



The Donor Committee for Enterprise Development

Case Study in using the DCED Standard Palm oil production in Thailand with GIZ¹

8th February 2011

This case provides an example where all the elements of the Standard have been integrated into the results measurement system, and where results measurement is part of regular programme management. It shows the transition from a sector-level results chain through individual activity logics, to a measurement plan, with example measurements and projections.

Part 1: Experience of the Programme

Description of Programme: The Thai-German Programme for Enterprise Competitiveness (TG-PEC) uses value chain and market development to improve the competitiveness of target enterprises, with particular emphasis on small and medium-sized enterprises (SMEs). The programme is funded by BMZ and implemented by GIZ in cooperation with Thailand International Cooperation Agency and various Thai ministries. TG-PEC programme is currently in its second phase. The programme has seven staff and a total budget of USD 8.4m². TG-PEC operates in the palm oil, shrimp, fresh fruit and vegetables, saa (decorative paper) and tapioca sectors. Each member of staff is involved fully in one sub-sector and partially in another. Results measurement is part of staff job descriptions. TG-PEC ends in 2011.³

How TG-PEC Became involved with the Standard: TG-PEC staff were involved in articulating the Standard, and subsequently hired an experienced consultant to conduct a gap analysis, and to prepare action plans to fill the gaps. Based on the consultant's findings, TG-PEC revised its impact assessment manual and organised an internal training to familiarise staff with the Standard. A mock audit to check TG-PEC's compliance with the Standard was carried out in November 2008.

TG-PEC's existing system already incorporated many elements of the Standard. Formally working towards the Standard did not require much extra work. The main tasks were to arrange all the results measurement documentation in a more systematic way and to document all the relevant practices (e.g. how to measure attribution, how to capture wider market change, how to measure sustainability, etc).

¹ We thank Phitcha Wanitphon for all of his assistance in preparing this case study. Please note that GTZ adopted the acronym GIZ on merging with DED and Inwent, 1st January 2011

² Euros have been converted to US\$ at an approximate rate of €1 = \$1.35

³ For more information on the Thai-German Programme for Enterprise Competitiveness, see <http://www.thai-german-cooperation.info/pec-home.html>

One major change required of the programme was to start measuring additional income generated as a result of programme activities.⁴ In the words of Phitcha Wanitphon, Deputy Programme Director: ‘Measuring additional income meant doing more calculations, but it was beneficial for two reasons. Firstly it helped us measure the significance of the intervention to the beneficiaries’ livelihood, in terms of how much it contributes to their total income. Secondly, measuring income is a good way for us to aggregate our results for internal reporting.’

TG-PEC decided not to measure the additional jobs created as a result of their programme. As advised in the Standard the programme provides justification for not doing so by explaining how the primary objective of the programme is to increase the competitiveness of enterprises and therefore sustainability of jobs in the long run, rather than to create jobs in the short run.⁵

Costs involved in participation: Each intervention has a budget of \$30,000 – 70,000, 10-15% of which is spent on results measurement. This is considered as a programme management cost. One-off costs of implementing the Standard have generally been low, although the mock audit and the consultant who helped TG-PEC prepare for it together cost around \$9,500.

Opportunities and Challenges: While the programme was using results chains before, working towards the Standard has led staff to add detail to their results chains, to show change at each level. Making results chains often used to be a one-time activity. Programme staff now use the results chain to improve intervention design and implementation, regularly discussing in meetings how actions might lead to desired impact. Results chains help staff members to explain their work more clearly, making it easier to share knowledge.

Results chains also help programme managers to allocate resources. When TG-PEC implements any new intervention, measuring intermediate indicators allows staff to check if the intervention is producing the desired results. These results are then used to determine whether to allocate more resources and scale up the intervention.

The major challenge in working towards the Standard has been to maintain rigour in the M&E system. As the programme prepared for a mock audit, realising that they were missing information, staff initially found themselves revisiting the same respondents with different questions. Since at that time they did not have an overview in place with details on how information will be collected, staff found themselves visiting the same respondents several times to collect missing information. In order to overcome that difficulty, the TG-PEC team now make measurement plans which clearly explain the indicators, who to interview, how to interview (tools) and when information will be collected. The measurement plans help staff to avoid duplication of effort.

