside the coop 2 times per month” (Siak)

“Two times harvesting is more efficient then three; more bunches and more money” (Siak)

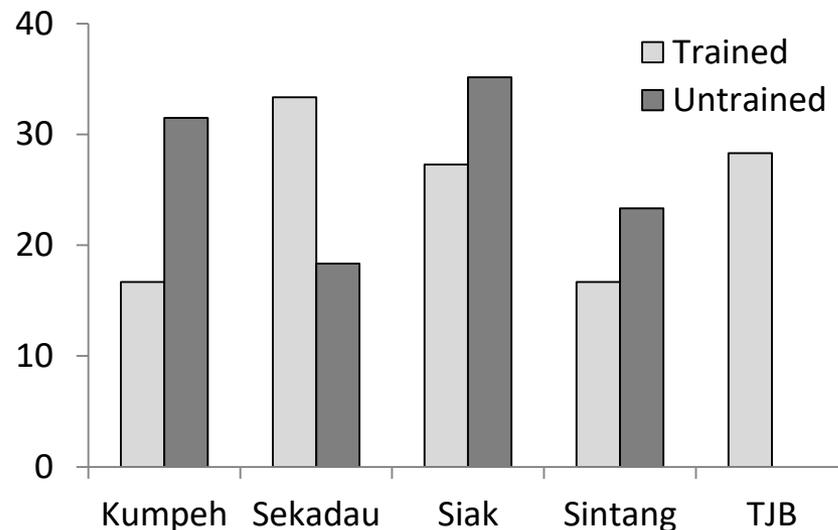
“We harvest only once per month when the mill is overloaded” (eight farmers in Sintang)

“I follow the schedule of the kelompok” (12 farmers from Sekadau)

**Weeding frequency:  $\geq 3$  times/month**

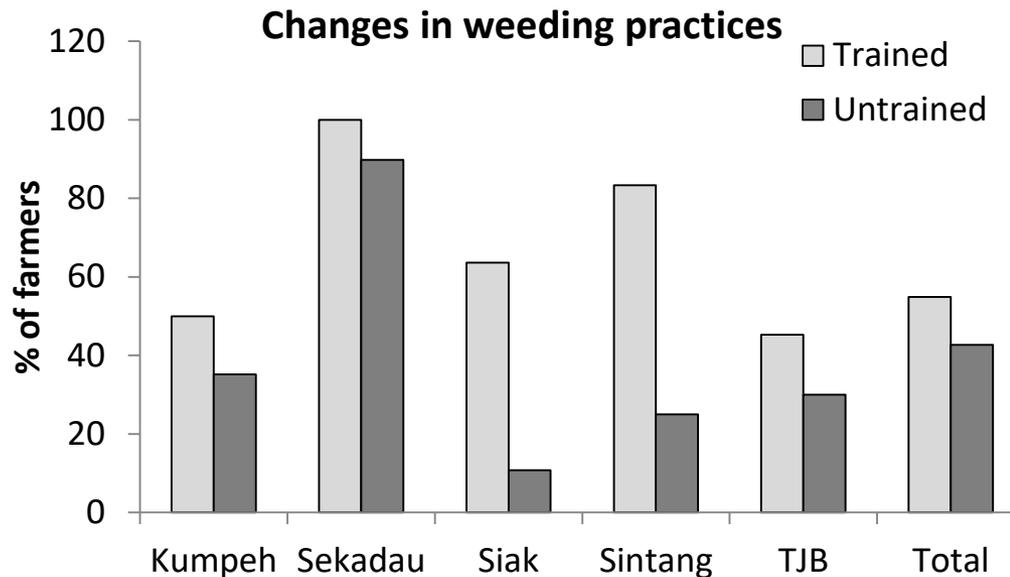


**Weeding standard: circle + path**



In four out of five research areas, a larger percentage of trained farmers applied recommended weeding practices compared with untrained farmers. Only in Kumpeh, the opposite trend was observed. In TJB, none of the un-trained farmers and 30% of the trained farmers applied recommended practices. The uptake of recommendations was particularly high in Sekadau, Siak, and Sintang, where the use of recommended practices was also more common among untrained farmers. Recommended practices involved the establishment of weeded paths and circles. Clear-weeding, no weeding, or the weeding of only paths or circles were classified as 'not recommended'.

Observations in >160 randomly selected plantations in the research areas gave a similar picture: recommended practices were common in Siak (>60%) but were observed in less than 10% of plantations in Kumpeh, and less than 5% of plantations in TJB.



In all case studies, more trained than untrained farmers indicated that they changed their weeding practices recently. They mostly changed their weeding standard, refraining from clear weeding and moving towards circle and path weeding.

Many farmers indicated that clear weeding was more expensive, and some weeded only paths and circles to save money. Such costs savings are a useful incentive to improve the adoption of more conservative weeding techniques. A number of both trained and untrained farmers indicated to refrain from clear weeding because of the negative effects on soil quality (especially soil moisture) and the risk of damage to the palms from herbicides. Other farmers preferred clear weeding because it made the plantation look 'clean'.

