Sustainable Rice Platform

SRP Performance Indicators for Sustainable Rice Cultivation

Version 2.0
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www.sustainablerice.org

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Authors/Recognition

This document has been prepared by the Sustainable Rice Platform (SRP) team led by the International Rice Research Institute (IRRI), UN Environment (UNEP) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), following extensive consultation with SRP members and external stakeholders. The SRP Secretariat wishes to express its gratitude to the following individuals and organizations for their support during the SRP Performance Indicator revision process: IRRI technical experts: Cecilia Acuin, Olivyn Angeles, Peter Brothers, Pauline Chivenge, Matty Demont, Martin Gummert, Buyung Hadi, Joel Janiya, Hung Van Nguyen, Estela Pasuquin, Ranjitha Puskur, James Quilty, Bjoern Ole Sander, Grant Singleton, Alex Stuart, Reiner Wassmann, Sudhir Yadav and in particular Sarah Beebout, who led this revision process throughout.

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Disclaimer

The views expressed in this document are those of the Sustainable Rice Platform and may not in any circumstance be regarded as representing an official position of the organizations cited.

The Sustainable Rice Platform (SRP)

SRP is a global multi-stakeholder alliance launched in 2011 led by UN Environment, IRRI and GIZ, comprising over 100 institutional stakeholders including public and private sector stakeholders, research, financial institutions and NGOs. SRP promotes resource-use efficiency and climate change resilience in rice systems (both on-farm and throughout value chains) and pursues voluntary market transformation initiatives by developing sustainable production standards, indicators, incentive mechanisms, and outreach programmes to boost wide-scale adoption of sustainable best practices. SRP's goal is to minimize environmental impacts of rice production and consumption while enhancing smallholder incomes and contributing to food security.

Validity

The Performance Indicators Version 1.0 remains valid until the outcome of field testing of Version 2.0.

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Contents

A. Changes from Version 1.0 to Version 2.0

The Sustainable Rice Platform (SRP) Performance Indicators Version 1.0 was originally published in October 2015. Version 2.0 is the result of a comprehensive review and revision, which began in August 2017 and was completed in January 2019. Version 1.0 was revised in compliance with the ISEAL Code of Good Practice for Setting Social and Environmental Standards (P005, Version 5.01, June 2010).

Version 2.0 introduces significant changes including the replacement of some indicators and the opportunity to measure most indicators at any of three levels: Basic/Intermediate/Advanced. These three levels make it easier for users to select an appropriate level where data are available or can be readily collected. Users are not required to collect data for all three levels. Version 2.0 allows collection of basic data (Level 1) as an entry point while leaving collection of higher-level data to external partners.

Version 2.0 of the SRP Performance Indicators was approved by the SRP membership at the SRP 8th General Assembly held in Siem Reap (Cambodia) on 24 January 2019.

Table 1: Comparison between SRP Performance Indicators v. 1.0 and v. 2.0 with overview of changes

PERFORMANCE INDICATORS V. 1.0	CHANGES DURING REVISION	PERFORMANCE INDICATORS V. 2.0
1. Profitability: net income from rice	• Added two levels (1 & 3)	1. Profitability
2. Labor productivity	• Added two levels (1 & 3)	2. Labor productivity
3. Productivity: grain yield	• Added two levels (1 & 3)	3. Productivity: grain yield
4. Food safety	• Moved Indicator No. 4 to 9 • Added two levels (1 & 3)	(see Indicator No. 9 below)
5. Water use efficiency	• Moved to Indicator No. 4 • Added water quality • Added two levels (1 & 3)	4. Water productivity & quality
6. Nutrient-use efficiency: N	• Moved to Indicator No. 5 • Added two levels (1 & 3)	5. N-use efficiency
7. Nutrient-use efficiency: P	• Moved to Ind tticator No. 6 • Added two levels (1 & 3)	6. P-use efficiency
8. Pesticide use efficiency	• Replaced Indicator No. 8 (Pesticide Use) with Indicator No. 7 (Biodiversity) • Moved entire scorecard to new locations, including: Standard, Indicator No. 7 Biodiversity, Indicator No. 10 Worker health & safety	7. Biodiversity
9. Greenhouse gas emissions	• Moved to Indicator No. 8 • Added two levels (1 & 3)	8. Greenhouse gas emissions
(See insertion Version 2.0)	• Moved Indicator No. 4 to 9 • Added two levels (1 & 3)	9. Food safety
10. Worker health & safety	• Added two levels (1 & 3)	10. Worker health & safety
11. Child labor	• Added youth engagement • Added two levels (1 & 3)	11. Child labor & youth engagement
12. Women's empowerment	• Developed new scorecard • Added levels 1 & 3	12. Women empowerment

