



Sustainable Rice Platform

SRP Performance Indicators for Sustainable Rice Cultivation

Version 1.0

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1. Introduction

The Sustainable Rice Platform (SRP) is a multi-stakeholder partnership to promote resource efficiency and sustainability both on-farm and throughout the rice value chain. The SRP is developing a range of tools to promote sustainable rice cultivation, including Guidelines, a Standard, training modules and decision-making tools. These tools are intended to be used either separately or together as appropriate to the farmer context.

Through a multi-stakeholder process, the SRP has developed the **SRP Standard for Sustainable Rice Cultivation v.1.0**, which we are now pleased to make available to SRP members. The SRP Standard has been developed based on priorities defined in a set of 12 **Performance Indicators (PIs)**, complemented with several topics essential for acceptance in potential destination markets. The Standard defines a set of key requirements with different levels of performance allowing for a stepwise improvement and compliance process.

The PIs are designed to support the Standard by measuring changes resulting from adoption of on-farm sustainable best practice, e.g. through compliance with the SRP Standard, or other interventions of interest to SRP members. The PIs thus offer a valuable and flexible tool to enhance our understanding of the effectiveness of individual interventions and to create a basis to communicate on progress towards sustainability in any rice system.

The field implementation phase will be an important next step to ensure relevance, robustness and user-friendliness of the Standard and PIs. Feedback from this implementation phase will help us to refine the tools to maximize value to SRP members, and establish their utility as scalable tools for driving wide-scale adoption of sustainable best practice.

SRP is therefore pleased to offer its members an opportunity to participate in this implementation phase, to be conducted in a number of countries representing a range of production and ecosystem contexts. SRP members are welcome to participate in field-validation of the Standard and PIs, either independently or separately, using their own facilities, with support and coordination from the SRP Secretariat.

Field-testing will require a common methodology to allow aggregation and analysis of data from different locations. It is anticipated that an online data entry tool will be offered to members in the near future to facilitate and standardize data entry processes, and automate analysis of field data by users themselves. The system will provide spatial information to allow linkages with other data such as weather maps.

This document provides an introduction to the **Performance Indicators**, a description of each PI and the methodologies required for sampling and data collection. The Annex provides Scorecards to be used in evaluating 4 specific PIs: pesticide use efficiency (PI 8), health & safety (PI 10), child labor (PI 11) and women's empowerment (PI 12).

This document is intended to be used in conjunction with the SRP Standard and the Field Implementation Protocol. The updated Standard, PIs, Implementation Protocol and reporting templates are all available for download at the Members' Area of the SRP website: www.sustainablerice.org, or from the SRP Secretariat: Secretariat@sustainablerice.org.

2. SRP Performance Indicators (PIs)

2.1 Introduction

The SRP PIs are designed to assess sustainability improvements resulting from changes in farm practice. The PIs cover key sustainability topics, selected according to the following criteria:

- Perceived relevance to key sustainability issues in the rice sector
- Applicability across diverse rice farming systems
- Ability of farmer to improve on indicator
- Ease of measurement (cost, effort, complexity)
- Ability to quantify performance
- Ability to measure indicators against agreed targets and thresholds.

Table 1 below summarizes the indicators and basis for measurement. In order to develop reliable conclusions, the PIs must be measured over a minimum of two cropping seasons. The PIs include both quantitative and qualitative assessments.

Table 1: SRP Performance Indicators

Name of indicator	Measurement	Source
SRP Guiding Principle: Improved Livelihoods		
1. Profitability: net income from rice	\$/ ha/ crop cycle \$/ ha/ year	Farm records Household survey
2. Labor productivity	kg paddy rice/ days \$ net income from rice/ days	Farm records Household survey
3. Productivity: grain yield	Kg paddy/ha	Farm records Household survey
SRP Guiding Principle: Consumer Needs		
4. Food safety	Kg safe milled rice/kg milled rice x100	Laboratory test
SRP Guiding Principle: Resource Use Efficiency		
5. Water use efficiency: total water productivity	Kg paddy/L (rainfall + irrigation)	Farm records Household survey
6 Nutrient use efficiency: N	Kg paddy/kg elemental N Kg elemental N removal / kg elemental N input	Farm records Household survey
7 Nutrient use efficiency: P	Kg paddy/kg elemental P Kg elemental P removal / kg elemental P input	Farm records Household survey
8 Pesticide use efficiency	Balanced scorecard	Farm records Household survey
SRP Guiding Principle: Climate Change Mitigation		
9. Greenhouse gas emissions	Mg/CO ₂ eq/ha	Farm records Household survey
SRP Guiding Principle: Labor Conditions		
10. Health & safety	Balanced scorecard	Household survey
11. Child labor	Balanced scorecard	Household survey
SRP Guiding Principle: Social Development		
12. Women's empowerment	Balanced scorecard	Household survey

In addition to data recorded by the farmers (in their Farmer Field Books), it will be necessary for certain data to be collected by partners or extension workers.

The next sections outline the overall methodology for measuring the performance indicators, followed by a more detailed description of the performance indicators including definitions, rationale, measurement units, and more detailed information on the measurement details and data collection. The Annex contains the Scorecards to be used for assessing 4 PIs:

- Pesticide use efficiency (PI No. 8)
- Health and safety (PI No. 10)
- Child labor (PI No. 11)
- Women’s empowerment (PI No. 12)

2.2 Data collection methodology

Responsibilities

The implementing partner is responsible for the data collection process. An implementing partner may be a research institute, company, extension worker, project owner, group manager or miller. Data collection can be organized in different ways. When one relies on farmer records, it is important to ensure that the farmers have the capacity, willingness and information to measure accurately. One can also visit farmers frequently (e.g. weekly) to discuss their activities over the previous period.