More than 60% of the farmers in the sample relied on paraquat, and about 35% relied on glyphosate (data not shown). As the RSPO discourages the use of paraquat, it's universal use in smallholder plantations could be a problem.

About the weeding, farmers remarked:

“Sometimes I do total weeding because weeds destroy the plantation” (Kumpeh)

“Gramoxone (paraquat) is more effective than other herbicides” (Kumpeh)

“Using too much chemicals is not good for the soil” (Kumpeh)

“Faster, easier and cheaper to use chemicals and to do circle weeding” (TJB)

“Total weeding looks cleaner” (TJB)

“Manual weeding is cheaper” (TJB)

“I try to keep the soil moist by applying manual circle and path weeding; oil palms needs a lot of water!” (TJB)

“I knows chemicals are not good, the cooperative also says not to use them” (Siak)

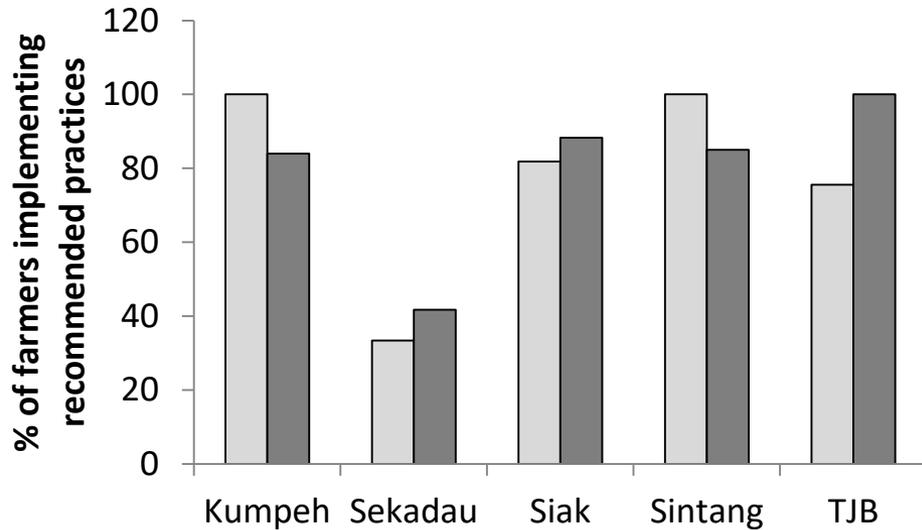
“In my own field I only use mechanical weeding, because my goats are sometimes graze the plantation” (Siak)

“Outside the circle and the path, I keep the weeds at 20 cm high” (Siak)

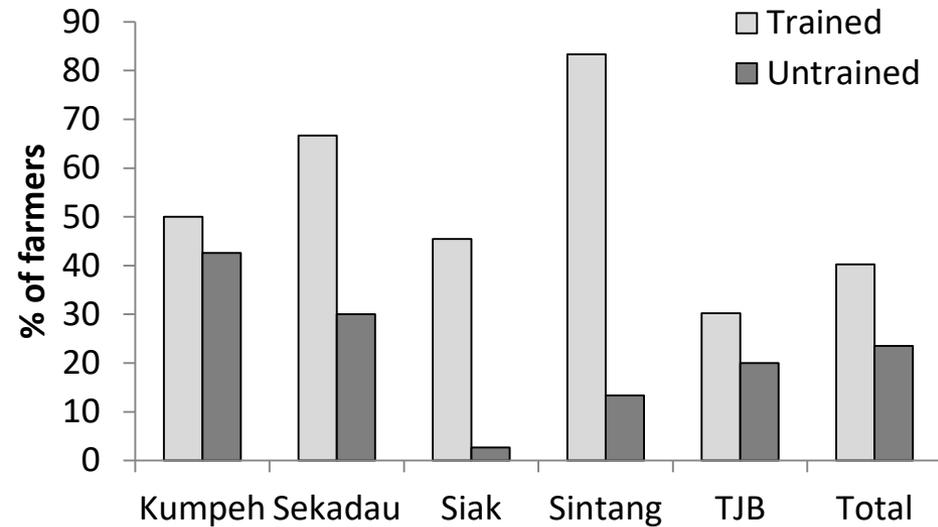
“When you do weeding, fertiliser will be absorbed by palms instead of weeds” (Siak)

“When you do circle weeding, it’s easier to see loose fruits, to evacuate the FFB from the plantation, and to apply fertiliser” (Siak)

**Pruning frequency:  $\geq 2$  times/year**



**Change in pruning practices**



In two out of five research areas, a larger percentage of trained farmers pruned at recommended frequency compared with untrained farmers. In the other three areas, untrained farmers pruned more frequently. For other recommended pruning practices (correct number of leaves, and stacking of the pruned leaves in a box (flat area) or along the contour line (slope)) depend on the age and condition of the plantation, and not enough data was available to assess the uptake of these practices. We observed that in Sekadau, 65% of the trained farmers implemented the box stacking (compared with 15% of untrained farmers). A larger number of trained than untrained farmers indicated to have changed their pruning practices recently, in all research areas.