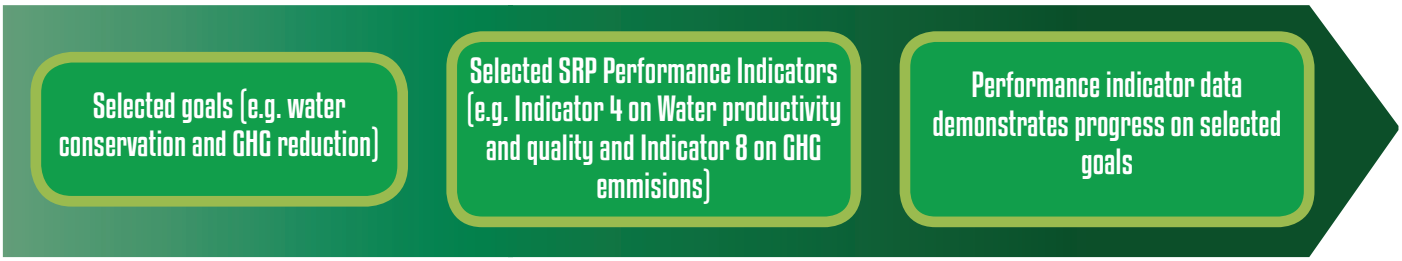
B. SRP Performance Indicators (PIs) Version 2.0

B.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 offers a range of tools to promote sustainable rice cultivation, including the Performance Indicators (PIs), a Standard, an Assurance Scheme, training modules and decision-making tools. These tools are intended to be used either separately or together as appropriate to the context of implementation.

Through a multi-stakeholder revision process, the SRP has developed this document, the SRP Performance Indicators v.2.0 (PIs). The SRP PI revision was undertaken in parallel to the revision of the SRP Standard for Sustainable Rice Cultivation. The Standard defines a set of key requirements with different levels of compliance, allowing for a stepwise improvement and verification process.

The PIs are designed to complement the Standard by measuring changes resulting from adoption of on-farm sustainable rice cultivation, e.g. through compliance with the SRP Standard, or other interventions of interest to SRP members. The PIs thus offer a 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. According to the impact visualization below, implementation partners may select from the individual PIs to show progress on selected goals.



The forthcoming field implementation of the Standard and Performance Indicators v. 2.0 across diverse production contexts will be important to ensure relevance, robustness and user-friendliness, while demonstrating their utility as scaleable tools for driving wide-scale adoption of sustainable, climate-smart best practices. Relevance at country level will be maximized by the establishment of National Interpretation Guidelines for the SRP Standard.

This document provides an introduction to the revised Performance Indicators V 2.0, a description of each PI and the methodologies required for sampling and data collection at each of the three levels. The Annex provides Scorecards to be used in evaluating specific PIs: e.g. health & safety (PI 10), child labor (PI 11) and women's empowerment (PI 12). These Scorecards should not be seen as a duplication of aspects in the SRP Standard but as a necessity whenever the PIs are used as a stand-alone document independent of the SRP Standard.