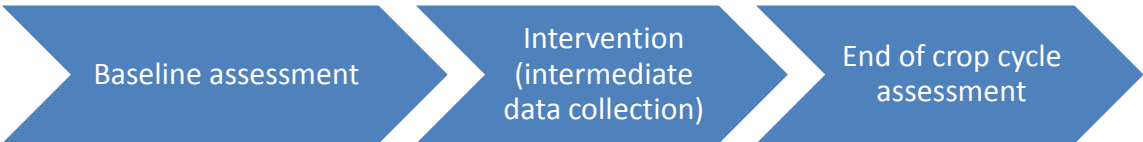
Number of indicators to measure

We recommend the measurement of all indicators as this will provide the best information about possible trade-offs and as such a more reliable picture on the total concept of sustainability. We do however acknowledge that the relative importance of indicators may depend on the particular context, the intervention strategy or available resources. Implementing partners are therefore free to decide which indicators they want to measure.

Frequency of data collection

It is recommended to set a baseline at the beginning of the project, in order to be able to benchmark improvement. The ability to set baselines will depend on the availability of historical farm records.

Collection of farm records, household surveys and laboratory tests should take place at the end of each crop cycle. Where applicable and possible, it is recommended to also collect data during the crop cycle as this can serve to validate the quality of record keeping.



It is recommended to measure performance indicators for at least 2 consecutive crop cycles between April 2015 and June 2016.

Sampling approach

We recommend applying a sampling approach per project. The implementing partner will select a number of farmers targeted by the project based on their representativeness, capacity and willingness to participate. If both women and men are part of the target population, stratification by gender is required in order to generate gender-disaggregated data.

Population size will determine the number of farmers to be sampled. Since population size may vary considerably across countries and projects, we propose the following guidelines to calculate sample size:

- A minimum of 5 farmers will be selected if the population size is equal to 50 farmers or less.
- If the target group is between 50 and 3500 farmers, the implementing partner will select 10% of the population for the sample size.
- If the target group is above 3500 farmers, the implementing partner will select 350 farmers.

The implementing partner is encouraged to collect additional data from a control group of non-participating farmers. This will provide a baseline to define plausible contributions of project interventions to improvements among target farmers.

Control farmers may live in the same village as farmers in the project, in neighbouring villages or in other locations, provided they are matched with project farmers in terms of similarities in their farming systems and socio-economic characteristics such as farm size, irrigation system, number and type of employees should also be matched. It is however important to avoid selecting control farmers who may be influenced by project interventions (spin-off from the project) or who may benefit from other ongoing interventions.

We propose the following guidelines to calculate the sample size for the control groups:

- If the sample size is 5 farmers, a minimum of 5 farmers will be selected for the control group.
- If the sample size is 10% of the target group, the control group shall be 5% of the sample size.
- If the sample size is 350 farmers, the control group shall comprise 35 farmers.

Table: sample sizes

Population (N)	Sample size target group	Control Group
$N \leq 50$	5	5
$N = 50-3500$	10%	5% of sample size
$N \geq 3500$	350	35

Data collection tool

SRP the developing an IT based data collection tool to facilitate the task of consistent data collection, data aggregation and analysis. The data collection tool will be supported with standardized formats for farm record keeping on the required records to measure the performance indicators.

2.3 Detailed description of the performance indicators

1. Profitability: net income from rice

Indicator: net income from rice

The indicator measures profitability, defined as the farmer's net income from rice cultivation per crop cycle and per year

Unit: US \$/ha/crop cycle and US\$/ha/year

An increase over time would be considered positive.

Rationale: The rationale for this indicator is based on the SRP guiding principle of improved livelihoods. The assumption is that increased net income leads to increased household capacity to pay for food, health services and education. Increased net income increases the attractiveness of rice cultivation and provides increased ability to invest in the farm.

Measurement details: The indicator is calculated as the gross income received from the sale of the rice crop minus the total fixed and variable costs of growing the rice crop. The calculation should include both rice marketed and rice used for subsistence as well as the opportunity cost of family labor:

- the value of subsistence consumption is based on market prices; the average price of 1kg rice sold that season)
- the opportunity costs of labor are determined by the fees for one day of rural labor in the project area during the applicable period

Data collection: Detailed data on costs and income are recorded in a Farmer Field Book during the season by a sample of farmers (see Section 4.2 for sample size). Data are collected per farmer, at least at the end of every rice crop cycle. An extension worker or research partner can also collect and check the data via a household survey. More frequent data collection over the crop season is encouraged in order to ensure quality of farmer records. Alternative data collection methods such as the use of mobile devices by extension workers are also encouraged.

2. Labor productivity

Indicator: Labor productivity

The indicator measures labor productivity, defined as the total amount of days worked, per kg of rice produced.

Unit: kg paddy rice/days and US\$ net income from rice/days

An increase over time would be considered positive.

Rationale: The rationale for this indicator is based on the SRP guiding principle: Improved Livelihoods. The assumption is that increased labor productivity leads to increased profitability, more time to spend on other activities, increased attractiveness of rice cultivation and increased willingness to invest in the farm.

Measurement details: Labor productivity includes labor all rice-related farm activities such as field clearing, plowing, planting, irrigation and fertilizer application, pest management, and harvesting. Labor includes temporary, permanent, and seasonal workers paid in cash as well as non-paid labor carried out by household members, other relatives and acquaintances.

Data collection: Detailed data on labor inputs (both family and hired) are recorded in a Farmer Field Book over the rice season by a sample of farmers (see Section 4.2 for sample size). Data are collected per farmer, at least at the end of every rice crop cycle. An extension worker or research partner can also collect and check the data via a household survey. More frequent data collection over the crop season is encouraged in order to ensure quality of farmer records. Alternative data collection methods such as the use of mobile devices by extension workers are also encouraged.

3. Productivity: grain yield

Indicator: Grain yield

The indicator measures productivity, defined as the recovered grain yield per hectare.

Unit: kg paddy/ha / crop cycle and kg paddy/ha / year

An increase over time would be considered positive.

Rationale: The rationale for this indicator is based on the SRP guiding principle: Improved Livelihoods. The assumption is that increased productivity leads to increased household food security, an increase in marketable surplus and increased national and international food security.