Farmers said:

“Correct frond stacking helpt to keep soil moist and to suppress weeds” (Kumpeh)

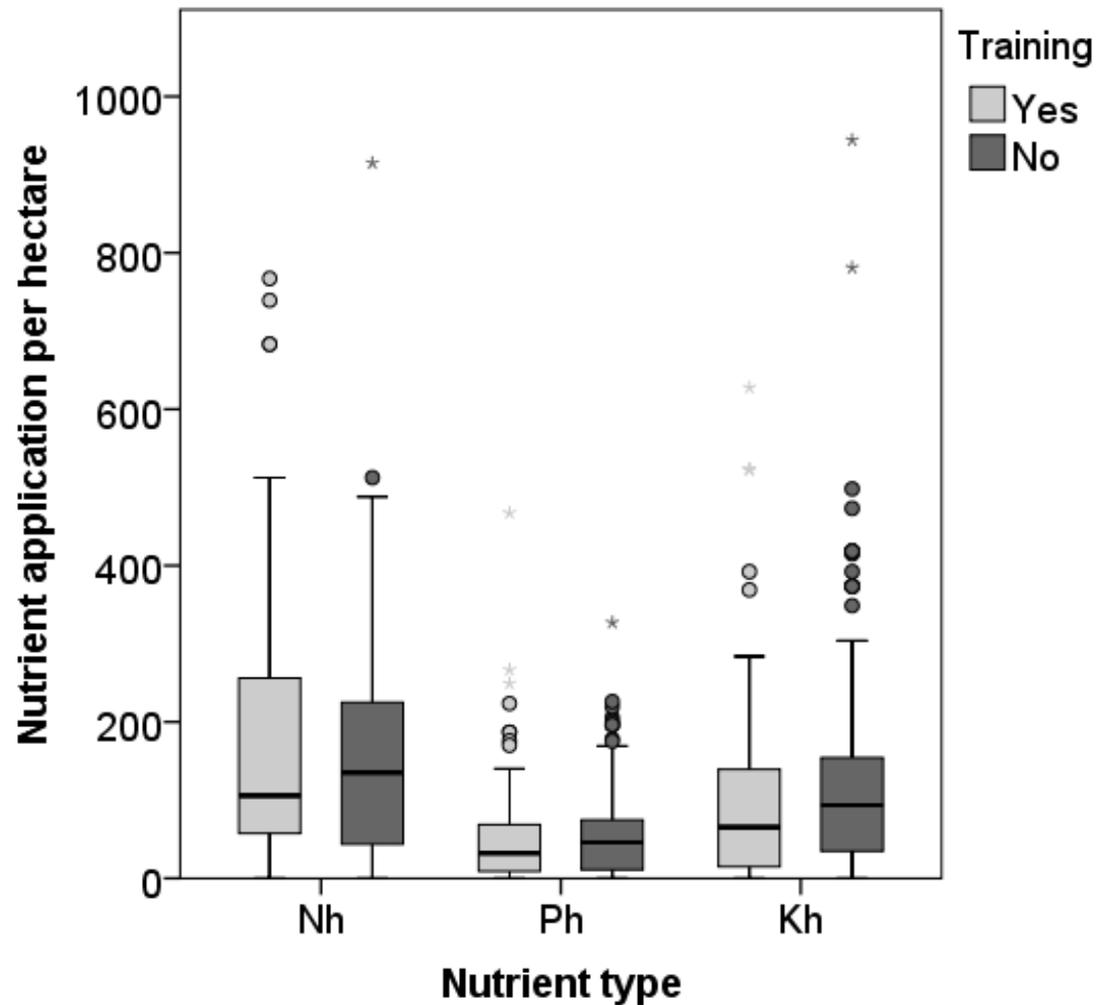
“I don’t prune often, because of time limitations” (TJB)