This document is intended to be used in conjunction with the SRP Standard and the SRP Assurance Scheme. The revised Standard, PIs, Assurance Scheme, training tools and templates are all available for download at the Members' Area of the SRP website: www.sustainablerice.org

The PIs are designed to assess sustainability improvements resulting from changes in farm practice. The revised PIs simplify measurement by offering a basic level of data collection. 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 2 below summarizes the PIs and basis for measurement at the three different levels: Basic/Intermediate/Advanced. Please note that some PIs do not have data measurement defined at all level, For example PI 11 and 12 only have the Intermediate level defined. With field testing of PI v. 2.0 it is possible that additional levels will be defined. Some PIs may continue to offer limited data measurement levels if seen as sufficient for all users.

Table 2: SRP Performance Indicators v. 2.0

INDICATOR	LEVEL	DATA
IMPROVED LIVELIHOODS		
1. Profitability: net income from rice	Basic	• Local currency/season
	Intermediate	• $/ ha/ crop cycle • $/ ha/ year
	Advanced	• Same as level 2, divided by opportunity cost of family labor
2. Labor productivity	Basic	• Local unit of grain production / man-day
	Intermediate	• Kg paddy rice/ man-day • Man-days/ ha/ crop cycle
	Advanced	• $ gross production / man-day
3. Productivity: grain yield	Basic	• Amount of grain produced (local unit)/field
	Intermediate	• Kg paddy/ha (adjusted to 14% moisture content), measured on whole field
	Advanced	• Kg paddy/ha (adjusted to 14% moisture content), using crop cuts from specific areas within field
RESOURCE USE EFFICIENCY		
4. Water productivity and quality	Basic	• No. of irrigations/season • Water quality risk assessment checklist
	Intermediate	• L water (rainfall + irrigation)/kg paddy • % water from irrigation • Water quality risk assessment checklist + water sampling when a risk is identified
	Advanced	• Same as level 2 with greater accuracy
5. Nitrogen-use efficiency	Basic	• Amount of grain harvested / amount of N fertilizer added through organic or inorganic sources (local units)
	Intermediate	• Kg N uptake / kg N input (using table to estimate N content of organic materials) • Kg paddy / kg N input (organic + inorganic)
	Advanced	• Kg N removal/ kg N input (using laboratory analysis of %N in organic materials) • Kg paddy / ha / kg N input (organic + inorganic + soil-supplied N)
6. Phosphorus-use efficiency	Basic	• Amount of grain harvested / amount of P fertilizer added through organic or inorganic sources (local units)
	Intermediate	• Kg P uptake / kg P input (using table to estimate P content of organic materials) • Kg paddy / kg P input (organic + mineral + synthetic)
	Advanced	• kg P removal/ kg P input (using laboratory analysis of %P in organic materials) • Kg grain / ha / kg P input (organic + mineral + synthetic + soil-supplied P)

INDICATOR	LEVEL	DATA
LIFE ON LAND		
7. Biodiversity	Basic	• PI 7 checklist of sightings of key pests and indicator organisms • Number of pesticide sprays per season
	Intermediate	• Pest damage rating • Presence/absence of key pest and indicator species (from detailed country-specific checklist) • Number of cumulative pesticide applications per season
	Advanced	• Area of land conversion (% of landscape converted to rice since 2009) • Enhancement of edge habitat (% edge habitat/arable land) • Abundance of protected/conservation target species (no. of individuals/100 ha) • Abundance of key biodiversity indicator species (country-specific)
CLIMATE ACTION		
8. Greenhouse gas emissions	Basic	• (under development)
	Intermediate	• Mg CO2 equivalents/ ha (methane only; using IPCC default values) • Mg CO2 equivalents/ kg paddy
	Advanced	• Mg CO2 equivalents/ ha (methane and nitrous oxide; using country-specific baseline values) • Mg CO2 equivalents/ kg paddy
CONSUMER NEEDS		
9. Food safety	Basic	• Checklist for food safety risk assessment completed●
	Intermediate	• Milled grain samples submitted to laboratory for analysis●
	Advanced	• Evidence of corrective action based on laboratory analysis results●
LABOR CONDITIONS		
10. Health & safety	Basic	• (under development)
	Intermediate	• PI 10 scorecard completed • Reports of human health concerns among field laborers
	Advanced	• Same as level 2, with greater accuracy
11. Child labor & youth engagement	Basic	• (under development)
	Intermediate	• PI 11 scorecard completed
	Advanced	• (under development)
SOCIALDEVELOPMENT		
12. Women's empowerment	Basic	• (under development)
	Intermediate	• PI 12 scorecard completed
	Advanced	• (under development)