Measurement details:

Yield is measured in kilograms of wet grain yield harvested, with an adjustment to 14% moisture content calculated based on the measured moisture content at the time of weighing. Before weighing, the grain should be threshed and dried to an appropriate moisture content for selling, milling or storage, depending on the intended immediate use. A moisture meter should be used to document the actual moisture content at the time of weighing. This value can be used to calculate the final grain yield, which must be reported at 14% moisture content. The entire harvest should be weighed and divided by the total land area.

If the farmer records separate yield measurements for different fields within a farm, these should be averaged across the whole farm (total amount of grain harvested/total land area of the farm) and reported as one value per household.

Rice yields should be disaggregated by:

- type (specialty, normal, etc.) to provide information on the farmer's choice (e.g. high yielding varieties, or low-yielding, high-value specialty products such as red glutinous rice)
- cropping season.

Data collection: Detailed data on yields are recorded in a Farmer Field Book during the rice season by a sample of farmers (see Section 4.2 for sample size). Data is collected per farmer, at least at the end of every rice crop cycle. An extension worker or research partner can also collect and check the data via a household survey. Alternative data collection methods such as the use of mobile devices by extension workers are also encouraged.

4. Food safety

Indicator: Food safety

The indicator measures food safety, defined as the percentage of milled rice that falls within safety requirements for heavy metals, pesticide residues and mycotoxins.

Unit: kg safe milled rice/kg milled rice x100

The target should be 100%

Rationale: The rationale for this indicator is based on the SRP guiding principle: Consumer Needs. The assumption is that safe rice products lead to consumer assurance. Safer food reduces rice-related human exposure to specific contaminants and leads to a healthier population.

Measurement details: Food safety is calculated as the total amount of safe milled rice, in kilograms, divided by the total amount of milled rice and multiplied by 100.

- From a food safety point of view it is highly recommended to test at least once for *heavy metals* (arsenic, cadmium, mercury, chromium and lead). Alternatively, one can decide to test based upon a risk assessment. If no risks have been identified then there is no need for further tests. If moderate levels of heavy metals have been detected then subsequent tests need to be conducted.

- Tests for *mycotoxins* must be conducted at least once; if there is no reason for concern, they can be repeated at intervals of 5 or 6 seasons. If there is concern tests need to be repeated every season. As mycotoxin infections are triggered by diseases at the panicle stage, tests for mycotoxins should be conducted in the event of detection of a risk of panicle diseases.

- A preliminary test must be conducted for *pesticide residues* whenever pesticide residues exceeding MRLs have been reported by any national government within the last 5 years.

To ensure food safety, above tests should be tested for all farms in the first season. In subsequent seasons, additional samples of only some farms can be taken for verification, with locations selected through a process to be determined (the quantity based on analytical budgets, and to locations selected either randomly, or on basis of areas of concern). If resources are constraint and requirements for food safety allow for it, the initial tests could also be based upon a sample (see Section 4.2).

SRP will consider selecting one or two labs to standardize the analytical procedure for use by all SRP participants. These should have automated LCMS-MS capability enabling analysis for many pesticides at one time.

Data collection: If a mill has traceability to farm level, the miller or extension worker can collect the samples at the mill after milling. Without this traceability, one could collect samples of paddy from a sample of farms, send them to a centralized sample collection system, and then have them all milled by the laboratory immediately prior to analysis. This last option is still second best to testing the product after it has gone through the real-world milling process, but it is more meaningful for improving food safety at the farm level. In both cases, records are kept of the size of the batch from which the sample was taken (in kg).

5. Water use efficiency

Indicator: Total water productivity

The indicator measures water use efficiency, defined as the total amount of recovered yield per input of water.

Unit: kg paddy rice/ L (rainfall + irrigation)

An increase over time would be considered positive.

Rationale: The rationale for this indicator is based on the SRP guiding principle: Resource Use Efficiency. The assumption is that savings in irrigation or rain water can be used for other important purposes (i.e. water availability increases).

Measurement details: Accurate field dimensions are required for this parameter. The farmer records in the Farmer Field Book details on the water input or energy consumption for each irrigation event. Water inputs are disaggregated by source; rainwater, ground water, surface water.

- Rainfall (mm), either within individual farmer fields or at a village level, is recorded using a rain gauge after each rainfall event. Alternatively, rainfall data can be sourced from local meteorological organizations or using global rainfall prediction models that are available through agencies such as NASA. The use of rain gauge data can be used to ground truth rainfall model data.

- Ground water irrigation. The farmer records the total number of irrigation events and the depth of water in the field at the start and end of each irrigation event. The initial water depth at the start of each irrigation should be negative where AWD irrigation scheduling is used, reflecting the water level below the soil surface. Where possible the farmer records the amount of pumped ground water, by installing a flow meter or calibrated pump and then records the time it is open or the amount of energy used to pump the water. Alternatively the discharge capacity (in terms of liters per second or equivalent units) and size of the pump, depth of groundwater (m) and the amount of energy consumed, either volume (diesel, gasoline) or kWh (electricity), during each irrigation event or total irrigation energy consumption per season should be recorded.

- Surface water irrigation. The farmer records the number of irrigation events and the depth of water in the field at the start and end of each irrigation event. The initial water depth at the start of each irrigation should be negative where AWD irrigation scheduling is used, reflecting the water level below the soil surface. Where possible the farmer should install an appropriate flow measuring device for open or closed channels, such as a weir, flume, submerged orifice or current meter.

Data collection: Detailed data on rainfall and irrigation are recorded in a Farmer Field Book during the rice season by a sample of farmers (see Section 4.2 for sample size). Data are collected per farmer, at least at the end of every rice season. However, this indicator, especially, would benefit from more frequent data collection to ensure completeness and quality of data. An extension worker or research partner can also collect and check the data via a household survey. Alternative data collection methods such as the use of mobile devices by extension workers are also encouraged.

6. Nutrient use efficiency: N

Indicator: Nutrient use efficiency: N or Partial nutrient balance: N

The nutrient use efficiency is defined as the recovered gain yield per unit of nitrogen input. The partial nutrient balance measures the input/output ratio of nitrogen.