⁴ Outreach, additional income and additional jobs are the three universal impact indicators that the DCED Standard recommends that all private sector development programmes either measure, or justify why these are not being measured. The universal impact indicators help programmes, donors and other relevant stakeholders to aggregate results, if required.

⁵ Version V of the DCED Standard requires that ‘The results chain(s) include the universal impact indicators at the relevant level wherever possible, or written justification is provided for each such indicator not included.’

Similarly, when TG-PEC decided to ensure that results can be attributed to the programme, the absence of a control group for some interventions meant that staff had to go back to the field, identify control groups and interview them. With the publication of TG-PEC's impact assessment guidelines⁶ aligned to the Standard, the more rigorous M&E system has become better institutionalised and creates fewer difficulties. Staff are aware of what needs to be done from the very beginning of an intervention. The system is now part of intervention management and so does not seem like an additional effort.

Part 2: Work towards the Standard

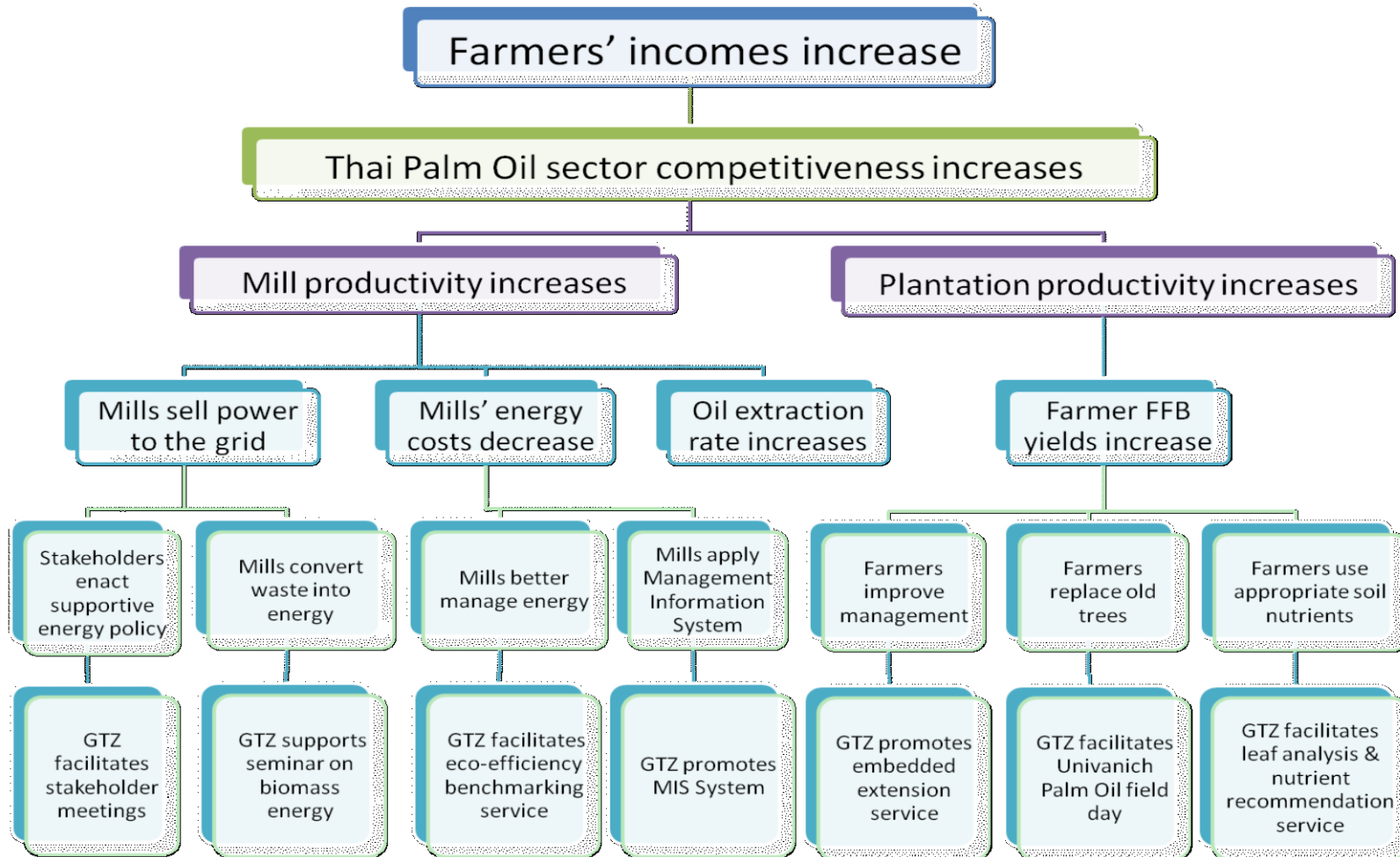
TG-PEC currently has a system in place to **articulate the results chains** for all of their interventions.