In addition to basic data recorded by the farmers (for example in their Farmer Field Books), it will be an advantage for certain intermediate and advanced data to be collected by implementing partners such as farmer group leaders, service providers or extension workers.

Table 3. Performance Indicator matrix of data quality and purpose

PERFORMANCE INDICATOR MATRIX OF DATA QUALITY				
DATA LEVEL	DATA PURPOSE	DATA COLLECTION SCALE	DATA SOURCE	DATA VERIFICATION
Basic	• Farmer learning and self-improvement • Minimum record-keeping requirement on the Standard	• One cropping season • One field • One household	• Farmer • Farmer Group • Service Provider	• Existence of record book
Intermediate	• Farmer group management • Internal verification • Minimum requirement for certification	• One cropping season • Group of fields • Group of farmers	• Farmer • Farmer Group • Service Provider • Scientist	• High-quality survey of farmers • Quantitative claims verified as specified per indicator
Advanced	• Improving the Standard	• Two or more cropping seasons (including non-rice) • Contiguous group of fields (landscape) or larger • Farmer group or larger	• Farmer Group • Service Provider • Scientist	• Data maintained to publication standards, with evidence of quality control

The following sections outline the overall methodology for measuring the Performance Indicators (PIs), followed by a more detailed description including definitions, rationale, measurement units, methodology and data collection. The Annex contains the Scorecards and Checklists to be used for assessing impacts where the PIs are used as a stand-alone document:

- Incoming water quality assessment checklist (PI No. 4)
- Biodiversity checklist (PI No. 7)
- Food safety (PI No. 9)
- Health and safety (PI No. 10)
- Child labor and youth engagement (PI No. 11)
- Women's empowerment (PI No. 12)

B.2 Data collection methodology

Responsible data collector

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 and corroborate their activities over the previous period.

Number of indicators to measure

We recommend the measurement of all indicators at any one of the three levels, as this provides an overvie of of possible trade-offs among competing sustainability objectives. However, since the relative importance of

indicators may depend on the production context, intervention strategy or available resources, implementing partners may elect to focus on a subset of PIs as relevant to specific objectives and priorities.

Frequency of data collection

It is important to establish a baseline as benchmark at the beginning of the project in order to be able to monitor improvement. The ability to set baselines will depend on the availability of historical farm records (for example cooperative accounts, government data, or data from international research centers).

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 PIs for at least 2 consecutive crop cycles.

Sampling approach

For large numbers of participating producers we recommend 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 fewer.
- If the target group is between 50 and 3,500 farmers, the implementing partner will select 10% of the population for the sample size.
- If the target group is above 3,500 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 observe improvements among target farmers.

Control farmers may live in the same village as farmers in the project, in neighboring 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. 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 4: sample sizes

POPULATION (N)	SAMPLE SIZE TARGET GROUP	CONTROL GROUP
N = ≤50	5	5
N = 50-3500	10%	5% of sample size
N = ≥ 3500	350	35

Data collection tool

An IT based data collection tool is under development to facilitate 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. Data ownership, privacy, use and type of reporting will be considered during the development of the IT database.