Unit: kg paddy rice/kg elemental N or Kg elemental N removal / kg elemental N input
An increase over time would be considered positive, provided farmers do not mine their soil.

Rationale: The rationale for this indicator is based on the SRP guiding principle: Resource Use Efficiency. The assumption is that improved N management leads to improved yields or reduced input costs, higher farm profitability, increased food security, less N lost to the environment; reduced eutrophication of waterways, reduced emissions of greenhouse gases (GHG) from paddy fields, and reduced energy consumption and GHG emissions from production and transport of fertilizers.

Measurement details: Records are kept of the total amount in kilograms of each type of fertilizer or soil conditioner applied to the rice field either prior to planting or during the season, for each field.

Record keeping should commence after harvest of the previous crop on the same field (whether rice or other crop). Records should be kept of all types of fertilizers applied (mineral, organic or synthetic). Sources of N that are not readily controlled by the farmer are excluded (e.g. biological nitrogen fixation from algae, indigenous soil N supply and N contributed through decomposition of roots from previous seasons).

Sources of N	Percentage of elemental N (%)
Rice straw	0.5-0.8 (0.65)
Cattle manure	0.4-0.6 (0.5)
Poultry manure	1.4-1.6 (1.5)
Pig manure	0.7-1.0 (0.85)
Compost (mostly cattle manure)	1.5
Compost (mostly poultry manure)	0.3
Compost (mostly kitchen scraps)	0.6

For the partial nutrient balance, one has to convert the tonnes of exported grain and straw on a N basis using average N content values.

Data collection: Detailed data on fertilizer use are recorded in a Farmer Field Book by a sample of farmers (see Section 4.2 for sample size). Data are collected per farmer, at least at the end of every rice crop cycle. An extension worker or research partner can also collect and check the data via a household survey. More frequent data collection over the crop season is encouraged in order to ensure quality of farmer records. Alternative data collection methods such as the use of mobile devices by extension workers are also encouraged.

7. Nutrient use efficiency: P

Indicator: Nutrient use efficiency: P or Partial nutrient balance: P

The nutrient use efficiency is defined as the recovered gain yield per unit of phosphorus input. The partial nutrient balance measures the input/output ratio of phosphorus.

Unit: kg paddy rice/kg elemental P and Kg elemental P removal / kg elemental P input
An increase over time would be considered positive, provided farmers do not mine their soil.

Rationale: The rationale for this indicator is based on the SRP guiding principle: Resource Use Efficiency. The assumption is that improved P management leads to improved yields or decreasing input costs, higher profitability for the farmer; less P lost to the environment, reduced eutrophication of waterways, and reduced energy consumption and GHG emissions from production and transportation of fertilizers.

Measurement details: Records are kept of the total amount in kilograms of each type of fertilizer or soil conditioner applied to the field growing rice either prior to planting or during the season on each field.

Record keeping should commence after harvest of the previous crop on the same field (whether rice or other crop). All types of fertilizers applied should be recorded (mineral, organic or synthetic).

The farmer, extension worker or research partner records the P content using known (i.e. label) or estimated percentage of elemental P in each fertilizer input to calculate total P. Default values for available P content in non-commercial (non-labeled) material as a percentage of fresh weight (not dried) are provided in the table below.

Sources of P	Percentage of elemental P (%)
Rice straw	0.07-0.12 (0.095)
Cattle manure	0.1-0.2 (0.15)
Poultry manure	0.5-0.8 (0.65)
Pig manure	0.2-0.3 (0.25)
Compost (mostly cattle manure)	1.2
Compost (mostly kitchen scraps)	0.2
Rice straw	0.1

For the partial nutrient balance, one has to convert the tonnes of exported grain and straw on a P basis using average P content values.

Data collection: Detailed data on fertilizer use are recorded in a Farmer Field Book by a sample of farmers (see Section 4.2 for sample size). Data are collected per farmer, at least at the end of every rice crop cycle. An extension worker or research partner can also collect and check the data via a household survey. More frequent data collection over the crop season is encouraged in order to ensure quality of farmer records. Alternative data collection methods such as the use of mobile devices by extension workers are also encouraged.

8. Pesticide use efficiency

Indicator: Pesticide use efficiency

This indicator measures optimized pesticide use.

Unit: The measurement unit is a 0-100 score based upon answers to multiple choice questions which describe a combination of practices and outcomes related to pesticide use efficiency. An increase over time would be considered positive.

Rationale: The rationale for this indicator is based on the on the SRP guiding principle: Resource Use Efficiency. The assumption is that improved pesticide management leads to increased farm profitability (through increasing yield and/or decreasing input costs), reduced environmental contamination by pesticides (leading to improved biodiversity and human health) and greater food security.

Measurement details: Measurement is based upon a scorecard covering the following topics:

1. Use of registered products
2. Calibration and maintenance of pesticide application equipment
3. Following label instructions
4. Targeted application
5. Weed management (number of applications)
6. Insect management (number of applications)
7. Disease management (number of applications)
8. Mollusk management (number of applications)
9. Rodent management (number of applications)
10. Bird management

The scorecard can be found in Annex 1.

The answers on the questions can be triangulated by observations and farm records. Farm records should be kept in a Farmer Field Book on the following topics:

- The trade name and active ingredient of the pesticide
- Total amount of pesticides applied to each rice crop cycle season per kilogram or liter of pesticide applied.
- For multiple applications of the same pesticide, the farmer should record each separate application.

Data collection: The scorecard is measured by a survey at least at the end of each rice crop cycle with a sample of farmers (see Section 4.2 for sample size). An extension worker or research partner can also collect and check the data via a household survey. More frequent data collection over the crop season is encouraged in order to ensure quality of farmer records. Alternative data collection methods such as the use of mobile devices by extension workers are also encouraged.

9. Greenhouse gas emissions

Indicator: Greenhouse gas emissions

This indicator measures the amount of methane emitted per unit of land area.

Unit: Mg CO₂e/ha

A decrease is considered to be positive.