One of TG-PEC's main areas of focus is to improve the productivity in Thailand's palm oil sector. To make Thai palm oil more competitive with its rivals in neighbouring countries, GIZ facilitates a wide range of interventions. These include exposure visits to familiarise local millers with advanced biomass technologies used in other parts of the world. GIZ also facilitates the growth of a market in technical information for farmers through commercial extension services, and promotes leaf analysis services for fertiliser recommendation.

TG-PEC wanted to get a broader picture of how each of its eight individual interventions contributed to overall sector goals, so staff created a sector-level results chain. The sector results chain helps the TG-PEC team to think through how separate interventions combine to have an impact on the entire sector. It also allows staff to avoid duplicating their efforts, for example by avoiding doing similar activities with different actors without additional benefit.

⁶ To view TG-PEC's *Staff Guidelines for Impact Assessment*, see www.Value-Chains.org/dyn/bds/docs/783/TGPEC_IA_Guide.pdf.

The figure below shows TG-PEC's sector-level results chain, capturing all of their interventions:



Based on this, the TG-PEC team prepares a logic, that shows how each individual intervention leads to changes in its particular sector. Each is based on a 'means-end' relationship, showing how at the goal level each intervention contributes to:

- Productivity
- Business Performance
- Promising Innovations
- Sustainable eco-efficient products and processes

One unusual aspect of this programme is that instead of having their individual activity results chain in a diagram, they use a table with indicators specified for goal and component/service market levels, to show how change will occur at different levels as a result of the programme's work. [Annex 1](#) provides an example of this. TG-PEC's logics are complemented by a sub-sector strategy, which has clear documentary evidence of research on the sector and the relations between the different actors involved in the sector.

TG-PEC clearly **defines indicators of change** at the different levels of logic. The programme's impact assessment manual explains the different indicators that can be used. At the impact level, the programme measures its outreach, and the additional change in income as a result of programme activities.

Where the programme supports interventions aimed at improving the framework conditions for the target group and/or aimed at service markets, it uses the following indicators of change:

1. *Changes in Framework conditions themselves:* Even though it is hard to measure progress towards policy changes, TG-PEC measures the following indicators for changes on the target group:

- Actual changes in policies or regulations (at least partially) as a result of programme activities
- Documented changes that will modify how a policy or regulation, aimed at the target group, is implemented by a public agency
- The target group's opinions concerning how the change has impacted on their businesses
- As an intermediate indicator, TG-PEC may also assess the stage which the government is at, in implementing the relevant policy, institutional or regulatory change.

2. *Changes in the demand for services:* To measure the change in demand for services that TG-PEC supports, the programme clearly defines the service product (benchmarking, business linkages, information systems, profitable environmental management, a new loan product, farm management etc.) and then outlines the indicators that can measure the service, e.g. the target group's awareness of a service and the benefit that it can deliver.

3. *Changes in the supply of services:* Since TG-PEC partners with service providers to increase the supply of certain services, it assesses the change in the supply of such services by measuring an increase in the quantity and the quality of the service to the target group.