C. Detailed description of the performance indicators

1. Performance Indicator on Profitability: net income from rice

Data Level	Indicator Description	Units	Data to be collected	Measurement Methods	Responsible Stakeholders
Basic	Net income from rice	Local currency/ crop cycle	• Amount of rice produced • Sale price of rice • Cash costs for inputs (land, seed, labor, agrochemicals) • agricultural fees and taxes (i.e. irrigation fee etc.)	Farmer-diary record Recall survey	Farmer Farmer group
Intermediate	Net income from rice, considered within the context of total farm income	USD/ ha/ crop cycle	• Same as Basic, plus: • Estimated cost of family labor	Farmer-diary record Recall survey (may use estimates for typical local costs of labor and other inputs)	Farmer Farmer group Service provider
Advanced	Returns to family labor	unitless ratio	• Gross production • Farm inputs and expenses • Cost of hired labor • Amount of family labor • Opportunity cost of family labor	Returns to family labor = [gross production - farm inputs and expenses-cost of hired labor]/[amount of family labor * opportunity cost of family labor]	Service provider Research and development specialist

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. An increase over time would be considered desirable.

Rationale: 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:

Basic: Provides an estimate of the profit from rice production. The focus of farmer learning is keeping records of expenditures and sales to enable improvement of profitability through both increased production and decreased expenditure.

Intermediate: 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. It should be interpreted within the context of total farm income, because rice production may only be a part of farming operations. The calculation should include both rice marketed and rice used for subsistence as well as the opportunity cost of family labor:

Net income from rice = gross income - costs

where:

- gross income includes both market rice and rice used for subsistence (valued at market prices; the average price of 1 kg rice sold that season)
- costs include all fixed and variable costs, including opportunity cost of family labor (determined by the wage for one day of rural labor in the project area during the applicable period)

Advanced: The indicator "Returns to family labor" measures the ratio of returns to investment of family labor of a farm. Ideally, the ratio should be greater than one in order for the farm to be sustainable because that means that family labor is rewarded at its opportunity cost and generates a surplus that can be reinvested in the farm for further growth.

Returns to family labor = [gross production -costs - family labor cost]/[amount of family labor * opportunity cost]

where:

- gross production is measured as the paddy output times the price
- costs are defined as in Intermediate level above
- amount of family labor includes time in record-keeping
- opportunity cost is the wage for one day of rural labor in the project area during the applicable time period

2. Performance Indicator on Labor productivity

Data Level	Indicator Description	Units	Data to be collected	Measurement Methods	Responsible Stakeholders
Basic	Field labor productivity	local unit of rice produced / days labor	• number of people contributing field labor • amount of time each person contributes	Farm-diary record Recall survey	Farmer Farmer group
Intermediate	Labor productivity	• kg rice produced/ days labor • days labor /ha / crop cycle	• Field labor (by activity, by gender, by age) • Farmer and family labor (including data collection, by activity, gender & age)	Farm-diary record Recall survey	Farmer Farmer group Service provider
Advanced	Gross production per worker	USD / day	• Amount of paddy produced • Sale price of paddy • Field labor • Farmer and family labor	Farm-diary record	Farmer group Service provider Research and development specialist

Indicator: Labor productivity
The indicator measures labor productivity, defined as the total amount of days worked, per kg of rice produced or per hectare cultivated. A decrease over time would be considered desirable. Maintenance of labor productivity might be sufficient in cases of already high labor productivity.

Rationale: 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:
Basic: Provides an estimate of field labor productivity based on a farmer's recall of how many people and how much time was spent working in the field during the cropping season. The focus for farmer learning is awareness that different management practices affect the amount of grain that can be produced with one person's labor.

Intermediate: Provides an assessment of total labor productivity based on farm-diary records. Labor productivity includes field labor for 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. Labor includes farmer time spent in planning and record-keeping, as well as in the field.