Rationale: This indicator is based on the SRP guiding principle: Climate Change Mitigation. The assumption is that reduced methane emissions from rice fields during crop growth decrease the contribution of rice cultivation to climate change.

Measurement details: Measurement is based upon an IPCC-approved methodology based upon the following indicators:

1. Number of days of crop growth (starting at transplanting for a transplanted crop).
2. Total amount, in kilograms, of organic material incorporated into the soil (i.e. straw, manure or compost).
3. Number of days of flooding prior to crop establishment
4. Number and duration of drying events (the number of times when the water depth falls at least 10 cm below the soil surface; or the number of times in which the soil dries to the point of light cracking).

Data are collected for the largest parcel of land. The quantity of methane is calculated according to the IPCC guidelines. Data is collected per farmer at the end of every season.

Responses can also be triangulated by observations and farm records.

Data collection: The data collection is conducted on a sample of farmers (see section 4.2. for sample size) per farmer at least at the end of the rice crop cycle. An extension worker or research partner can also collect and check the data via a household survey. More frequent data collection over the crop season is encouraged in order to ensure quality of farmer records. Alternative data collection methods such as the use of mobile devices by extension workers are also encouraged.

10. Health & safety

Indicator: Workers' health & safety

Unit: The measurement unit is a 0-100 score based upon answers to multiple choice questions which describe a combination of practices and outcomes related to health and safety. An increase over time would be considered positive.

Rationale: This indicator is based on the SRP guiding principle: Labor Conditions. The assumption is that increased health and safety measures lead to reduced health and safety risks. Improved worker health lead to reduced health-related costs, improved continuity of work and improved livelihoods.

Measurement details: Measurement is based upon a scorecard covering the following topics:

1. Incidence of work-related accidents and illnesses
2. Safety instructions and first aid
3. Re-entry periods after pesticide application
4. Availability and use of PPE
5. Suitable maintenance of equipment for safe operation
6. Pesticide applicator training
7. Age and gender of pesticide applicator
8. Washing and changing facility for pesticide applicator
9. Storage of pesticides
10. Disposal of pesticide container

The scorecard can be found in Annex 1.

Data collection: The scorecard is measured by a household survey at least at the end of each rice crop cycle with a sample of farmers (see Section 4.2 for sample size).

11. Child labor

Indicator: Child Labor

This indicator measures the incidence of child labor and respect for children's right to education.

Unit: The measurement unit is a 0-100 score based upon answers to multiple choice questions describing a combination of practices and outcomes related to child labor. An increase over time would be considered positive.

Rationale: The indicator is based on the SRP guiding principle: Labor Conditions. The assumption is that the absence of child labor leads to reduced health risks and greater opportunity to attend school.

Measurement details: Measurement is based upon a scorecard covering the following topics:

1. Employment of children below the age of 15 years old as permanent or seasonal workers
2. Children below the age of 18 years old doing hazardous work
3. Children of school age attending school all year long

The scorecard can be found in Annex 1.

The scores can be triangulated by observations and records, e.g. school enrolment records.

Data collection: The scorecard is measured by a household survey at least at the end of each rice crop cycle with a sample of farmers (see Section 4.2 for sample size).

12. Women's empowerment

Indicator: Women's empowerment

The indicator measures women's power to make decisions relevant to their well being.

Unit: The measurement unit is a 0-100 score based upon answers to multiple choice questions which describe a combination of practices and outcomes related to women's empowerment. An increase over time would be considered positive.

Rationale: The indicator is based on the SRP guiding principle: Social Development. The assumption is that empowerment of women leads to improved maternal health, improved family health and well-being. In situations where women are directly involved in rice production, women's empowerment (e.g. by increasing women's access to knowledge) is also expected to lead to higher levels of productivity and profitability.

Measurement details: Measurement is based upon a scorecard covering the following topics:

1. Women's control over decisions regarding household agricultural production
2. Women's control over decisions regarding their own labor input
3. Women's satisfaction regarding their labor input
4. Women's access to information and capacity building
5. Women's access to seasonal resources for farm activities
6. Women's control over long-term resources for farm activities
7. Women's control over decisions regarding household income
8. Women's control over their personal income
9. Women's participation in collective-decision making
10. Violence against women

In this indicator we refer to the main decision making female(s) in the household (generally spouses).

The scorecard can be found in Annex 1.

For this indicator an attempt should be made to ask an equal number of both men and women (although not both from the same household).

Data collection: The scorecard is measured by a household survey at least at the end of each rice crop cycle with a sample of farmers (see Section 4.2 for sample size).

Annex 1: Scorecards

A. Pesticide Use Efficiency (PI No. 8)

No	Indicator	Corresponding requirement	Level(s) of performance	Score
1	Use of registered products	<p>Purchased pesticides, including biologicals:</p> <ul style="list-style-type: none"> are used in line with national government recommendations, are registered for use in rice, come from a trustworthy source, and are not on any of the following international lists: <ul style="list-style-type: none"> Persistent Organic Pollutants (POP's) in the Stockholm Convention Annex III of the Rotterdam Convention 1A or 1B under World Health Organization (WHO) classification. <p>Crude farm produced bio-pesticides are allowed:</p> <ul style="list-style-type: none"> if not harmful to the environment and human health, if produced on farm and not purchased, and if proven to be effective. 	a) There is no use of pesticides.	10
			b) Compliance with all of the listed elements for purchased or farm-produced pesticides.	10
			c) Non-compliance with one or more of the listed elements for purchased or farm-produced pesticides.	0
2	Targeted application	<p>Pesticides are not applied:</p> <ul style="list-style-type: none"> on non-target areas within 5 meters of occupied buildings, roads or pathways unless there is no threat to human or wildlife within 5 meters of water bodies (including main irrigation channels) within 1 meter of small diversion canals within 5 meters of protected areas during strong winds. 	a) Managed without pesticides	10
			b) Compliance with all listed conditions	10
			c) Non-compliance with one or more of the listed elements for purchased or farm-produced pesticides.	0
3	Label instructions	Each pesticide application is in accordance with label instructions on application method, pre-harvest interval and dosage.	a) There is no use of pesticides.	10
			b) Instructions followed on application method, pre-harvest intervals and dosage.	10
			c) Instructions followed on application method, pre-harvest intervals, but sub-optimal dosage.	5
			d) Incorrect application method, dosage in excess of labeled amount, or timing within pre-harvest interval.	0
4	Calibration	Pesticide application equipment is calibrated, and it is maintained to prevent leakage or contamination of products.	a) There is no use of pesticides.	10
			b) Calibration and maintenance within current crop cycle	10
			c) Calibration and maintenance within the past 2 years	5
			d) No calibration and maintenance within the past 2 years	0