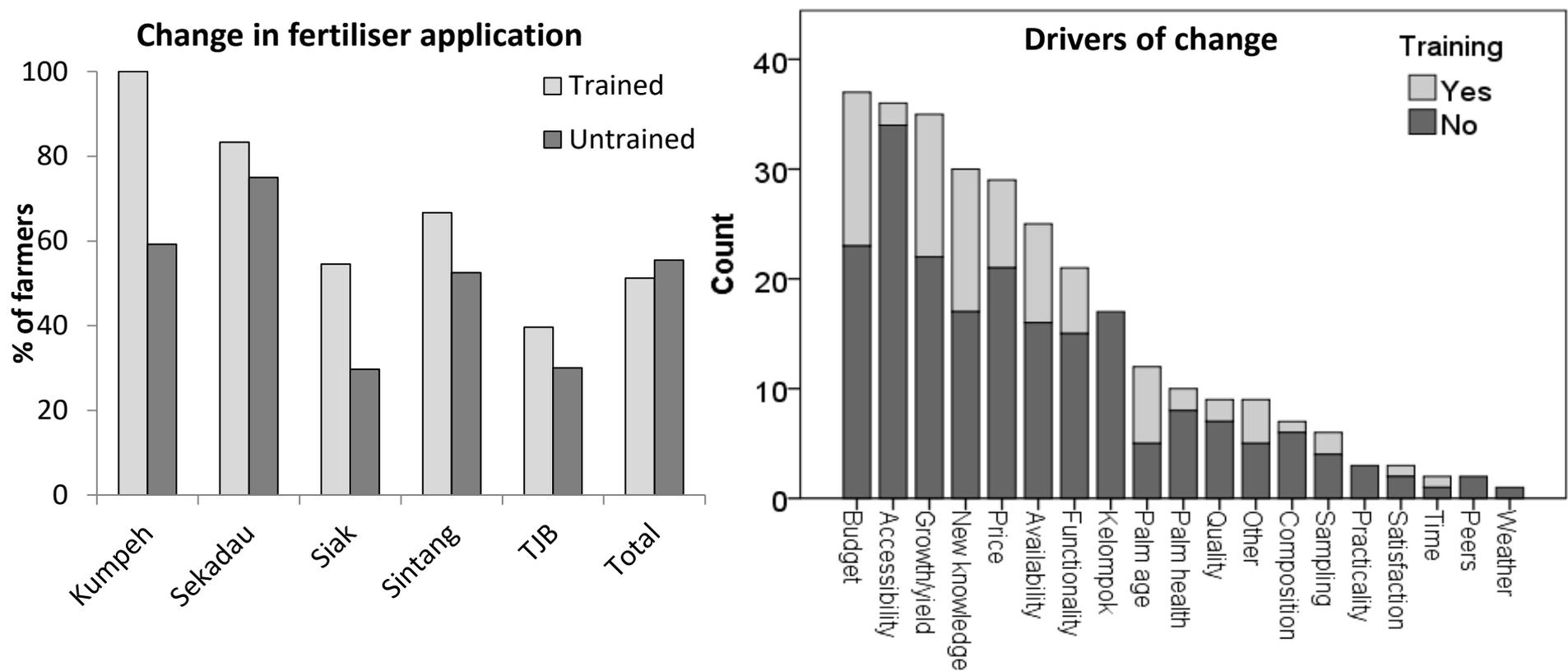
“I prune two times per year, or less when I don’t have money” (Siak)

Fertiliser applications in the research area showed a similar trend as in other smallholder areas. Nitrogen (N) was applied in relatively large (sufficient) quantities, and the same was true for phosphorus (P), but potassium (K) was applied in insufficient quantities to meet palm demand.

Only in TJB, self-reported applications of N, P and K were significantly higher in trained than in untrained plantations. However, the training in this area (and in the other areas) was biased towards larger farmers, and therefore this increase may be due to farm size and wealth, rather than training.

No significant differences in fertiliser application between trained and untrained farmers were observed in the other areas (data not shown).





In all case studies, more trained than untrained farmers indicated that they recently changed the types of fertilisers that they applied. But this did not lead to a general improvement in plant nutrition (previous slide). Farmers mostly cited fertiliser and cash availability as key constraints. The availability of subsidised fertilisers for farmers who were not part of a cooperative or farmer group was particularly problematic.

Trained farmers mostly named budget, palm growth/yield, and new knowledge as reasons to change their practices. Untrained farmers mostly named accessibility, palm growth/yield, budget, and price. Other important reasons to change fertiliser application were availability, functionality (especially of using NPK blends), group policy, and palm age.

Both cooperatives and traders sometimes provided loans for fertilisers. None of the interviewed farmers indicated to borrow money from a bank for the purpose of buying fertilisers.

About the fertiliser application, farmers remarked:

“Borax/KCl/NPK Mutiara/... is too expensive” (all areas)

“NPK Ponska works for rice, so now I’m testing if it works for oil palm” (Kumpeh)

“I started applying fertilisers after the training” (Kumpeh)

“It is now easier and faster to get the fertilisers due to farmer group” (TJB)

“I mix all fertilisers together before application” (TJB)

“My palms are older now, so I changed the fertilisers based on the needs of the palm” (TJB)

“NPK Ram Sakti is being advised by SPN after testing the leaves” (Siak)

“I have no knowledge about fertilisers; the cooperative tells me what to do” (Siak)