Quantity can be measured by the amount of output of service (number of clients served, volume of business, increased range of products offered). Quality is subjective and thus TG-PEC researches the target group's opinions of the service via surveys. As an intermediate indicator, TG-PEC also assesses service providers' capacity to sustainably deliver the service.

As shown in the Leaf Analysis logic, the programme team predicts impact for outreach (scale) and additional income, but not for other indicators. Even for net additional income, estimations for impact are made only after impact assessment, except where an intervention is being scaled up and the programme team makes projections based on the results of pilot interventions.

In order to **measure changes in indicators**, TG-PEC has create a clear system for collecting baseline information and eventually impact data, laid out in the programme's impact assessment guidelines.

During an intervention's pilot phase, TG-PEC develops and tests a service with only a few service providers and with limited outreach. The aim of assessment at this stage is to learn if the service has the desired impact on target enterprises, if all relevant stakeholders accept it and if it can be delivered sustainably. A baseline is usually conducted with 30 clients (target group) and 10 non-clients (control group) who are visited again after the intervention to assess their changes. Even though the sample size is relatively small, it is appropriate for the programme's size and scope.

During the scale-up or market development phase, TG-PEC aims to substantially increase the outreach of the service, either by encouraging more providers to offer the service or by helping existing providers to scale up their provision. During this phase, impact assessment focuses on the scale of service provision, using the data from the pilot phase to estimate impact on target enterprises. If the scale is likely to be large, a small survey may be conducted during the scale up phase to check that impact data from the pilot phase is still realistic. However, the impact assessment is necessarily more intensive in the pilot phase than the scale up phase.

[Annex 2](#) summarises how the baseline and impact assessment were done for the 'Appropriate Soil Nutrients' intervention, and gives an overview of the findings. [Annex 3](#) presents example findings of the measurement of the indicators, with projections for impact.

TG-PEC has specific guidelines for how to **measure attribution**. For most interventions, TG-PEC measures impact before and after the intervention with control and target groups. This allows the programme to see how target enterprises have changed during intervention, in comparison with what would have happened anyway. In other words, using a control group allows the programme team to isolate change that resulted from its interventions, as opposed to other factors.

For TG-PEC's policy-based interventions, where it would be very demanding to establish a reasonable control group, staff assess attribution by gathering the opinions of the target group. They ask questions such as what the respondent expects from the change in policy or

regulations, how the respondent thinks they have changed their behaviour, and what benefits they got as a result.

These more formal methods are always supported by the measurement of intermediate indicators at the service market/framework conditions level and at the goal level. These measurements enable TG-PEC to show how their work has triggered service providers or government institutions to bring about changes in service markets or framework conditions. This makes it easier to attribute changes in enterprises' behaviour to programme activities.

To support its conclusions about impact, TG-PEC produces the following supporting documentation:

- Research reports
- Raw data for calculation of indicators and actual calculation methods
- TORs for consultants who conducted the research
- Supporting government data when appropriate
- Primary or secondary data on the target group
- Each version of the sector strategy / sector progress report
- Implementation Arrangements and Implementation Agreements

TG-PEC has a system in place to **capture wider changes in the system or market**. TG-PEC measures copying where applicable. In the case of the Leaf Analysis intervention, for example, one enterprise cannot simply copy the fertiliser recommendation used by his neighbour, as different plantations have different soil conditions, age profiles, etc. In contrast, copying in is possible for a separate intervention which aims to increase use of an improved pruning technique. Farmers can and do copy the improved pruning technique. This was demonstrated during the intervention's final assessment, by asking the farmers that learned the technique from service providers trained directly by the programme, how many other farmers copied their practice.