No	Indicator	Corresponding requirement	Level(s) of performance	Score
5	Weed management	<p>Non-chemical methods of weed control include:</p> <ul style="list-style-type: none"> • Good land preparation • Flooding • Mechanical weeding • Manual weeding • Biological control agents <p>Appropriate herbicide application follows principles of IPM and meets all of the following criteria:</p> <ul style="list-style-type: none"> • It is applied during early crop growth stage before rice canopy closes) and when weeds are small • An appropriate herbicide is used for the type of weed problem (choice of mode of action) • Local information about herbicide-resistant weeds is used when choosing an appropriate herbicide 	a) Weeds are controlled without herbicides.	10
			b) Weeds are controlled with a combination of physical and chemical techniques, with a maximum of 1 herbicide application per season, which must meet the criteria for appropriate use.	5
			c) Weeds are controlled with up to 4 herbicide applications (must have distinct modes of action) per crop cycle, meeting all criteria for appropriate use.	2
			d) Weeds are not effectively controlled or are managed with inappropriate herbicide use.	0
6	Insect management	<p>Non-chemical insect control methods include:</p> <ul style="list-style-type: none"> • Synchronised planting • Use of resistant/tolerant varieties • Promotion of beneficial natural enemies (e.g. insects, spiders) by avoiding insecticide use • Promotion of other predators (e.g. birds, bats, frogs) • Crop rotation or extended fallow period • Balanced nutrient application (avoiding excessive use of nitrogen) • Biological control agents, e.g. Metarizhium, Beauveria <p>Appropriate insecticide use follows principles of IPM and must meet all of the following criteria:</p> <ul style="list-style-type: none"> • It is applied only if presence of specific pest at high density has been confirmed and damage is high (not preventively; apply action thresholds if locally available) • It is applied more than 40 days after sowing • (Exceptions to the latter are acceptable if following IPM recommendations by local government extension experts) 	a) Insect pests are managed without use of chemical insecticides.	10
			b) Insect pests are managed with maximum of 1 application of insecticides per crop cycle, only in the conditions for appropriate use.	5
			c) Insect pests are managed with a maximum of 2 insecticides per crop cycle, both of which should be within the conditions of appropriate use.	2
			d) Insect pests are not effectively managed or insecticides are used preventively or insecticides are applied before heading (except for stem borer).	0

No	Indicator	Corresponding requirement	Level(s) of performance	Score
7	Disease management	<p>Non-chemical disease management options include (effective for fungal, bacterial and viral diseases):</p> <ul style="list-style-type: none"> • Use resistant varieties • Synchronize planting • Remove host plants (weeds on bunds, rice stubble or volunteer rice) • Keep the environment between soil and plant canopy either dry or moist (depending on the disease) • Planting at low densities • Balanced nutrient application (avoiding excessive use of nitrogen) • Biological control agents, e.g. Trichoderma <p>Acceptable chemical disease management options for fungal diseases meet all of the following criteria:</p> <ul style="list-style-type: none"> • Where feasible, non-chemical methods are used • It is applied only if non-chemical methods are not sufficiently effective on their own • Fungicide application should not be used after flowering (within 35 days of harvest) • Fungicide application should only be used in scenarios with high risk of fungal disease (according to recent history and predicted weather patterns) <p>Fungicide treatment of seeds is allowable for direct-seeded systems</p>	a) Diseases are managed without use of chemical control.	10
			b) Fungal panicle diseases with clear historical evidence in the field (e.g. false smut, dirty panicle, neck and panicle blast) are managed with 1 fungicide application, only in the conditions for appropriate use. .	5
			c) Fungal diseases are managed with maximum 2 fungicide applications per crop cycle, only in the conditions for appropriate use.	2
			d) Diseases are not effectively managed or fungicides are applied in excess of requirements.	0
8	Mollusk management	<p>Non-chemical mollusk control options include:</p> <ul style="list-style-type: none"> • Physical control (vigilant destruction of egg masses, hand-picking of snails, baiting- and capturing, maintaining saturation without standing water during the vulnerable period) • Promotion of predators (birds) • Use of sturdier seedlings during transplanting • Crop rotation or extended dry fallow period <p>Appropriate use of molluskicides (chemical or organic) follows principles of IPM and must meet all of the following criteria:</p> <ul style="list-style-type: none"> • Should not be used before manual transplanting (worker safety) • Used only within first 3 weeks after crop establishment 	a) Mollusk pests are managed without use of molluskicides	10
			b) Mollusk pests are managed with maximum 1 application of molluskicides per crop cycle, but only if applied for rice younger than 30 days old.	5
			c) Mollusk pests are managed with a maximum of 1 molluskicide application per crop cycle, but it is done during fallow.	2
			d) Mollusk pests are not managed effectively (i.e. re-planting is necessary), or molluskicide is over-applied or applied on rice older than 30 days.	0
9	Rodent management	<p>Non-chemical rodent control options include:</p> <ul style="list-style-type: none"> • Synchronised planting • Community rodent management, e.g. rat eradication campaigns, trap crops • Use of a trap crop 	a) Rodent pests are managed without use of rodenticides.	10
			b) Rodent pests are managed with maximum 1 application of rodenticide per crop cycle, but only if used before heading.	5