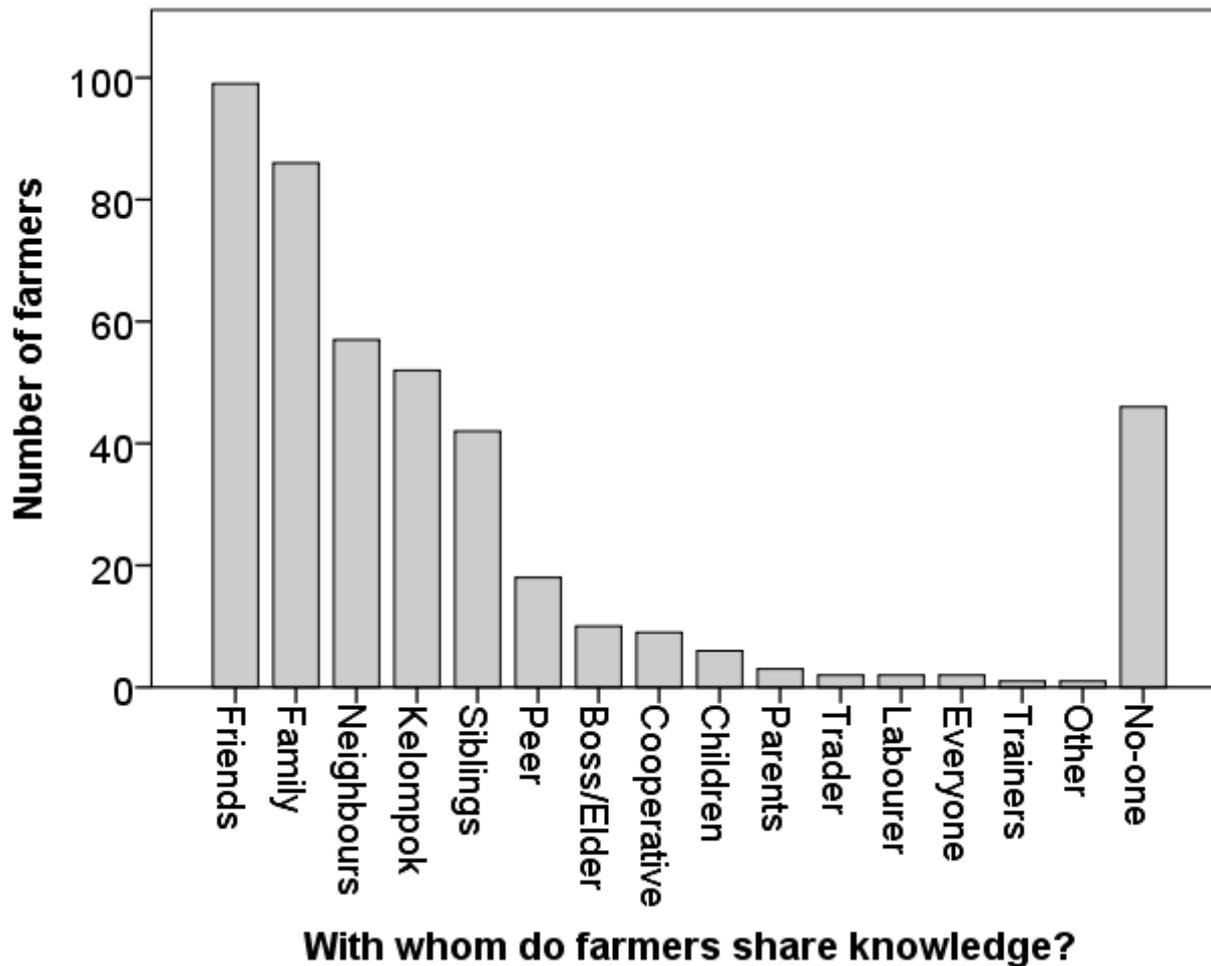
“My friend says I should give more fertiliser because my harvest is low” (Siak)

“I would like to use Empty Fruit Bunches but they are difficult to get” (Sekadau)