Advanced: Gross production per worker measures the contribution of each worker to gross output of rice valued at current prices. Gross production is measured as the paddy output times the price. Labor is calculated as described for the intermediate level.

3. Performance Indicator on Productivity: grain yield

Data Level	Indicator Description	Units	Data to be collected	Measurement Methods	Responsible Stakeholders
Basic	Grain yield	local unit/ season	• Amount of paddy harvested	• Farm-diary record	Farmer
Intermediate	Grain yield (at 14% moisture content)	kg/ ha (measured on whole field)	• Field size • Amount of paddy harvested • Moisture content of paddy at time of weighing	• Measuring tape or map calculation • Weighing scale • Moisture meter (or oven-drying and re-weighing a subsample) When moisture meter is not available assume 24% as default moisture percent.	Farmer Farmer group Service provider
Advanced	Grain yield (at 14% MC)	kg/ ha (measured by crop cut)	• Field size • Amount of paddy harvested from a patch of known area (e.g. 5 m2) • Moisture content	• Measuring tape or map calculation • Weighing scale • Moisture meter (or oven-drying and re-weighing a subsample)	Service provider Research and development expert

Indicator: Grain yield

The indicator measures productivity, defined as the recovered grain yield per hectare. An increase over time would be considered desirable.

Rationale: It is assumed that increased productivity leads to increased household food security, an increase in marketable surplus and increased national and international food security.

Measurement details:

Basic: Provides a rough estimate of productivity, based on farmer recall of amount of grain harvested in local units (without adjusting for moisture content). The focus for farmer learning is awareness of how this season's harvest compares with other seasons and other fields.

Intermediate: Provides an accurate measurement of grain yield for the whole field. Field size must be verified through direct measurement with a measuring tape or calculation of area on a map, not just from farmer record. Legal records of landholding size may be used, but are less desirable than direct measurement because planted field area is not usually the same as property borders. Yield is measured in kilograms of wet grain harvested from the whole field. 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.

Example moisture content adjustment calculation for 4350 kg grain at 23% moisture content (MC) at the time of weighing:

weight14% = weight23% x (100-23)/(100-14)
weight14% = 4350 x (77/86) = 3895 kg at 14% MC

For interpretation and appropriate comparisons, rice yields should be disaggregated by:

- type of rice, 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

Advanced: Provides an accurate measurement of the most and least productive parts of the farm by taking crop cuts from small sections with known area. The assessment is done by an average of various crop cuts. As with the intermediate level, grain weight is measured after threshing and initial drying, and moisture content is recorded at the time of weighing so that yields can be expressed at 14% moisture content.

4. Performance Indicator on Water productivity and quality

Data Level	Indicator Description	Units	Data to be collected	Measurement Methods	Responsible Stakeholders
Basic	• Irrigation water use • Irrigation water quality risk assessment	• No. of irrigations/ season • Checklist	• No. of irrigations during land preparation and during the crop cycle • Incoming (irrigation) water quality risk assessment checklist completed	• Actual observations (e.g. farm diary) or recall survey • Checklist A. PI No 4 in Annex 1	Farmer or Farmer group or Water association
Intermediate	• Water productivity (irrigation + rainfall) • Percent of total water from irrigation [L irrigation water/ L (irrigation + rainfall) * 100] • Irrigation water quality sample analyzed if necessary	• L water/ kg paddy rice • % • Checklist	• Duration of land preparation (days) • Estimated irrigation water volume during land preparation (L) • Estimated irrigation water volume during the growing season (L) • Total rainfall during land preparation and the crop growing cycle (L) • Irrigation water samples analyzed for salinity if risks were identified through use of the checklist	• Actual observations or recall survey • Computation from actual observations (No. of irrigations x depth of irrigation x land area) • Computation from actual observations (same as above) • On-site measurement (rain gauge) or nearby weather station • Completed checklist + evidence of sample collection and submission for any risks identified	Farmer or Farmer group or Water association
Advanced	Same as level 2 plus: • Water quality testing of outflowing (runoff) water	Same as level 2 plus: • Water quality analysis results	• Duration of land preparation (days) • Measurement of irrigation water volume during land preparation and crop cycle	• Farm records of start date of land preparation and date of crop establishment • Record of volume used for each irrigation (e.g. with a flow meter) or a proxy such as amount of fuel used for a specific pump	Water association or Service provider or Research & development expert