No	Indicator	Corresponding requirement	Level(s) of performance	Score
		<ul style="list-style-type: none"> • Trapping • Hunting • Use of narrow bunds (minimize rodent habitat) • Promotion of predators (birds of prey, snakes) <p>Appropriate rodenticide use must meet all of the following criteria:</p> <ul style="list-style-type: none"> • Appropriate timing is to manage rodents during the vegetative growth phase of the crop so that they don't produce an outbreak during grain-filling. • Only in response to current or historical evidence of rodent problems • Rodenticides should be placed under protective cover, e.g. bamboo tubes or coconut husks, where they are not easily accessible to birds or exposed to rainfall 	<p>c) Rodent pests are managed with more than 1 application of rodenticide per crop cycle, but only if used before heading.</p>	2
			<p>d) Rodents are not managed effectively, or rodenticide is used too late to provide effective protection.</p>	0
10	Bird management	<p>Non-lethal bird control options include:</p> <ul style="list-style-type: none"> • Synchronized planting • Scare/deterrent devices • Promotion of predators (e.g. birds of prey, shrikes) 	<p>Bird pests are managed without use of lethal control</p>	10
			<p>Bird pests are managed by live trapping and all non-pest species are released alive</p>	5
			<p>Birds are indiscriminately persecuted by killing, poisoning or hunting</p>	0
Score (0-100)				

B. Health and Safety (PI No. 10)

No	Indicator	Corresponding requirement	Level(s) of performance	Score
1	Incidence of work-related accidents	<p>The frequency of work-related accidents resulting in minor and major injuries or ill health for workers or any person in or outside the farm.</p> <p>Examples of accidents that could result in injuries or ill health include but are not limited to:</p> <ul style="list-style-type: none"> • Fires, explosions, emissions, spills, accidents with vehicles or machinery, collapses, cuts <p>Examples of injuries or ill health include but are not limited to:</p> <ul style="list-style-type: none"> • Fractures, cuts, infections, burns, respiratory and other diseases related to pesticide use, snake bites, leptospirosis <p>We distinguish a minor and major degree of severity of injuries or ill health:</p> <ul style="list-style-type: none"> • Minor: injuries or diseases with a short-term impact and that require medical assistance or cause to miss at least one day of work • Major: semi-permanent, permanent injury or ill health diseases or death 	a) No minor and major work related injuries or ill health	10
			b) No major work related injuries or ill health, but minor cases in a lower frequency compared to the last crop cycle	5
			c) Any major work related injuries or minor cases in an equal or higher frequency compared to the last crop cycle	0
2	Safety instructions and first aid	Workers, including working household members, receive regular safety instruction to prevent work related accidents or diseases, and first aid supplies are available on-farm	a) No workers or working family members, and first aid supplies are available on-farm.	10
			b) Workers, including working household members, receive regular safety instruction and first aid supplies are available on-farm.	10
			c) Workers, including working household members, receive regular safety instruction, but no first aid supplies are available on-farm.	5
			d) There is no safety instruction and there are no first aid supplies available on-farm.	0
3	Calibration	Tools and equipment for farm operations and post-harvest processed are frequently maintained and calibrated.	a) Calibration and maintenance within current crop cycle.	10
			b) Calibration and maintenance within the past 2 years.	5
			c) No calibration and maintenance within the past 2 years.	0
4	Training pesticide applicators	Pesticide applicators receive training on handling and use of pesticides.	a) There is no use of pesticides.	10
			b) Pesticide applicators participated in a training session in the past 3 years.	10
			c) Pesticide applicators participated in a training session in the past 5 years.	5
			d) Pesticide applicators did not participate in a training session in the past 5 years.	0

5	Personal Protective Equipment (PPE)	Pesticide applicators use good quality Personal Protective Equipment (PPE), including: <ul style="list-style-type: none"> gloves masks boots protective clothing. Protective clothing is washed after use.	a) There is no use of pesticides.	10
			b) Pesticide applicators use at least 3 of the listed PPE items, but always gloves, (or at least what is required on the product label) of good quality and clothing is washed after use.	10
			c) Pesticide applicators use at least 2 of the listed PPE4 items, but always gloves, of good quality and clothing is washed after use.	5
			d) Pesticide applicators use less than 2 of the 4 items, or do not use gloves, or use items of low quality, or clothing is not washed after use.	0
6	Washing and changing facility	Washing and changing facilities are available for pesticide applicators.	a) There are no workers employed who apply pesticides.	10
			b) Washing and changing facilities are available.	10
			c) A washing or changing facility is available.	5
			d) No washing or changing facility is available.	0
7	Applicator restrictions	Pesticides are not applied by pregnant or lactating women, by children below 18 years, or by persons who suffer from chronic or respiratory diseases.	a) There is no use of pesticides.	n/a
			b) Pesticides are not applied by pregnant or lactating women or by children below 18 years, or by persons who suffer from chronic or respiratory diseases.	3
			c) Pesticides are applied by pregnant or lactating women or by children below 18 years, or by persons who suffer from chronic or respiratory diseases.	0
8	Re-entry times	Recommended re-entry times after use of pesticides are observed and communicated (or 48 hours if label does not give a recommendation).	a) There is no use of pesticides.	10
			b) Recommended, or 48-hours re-entry times are observed and communicated by placing warning signs on the fields.	10
			c) Recommended, or 48-hours re-entry times are observed and communicated verbally.	5
			d) Recommended, or 48 hours re-entry times are not observed or not communicated.	0
9	Pesticide storage	Pesticides and inorganic fertilizers (including empty containers) are labeled and stored in a locked place, separate from fuel, food and out of reach of children.	a) There is no use of pesticides or inorganic fertilizers.	10
			b) Pesticides and inorganic fertilizers are labeled and stored in a locked and separate place.	10
			c) Pesticides and inorganic fertilizers are labeled and stored in a general farm storage area.	5
			d) Pesticides and inorganic fertilizers are not labeled or stored.	0
10	Pesticide disposal	Empty pesticide containers and obsolete pesticides are properly disposed of.	a) There is no use of pesticides.	10
			b) Farmer participates in a collection, return or disposal system.	10
			c) In absence of such a system: <ul style="list-style-type: none"> empty containers rinsed 3 times with water and made unusable by crushing or puncturing before burying them on the farm and are not recycled. surplus spray and wash water is applied over an unmanaged part of the farm, away from water bodies. obsolete pesticides (past shelf life or banned pesticides) are returned to the dealers and if not possible disposed of in a manner that minimizes exposure to humans and the environment. 	10
			d) There is a collection, return or disposal system, but it is not used. In absence of such a system, empty pesticide containers and obsolete pesticides are not disposed of as described under c).	0