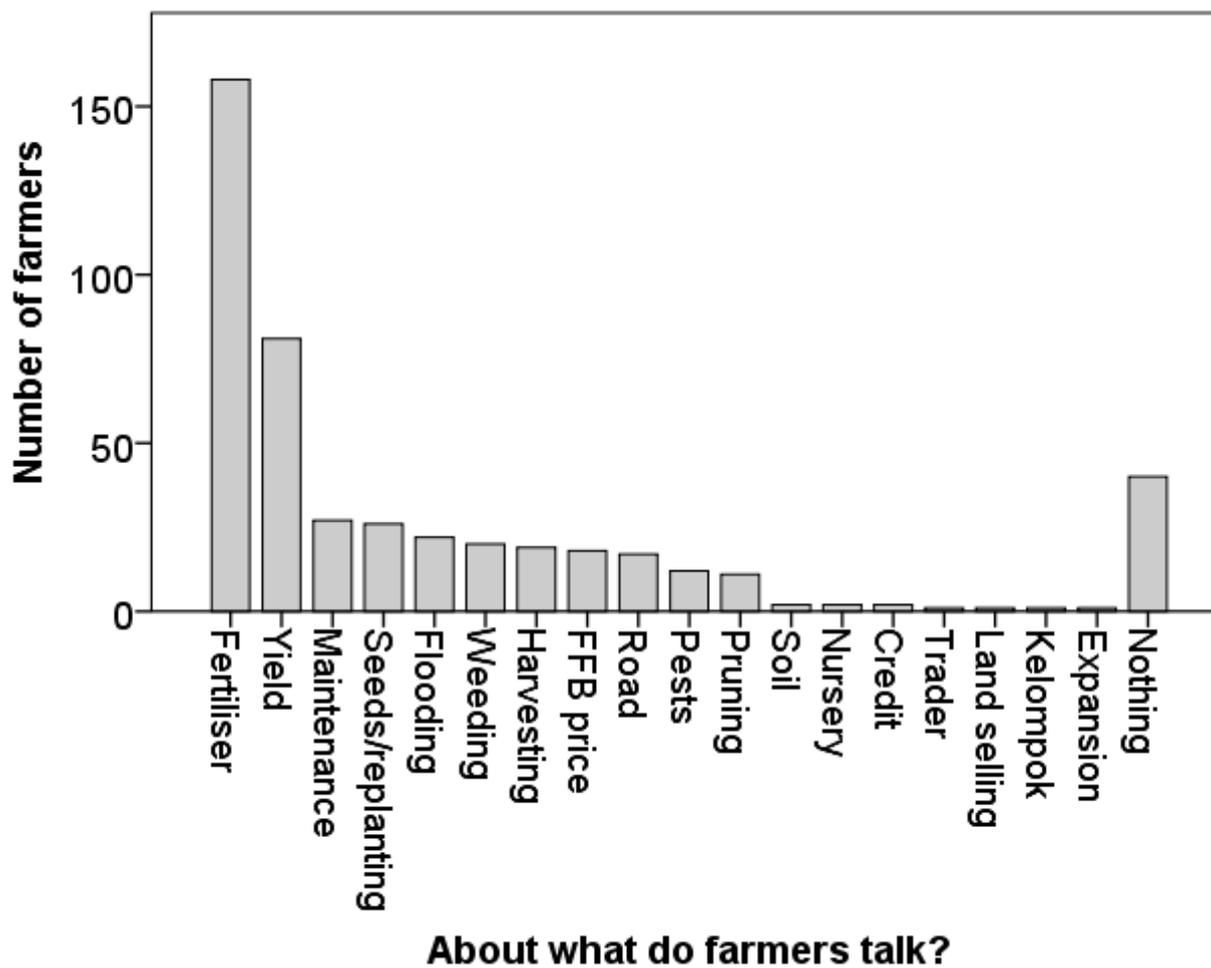
“I’m planning to use fertilisers, but I’m not sure which type” (Sekadau)

“There are so many different ideas about fertilisers, I get confused” (Sekadau)

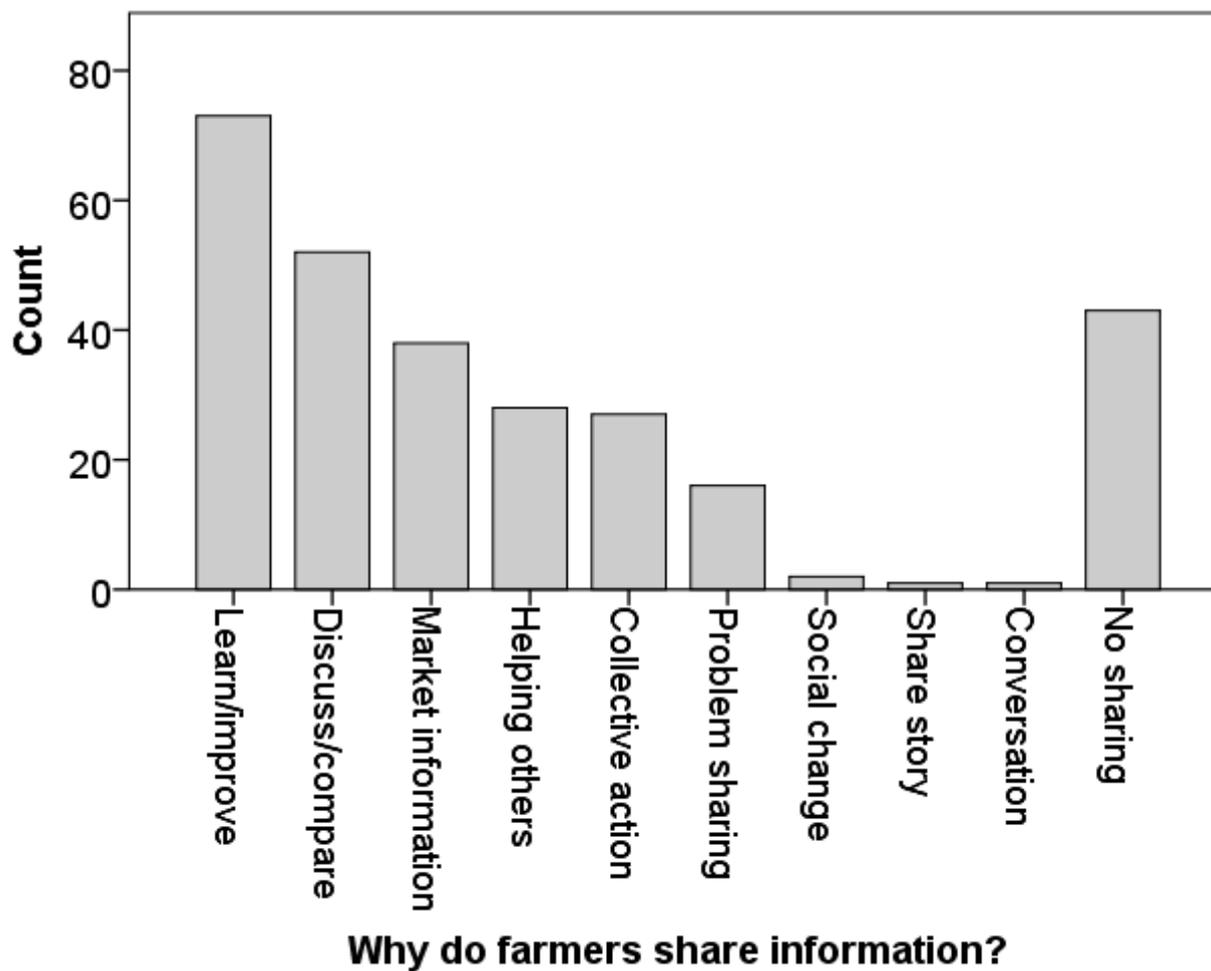
“I follow the recommendations of the farmer group” (Sekadau)