All **costs incurred by the programme are tracked annually** by the programme's accountants. Costs are tracked both for the overall programme and on an intervention-by-intervention basis. Furthermore, every intervention report contains a breakdown of costs, divided into contributions of the programme and of its partners (private sector and/or government). The following table shows costs for the leaf analysis:

| | GIZ | Partners |
|--|---------------|-----------------|
| A. Intervention Costs (USD)⁷ | | |
| Extra Investment in Equipment | | 23,300 |
| Laboratory Capability Improvement | 7,500 | 10,000 |
| Social Marketing Program | 42,000 | 10,600 |
| Training of the farmers | 1,000 | 20,000 |
| Analysis and Recommendation Work | - | 10,000 |
| Total Intervention Costs | 50,600 | 74,000 |
| % Contribution | 40.6% | 59.4% |
| B. Impact Assessment (USD) | 9,600 | - |

⁷ Thai Baht have been converted to USD at an approximate rate of \$1=THB30

The programme **reports** its impact in individual sectors annually to BMZ. TG-PEC reports against all programme impact indicators including productivity, additional income and outreach of the programme. The programme is in the process of aggregating all its results to report on the overall achievements of the programme. Here, the logics help them to separate out interventions by timeframe and target group, to correct for overlap and avoid double counting.

The **results measurement system** used by the TG-PEC programme is well institutionalised. Results measurement is part of the regular work of the teams responsible for implementing the interventions, which use results measurement as a management tool to improve their work. The programme’s M&E manual contains clear guidelines on tasks and responsibilities.

The impact assessment manual also provides guidance on what information to collect to assess change, how to collect it, when to collect it and who will be responsible for data collection. The manual also explains the reporting system programme staff use to record data and to report on achievements (see [Annex 2](#)).

The following table is an excerpt from TG-PEC’s impact assessment manual. It shows how to measure change at the goal level:

| Need to know | Indicators | Sample Questions |
|-----------------|---|---|
| Competitiveness | Perception of the service’s contribution to competitiveness (if applicable) | Did this service make a difference to the competitiveness (see definition) of your business? |
| | Productivity (inputs/outputs) | For productivity, a number of questions will be asked related the volume and price of outputs for a given period of time and the costs of the three most important inputs required to produce that particular output. |
| | Sales | |
| | Quality (i.e. grades) (if applicable) | What amount/percent of your products/produce was A grade? |
| | Innovation (if applicable) | Innovation questions will be specific to the expected types of innovation. |
| | Eco-efficiency (if applicable) | Eco-efficiency questions will be specific to the expected types of eco-efficiency products or processes. |

Annex 1: Logic for ‘Leaf Analysis’ Intervention

The table below shows the logic for a TG-PEC intervention to promote the use of appropriate soil nutrients by farmers. Use of appropriate fertilisers is crucial for palm oil farmers to attain optimal yields of Fresh Fruit Bunches (FFB). TG-PEC has worked with the company Vichitbhan Palm Oil to turn its leaf analysis laboratory into an accurate and cost-effective facility for the Thai palm oil industry. Vichitbhan should thus be able to deliver quality fertiliser recommendations. TG-PEC has also stimulated sustainable demand for the service.

| Indicator | Definition | Calculation | Assumptions |
|---|--|---|---|
| The aim of this intervention is to provide about 1,000 plantations with expert recommendations on the economic use of fertilizer. | | | |
| Goal level Indicators | | | |
| Improved Fresh Fruit Bunch (FFB) yield | Increase of average FFB yield /rai ⁸ /year 18 – 20 months after applying recommended fertilizer | Difference between (change in FFB yield /rai for treatment group) and (change in FFB yield /rai for control group) | Recommended fertilizer available in the market. |
| Increase in Income | Average net additional income per rai per 12 months across all respondents | Difference between (change in net income per rai for participant group) and (change in net income per rai for control group) measured 12 months before and 12 months after the intervention | |
| Component Level Indicators | | | |
| 1. Usage of service | Increase in the usage number of leaf analysis service (sending leaf in for testing) | Difference between number of service usage before intervention and after intervention | |
| 2. Usage of fertilizer recommendation. | Number of farmer apply for testing service and use fertilizer recommendation across all respondents | Percentage of farmer use fertilizer recommendation | |
| 3. Satisfaction with the service | Satisfaction rate on leaf analysis of those received leaf analysis service | Satisfaction survey question was asked. The scales used in the survey vary from a 4 point "Very Satisfied to Not at all Satisfied" | |