C. Child Labor (PI No. 11)

No	Indicator	Corresponding requirement	Level(s) of performance	Score
1	Employment of children <15 years old as permanent or seasonal workers	Children below 15 years are not engaged as permanent or seasonal workers. If local legislation has established a higher minimum age, this higher age applies. Age of employees is always verified (ILO Convention 138).	<ul style="list-style-type: none"> • a) There are no children below the minimum age are working on the farm, unless they are members of a small scale family farm, and the following conditions are met: • they perform light age-appropriate duties, • the work is not harmful to their health and development, • the work does not interfere with their education, • the work does not exceed 14 hours per week, • children are always supervised by an adult. 	25
			b) Children below the minimum age are working on the farm, but there are deliberate and evidenced efforts to stop the children from working and to get them into education.	10
			c) Children below the minimum age are working on the farm, and no deliberate and evidenced efforts were made to stop the children from working and to get them into education.	0
2	Hazardous work	Children below 18 years do not conduct hazardous work or any work that jeopardizes their physical, mental or moral wellbeing (ILO Convention 182). The following conditions are met: <ul style="list-style-type: none"> • Children do not carry heavy loads, • The work is not at dangerous locations, • The work is not at night (between 22.00 pm and 06.00 am), • Children do not use harvest knives, • Children do not work with dangerous substances or equipment 	a) There are no children below 18 years working on the farm.	25
			b) Children below 18 years are working on the farm and all listed conditions are met.	25
			c) Children below 18 years are working on the farm and they use harvest knives, but all of the other listed conditions are met.	10
			d) Children below 18 years are working on the farm, and one or more of the other listed conditions are not met.	0
3	Education	Children living on the farm in the age of compulsory schooling go to school all year long.	a) There are no children living on the farm within the age of compulsory schooling.	50
			b) Children living on the farm within the age of compulsory schooling go to school all year long.	50
			c) Children living on the farm within the age of compulsory schooling go to school, but not all year long.	25
			d) Children living on the farm within the age of compulsory schooling do not go to school, but deliberate and evidenced efforts are taken to get them into education, e.g. by lobbying for a nearby school or by providing on-site schooling.	10
			d) Children living on the farm within the age of compulsory schooling do not go to school, and no deliberate and evidenced efforts are taken to get them into education.	0
Total score (0-100)				

D. Women's Empowerment (PI No. 12)

No	Indicator	Corresponding requirement	Level(s) of performance	Score
1.	Women's control over decisions regarding household agricultural production	Women should have decision-making power over the choice of the products and markets of the household's agricultural production	a) Women have at least equivalent decision-making power	10
			b) Women have some but less than equivalent decision-making power	2
			c) Women have none or marginal decision-making power	0
2.	Women's control over decisions regarding their own labor input	Women should have decision-making power over how much labor they contribute to agriculture, the timing of their labor input and the type of activities they do	a) Women have at least equivalent decision-making power	10
			b) Women have some but less than equivalent decision-making power	2
			c) Women have none or marginal decision-making power	0
3.	Women's satisfaction regarding their labor input	Women's labor input in agricultural production should be in balance with their productive and domestic tasks, leisure and possible other income generating activities	a) Women are satisfied	10
			b) Women are partly satisfied (e.g. no balance during peak labor-requiring periods)	2
			c) Women are structurally unsatisfied	0
4.	Women's access to information and capacity building	Women should have access to information, training and extension services related to women activities	a) Women have equal access	10
			b) Women have less access	2
			c) Women have good access	0
5.	Women's access to seasonal resources for farm activities	Women should have decision-making power and equal access to seasonal resources for farm activities including hired labor, seeds, fertilizers, pest control products and credit	a) Women have at least equivalent decision-making power and equal access	10
			b) Women have some but less than equivalent decision-making power and less than equal access	2
			c) Women have none or marginal decision-making power and no access	0
6.	Women's control over long-term resources for farm activities	Women should have decision-making power and share ownership of long-term resources (decisions that are typically made =< once per year, which affect the whole farm, including: land, forests, gardens, livestock, agricultural equipment, irrigation system, credit, buildings)	a) Women have at least equivalent decision-making power and ownership	10
			b) Women have some but less than equivalent decision-making power or ownership	2
			c) Women none or marginal decision-making power or ownership	0
7.	Women's control over decision-making regarding household income	Women and men should have decision-making power for the total household income	a) Women have at least equivalent decision-making power	10
			b) Women have some but less than equivalent decision-making power	2
			c) Women have none or marginal decision-making power	0
8.	Women's control over their personal income	Women should have equivalent or greater control of income they generate themselves	a) Women have equivalent or greater control	10
			b) Women have some but less than equivalent control	2
			c) Women have no or very limited control	0
9.	Women's participation in collective-decision making	Women should be able to participate in group decision-making processes regarding rice production and marketing (e.g. irrigation scheduling, leadership committees of cooperatives, credit groups)	a) Women participate in group leadership, are active in group decisions and their voices are valued	10
			b) Women are present during group decisions, but their contributions are not given full weight	2
			c) Women are excluded from group decision making	0
10.	Violence against women	There must not be any violence that results in, or is likely to result in, physical, sexual or mental harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or in private life (UN resolution 48/104 of 20 December 1993)	a) There are no cases of violence	10
			b) There is at least one case of violence	0
Total score (0-100)				

* In this indicator we refer to the main decision making female(s) in the household (generally spouses).

** Agricultural production refers to any farm production, not only rice.