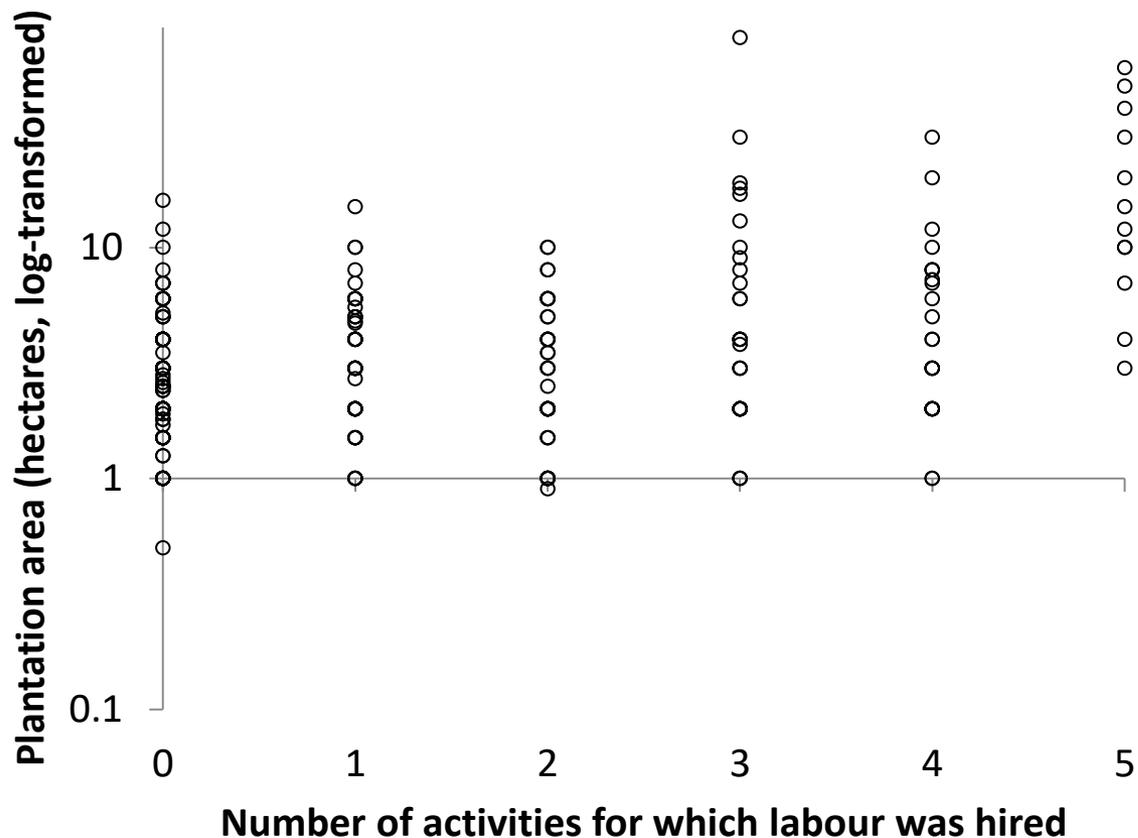
Farmers were asked with whom they shared information about farming practices. The information was shared mostly with family and friends. Information was also regularly shared with neighbours. Most information sharing occurred in informal settings (data not shown). Only if farmer groups or cooperatives existed, information was regularly shared in 'official' meetings. Less than 20% of the farmers indicated not to share any information, for example because they believed that everyone knew the same, or because they did not think sharing was good for their business.



When sharing information about farming, the most important topics were fertilisers and yield. Discussions about fertilisers were mainly concerned with sources and prices of fertilisers, but also with finding the most effective fertiliser types. For the yields, farmers compared their own production with the production of others, and discussed trends in yield, such as the very poor yields following on the 2015 El Niño dry season.