⁸ 1 rai = 0.16 hectares = 40 m x 40 m

| Indicator | Definition | Calculation | Assumptions |
|--|---|---|-------------|
| | | Percentage of those rate their opinion following above scale were presented | |
| 4. Continued existence of the laboratory and provide service in the area | Lab still open for operation and provide service in Chumphon in 2008 | Number of services provided after pilot phase (from 2008 onward) | |
| 5. Improvement of lab capacity | Lab is capable to provide service on commercial basis. Critical success factors identified: 4.1 Attitude & motivation 4.2 Marketing 4.3 Personnel 4.4 Product development | 4.1 Interviewing of Management 4.2 List of PR and Marketing activities done by Vichitbhan 4.3 Difference between no. of personnel before intervention start and after intervention. Qualification of lab staff 4.4 List of supported docs developed after intervention. List of other soil nutrients or substance offered for testing after intervention | |
| Scale up phase | | | |
| 6. Expansion of service to the other area | 6.1 No. of visitors to the lab 6.1 No. of client (fee paid) outside Chumphon | 6.1 Visitor log sheet/record 6.2 Lab customer number record/pay in slip | |

Annex 2: Data Gathering to Date

I. Summary of Research Conducted.

1. Baseline Survey: Walailak University

- April 2007 (assignment period : 15 Nov – Dec 2006)
- The baseline study aimed to measure farmer's behaviour and competitiveness both at target group and control group before using leaf analysis service (goal level indicator) and to look into the situation of demand and supply of the services before the leaf analysis service been delivered. Awareness of the service and its benefits was measured.

VCB offered "leaf sampling method" training to prepare farmers for leaf analysis session beginning of 2007. The survey was conducted before training. The non-probabilistic sampling was used to select farmers from the training invitee list. VCB supplied the name list of farmers from its customer base. So assignment to the 2 groups (target and control) is non-random. Anyhow, broad criteria for being used in the samples were identified i.e. age of palm, size of plantation, geographical area).Data were collected through one-on-one interview using prepared questioner.

Data were collected and presented as followed for both target group and control group ;1) % of respondents aware of the service 2) % of respondent understand benefit of services 3) % of respondents purchase service from other source 4) Yield /rai/year 5)fertilizer application

Quasi-experimental design (difference of difference) is used to measure changes in the indicators and to show project's attribution.

- 50 target farmers, 10 farmers as control group.
- The report and supporting docs e.g. TOR, questioners, calculation sheet are kept and filed according to GIZ filing system. Electronic file kept in GIZ Thailand Intranet system /palm oil sector/, hard copy kept in Palm oil folder at component office.

2. First Follow-up Survey (interim): Prince of Songkhla University (PSU)

- October 2007 (assignment period : July 2007)
- Interim survey aimed to measure experience of the service of the target group and measure (as an interim assessment) perception of the service contribution to competitiveness both for target and control group. The survey was done in July 2007 after the delivery of the first batch of leaf analysis service which lasted from Feb – Mid of May. Due to the unavailable/uncompleted data on yield and input cost of the baseline group (even though the team try to recruit those who record his/her farm productivity and production cost regularly), PSU team has been assigned to verify collected data at the baseline. It was found out that few cases can be used as data completed and reliable enough. Yet , only 7 out of 50 have sent leaf for testing. This will not allow the project to meet the objective of the intervention. As a result ,only 7 of the baseline interviewees were re-selected at the interim survey. The project has decided to use the 1st interim survey as the baseline, however perception of the service which was measured at this stage could be influenced by knowledge/information of service benefit received at the 1st leaf analysis training.

The non-probabilistic sampling was used to select farmers. Data were collected through one-on-one interview using prepared questioner

Data were collected and presented as followed for target and control group 1) % of respondent understand benefit of services 2) % of respondent satisfied with the service 3) % of respondent change in practice (apply fertilizer as recommended) 4) % of respondent think the service will make difference to yield.

Quasi-experimental design (difference of difference) is used to measure changes in the indicators and to show project's attribution.

- 50 target farmers , 12 farmers as control group .
- The report and supporting docs e.g. TOR , questioners, calculation sheet are kept and filed according to GIZ filing system. Electronic file kept in GIZ Thailand Intranet system / palm oil sector/, hard copy kept in Palm oil folder at component office

Annex 3: Example findings of the measurement of indicators, with projections

A) Goal Level Indicators

| Indicator | Definition | Calculation | Assumptions | Status Before Intervention | Status After Intervention | Change Attributed to T-G PEC* |
|--------------------------|---|--|--|--|---|--|
| Improvement of FFB yield | Increase of average FFB yield /rai 18 – 20 months after applying recommended fertilizer | <p>Baseline Average yield of participated group : 2.468 ton/rai/year</p> <p>Average yield of control group: 2.237 ton/rai/year</p> <p>18-20 months Final Follow up</p> <p>Average yield of participated group : (A) Average yield of control group : (B) (A - 2.468) – (B - 2.237)</p> | Recommended fertilizer available in the market | <p>Baseline</p> <p>1. Average yield of participated group: 2.468 ton/rai/year</p> <p>2. Average yield of control group: 2.237 ton/rai/year</p> | <p>Final Follow-up</p> <p>(A) 4.123 ton/rai/year (participated group)</p> <p>(B) 2.883 ton/rai/year (control group)</p> <p>Data to be collected End of 2008</p> | <p>To be calculated once follow-up data be collected end of 2008 (difference in output (yield) between treatment group and control group were recorded before leaf analysis service be delivered. End of 2008 , the second difference of yield between treatment group and control group will be worked out again. Impact of this intervention is the follow-up difference less the difference at the baseline.</p> <p>1.008 ton per Rai/Year</p> |

| | | | | | | |
|--------------------|--|--|--|--|--|--|
| Increase in income | Avg net additional income per rai per 12 months across all respondents | | | | | |
|--------------------|--|--|--|--|--|--|

* Explain how change attributed to T-G PEC was calculated. Justify finding based on data gathered.

B) Component Level Indicators

| Indicator | Definition | Calculation | Assumptions | Status Before Intervention | Status After Intervention | Change Attributed to T-G PEC* |
|--|--|--|--|---|--|---|
| 1. Usage of service | Increase in the usage no. of leaf analysis service (sending leaf in for testing) | Difference between no. of service usage before intervention and after intervention No. of farmer using service in 2005 : 88 No. of farmer using service in 2007 : 179 179-88 = 91 103 % increase | Farmer did not send leaf to other labs | At the initial phase of lab's operation in 2005 , VCB has on a trial out basis , received samples from 88 farmers | No. of farmer sent leaf for testing in 2007 179 | Leaf analysis service is new, changes in demand and supply of this service can be 100 % claimed as impact from project's activities |
| 2. Usage of fertilizer recommendation. | No. of farmer apply for testing service and use fertilizer | Percentage of participated farmers use the | | N/A | Interim follow-up Participated group : | Leaf analysis service is new, changes in |

| | | | | | | |
|----------------------------------|---|--|--|-----|--|---|
| | recommendation across all respondents (for control group receipt of the service from any source will be recorded) | service and apply fertilizer recommendation were recorded | | | 82.76 % apply fertilizer recommendation Control group 0% apply fertilizer recommendation /receipt service from other source | demand and supply of this service can be 100 % claimed as impact from project's activities |
| 3. Satisfaction with the service | Satisfaction opinion (rate) on leaf analysis service of those received service | The scales used in the survey vary from a 4 point "Very Satisfied to Not at all Satisfied" Percentage of those rate their opinion follow above scale were presented. | | N/A | Overall 50 farmers interviewed (participated group) 29 attended training and sent leaf in for testing , 86.65 % said they were very satisfied with service , 10% little satisfied , 3.34 % dissatisfied 21 did not attend training but sent leaf in for testing,90.48 % said they were very satisfied with service while | Leaf analysis service is new, changes in demand and supply of this service can be 100 % claimed as impact from project's activities |