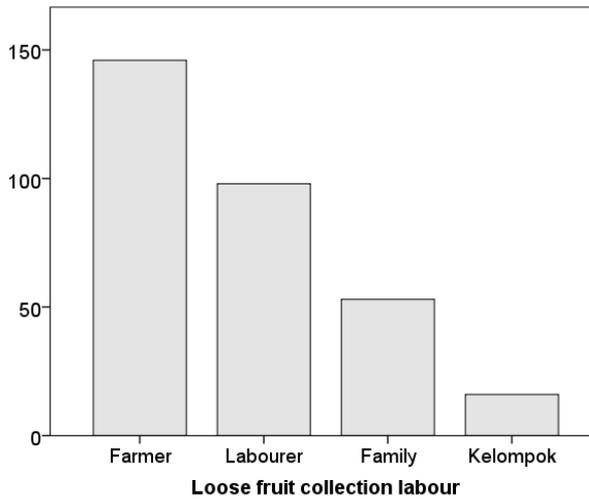
Farmers were also asked for their reasons to share information. Most farmers indicated to share information in order to learn and improve. Comparing yields and practices with other farmers, and obtaining recent information about FFB prices and fertiliser price and availability were also important reasons for discussion. Some farmers started discussions in order to achieve collective action for improving road quality, drainage, or pest control. Knowledge sharing for the sake of helping others was also mentioned by some farmers.



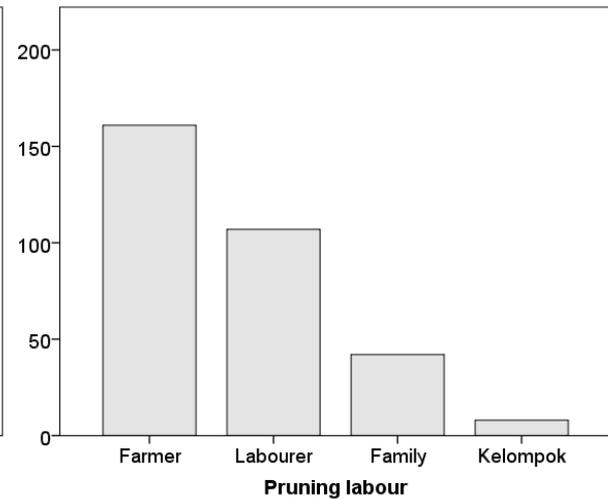
On average, farmers with larger plantations were more likely to hire labourers for their field activities than farmers with smaller plantations. Labour hiring also appears to have a social function: because most villages rely only on palm oil, the richer farmers/family members are employing the poorer people in order to support them.



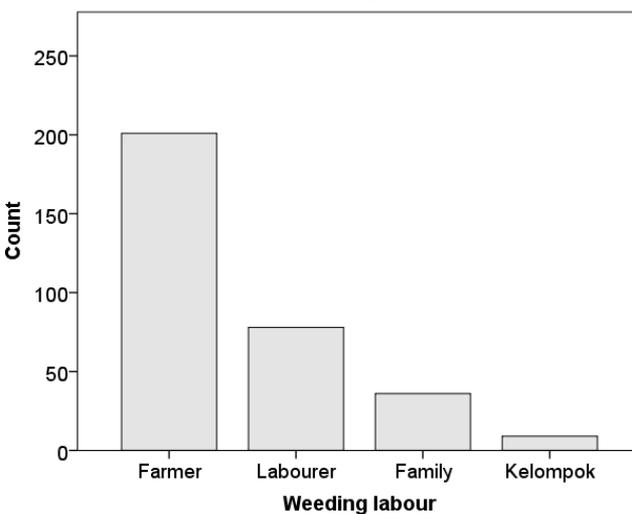
**Harvesting labour**



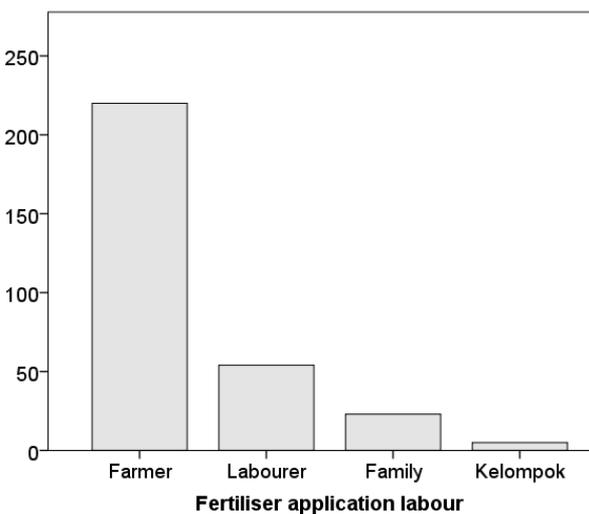
**Loose fruit collection labour**



**Pruning labour**



**Weeding labour**



**Fertiliser application labour**

Labour was hired most regularly for harvesting, loose fruit collection, and pruning. Weeding and fertiliser application were mostly carried out by the farmers themselves. There were several reasons for this labour division: 1) harvesting needs to be done most frequently, so it is the most useful thing to delegate; 2) harvesting is the most physically heavy work; 3) harvesting is more often arranged centrally by cooperatives or traders who have their own harvesting teams. Weeding and fertiliser application can be done in the farmers' "own time" but the harvesting needs to be done in coordination.