| | | | | | | |
|---|--|---|--|--|---|--|
| | | | | | 9.54% little satisfied Average for these 2 groups : 88.56 % were very satisfied | |
| 4. For Supply side: Continued existence of the laboratory and provide service in the area | Lab still open for operation and provide service in Chumphon in 2008 | | | 3. Service was functioned once in 2005 when lab was completely constructed but suspended after that | 3. Lab is still operating in 2008, 179 farmers sent leaf in for analysis in 2007 another 62 farmers use service in 2008 | |
| 4. Improvement of lab capacity | Critical success factors identified : 4.1 Attitude & motivation 4.2 Marketing 4.3 Personnel 4.4Product development | Changes in each factor will be monitored and recorded | | 4.1 Negative attitude and low motivation toward commercial service provision. VCB believed that low demand is foreseen and to stimulate demand need strong effort and much resources 4.2 Did not conduct any marketing and PR | 4.1 to be assessed by sector manager 4.2 Until June 2008 1 time set up booth at “Palm Oil Field Day” in Krabi , 4 time farmer – meet –Lab sessions in Chumphon CDs and Brochure were re-produced by Vichitbhan 4.3.1 Promote better qualified lab | |

| | | | | | | |
|-----------------------------------|--|--|--|--|--|--|
| | | | | <p>Activities</p> <p>4.3.1 Qualification of lab chief was not at all suit the basic technical requirement of such position.</p> <p>4.3.2 No lab consultant in place</p> <p>4.3.3 No staff training plan</p> <p>4.4.1 No standard operation procedure (SOP) existed</p> <p>4.4.2 Analytical form and other supported docs not properly be maintained, no record keeping established</p> | <p>staff as chief</p> <p>4.32. Lab consultant hired</p> <p>4.3.3 Staff training plan was discussed and staff were sent to training</p> <p>4.4.1 Standard operation procedure was developed</p> <p>4.4.2 All forms be adjusted and record keeping be introduced</p> | |
| 5.The expansion to the other area | Number of client (fee paid) outside Chumphon | Changes will be monitored and recorded | | No client (fee paid) outside Chumphon | 1. 2 mills in Surathani sent 2 leaf samples for testing , one mill | |

| | | | | | | |
|--|--|--|--|--|---|--|
| | | | | | sent ash for testing 2. Tha Chana Palm oil Co. Ltd in Surathani province has agreed to sponsor its 20 farmers for leaf testing service | |
|--|--|--|--|--|---|--|

C) Outreach and Income

| Intervention | Outreach in 2009 | Additional Net Income per farmer or SME per year | Total additional net income generated in 2008 | Cumulative outreach since 2007 | Cumulative additional net income since 2007 |
|-----------------------|------------------|--|---|---|---|
| Leaf Analysis Service | 106 | Average planting area is 50 rai. Attributable Increase income is 231,150 THB per Annum. | 20 Mil. THB/Annum | 2007 179 farmers. 2008 89 farmers. 2009 106 farmers. Suksomboon: around 450 farmers. Total 824 farmers. | 157 Mil. THB/Annum |

Projections

For each subsequent year after the one above through two years after each intervention will be completed.

| Intervention | Outreach | | | | Total additional net income for farmers and SMEs | | | |
|-----------------------|----------|------|------|-------|--|-----------|-----------|------------|
| | 2009 | 2010 | 2011 | Total | 2009 | 2010 | 2011 | Total |
| Leaf Analysis Service | 130 | 150 | 170 | 450 | 5,700,000 | 6,600,000 | 7,400,000 | 20,000,000 |

Supporting Evidence for Projections: [May include progress and projections in sector indicators and/or other evidence.]

** Projection of outreach based on around 20 % increase in no. each year

*** Calculation of Additional net income for farmers based on 10 % yield increase

FFB selling price in 2007: 4.07 Bht/k.g

Input cost : 3978 Bht/Rai

Taking 10% increase of FFB yield : 2.47 ton/rai/year

$$(50 \times 4.07 \times 2.47 \times 1000) - (3978 \times 50) - (50 \times 4.07 \times 2.254 \times 1000) - (3978 \times 50)$$

Additional Net Income per farmer per year = 43,956 Baht (USD 1,500)