		• Rainfall data may be obtained from remote sensing data or may be simulated instead of being measured with a rain gauge • Water input and output samples should be tested for net change in concentrations of the following: • pH • Salinity • Turbidity • Dissolved oxygen • Total dissolved solids • Nitrate • Phosphate • Pesticide residues (focus analysis on pesticides known to be present in the system)	• Rain gauge or remote sensing data or modeled from regional weather data • Laboratory analysis using an approved standard method for the listed parameters

Indicator: Total water productivity & quality

The indicator measures water productivity, defined as the total amount of water used to produce 1 kg paddy rice. A decrease over time would be considered desirable. It also provides a risk assessment for identification of incoming (irrigation) or outgoing (runoff) water quality concerns.

Rationale: It is assumed that savings in irrigation or rain water can be used for other important purposes (i.e. water availability increases). The rationale for the water quality part of this indicator is based on the SRP guiding principles: Resource Use Efficiency & Environmental Protection. The assumptions are that irrigation water must be high-quality to achieve water-use efficiency and that farm management should prevent contamination of downstream water sources.

Measurement details:

Basic: The focus for farmer learning and self-improvement is awareness of the quality and quantity of irrigation water used during land preparation and during the cropping season. It is important to include land preparation, because up to ⅓ of the total season's water may be used before the crop is planted. It is important to consider the context of the season (wet vs. dry) when interpreting the results. The checklist for incoming (irrigation) water quality (see annex) is intended to make the farmer aware of potential water quality concerns that could affect productivity.

Intermediate: Provides a good estimate of how much irrigation water is used before and during a season and an assessment of salinity risks in irrigation water. An accurate estimate of field dimensions and grain yield are required for this indicator (see Level 2 for Indicator #3). The farmer records details in the Farm Diary on the water input for each irrigation event (no. of irrigations and depth of water during irrigation). An estimate of rainfall is provided by the farmer group or water association using a rain gauge. Water inputs are disaggregated by source: rainwater or irrigation. The water quality checklist is completed and a water sample is tested for salinity if any risks have been identified. Data are collected per farmer, at least once 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.

Advanced: Provides an accurate measurement of how much water is used before and during a season and an assessment of incoming and outflowing water quality. Accurate field dimensions and grain yield measurements are required for this parameter (see Level 3 for Indicator #3). The farmer records details in the Farm Diary on the water input or energy consumption for each irrigation event. Water inputs are disaggregated by source: rainwater or irrigation. For irrigation water, inputs are disaggregated by irrigation source:groundwater or 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.

- Groundwater 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 groundwater, 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.

For water quality analysis, service laboratories will provide information about their standard method(s); this information should be included with any report for SRP. Acceptable laboratory analysis methods are those that follow an adequate laboratory quality assurance system.

The relevant water quality parameters are:

- pH
- Salinity
- Turbidity
- Dissolved oxygen concentration
- Total dissolved solids
- Nitrate concentration
- Phosphate concentration
- Pesticide concentration

5. Performance Indicator: Nutrient use efficiency: N

Data Level	Indicator Description	Units	Data to be collected	Measurement Methods	Responsible Stakeholders
Basic	N fertilizer productivity: amount of grain produced / unit fertilizer added	• local units for grain yield and fertilizer amount	• No. of times fertilizer was applied • Amount of fertilizer applied • Type of fertilizer applied (synthetic or organic) • Amount of grain harvested	• Farmer records • Farmer recall survey	Farmer Farmer group
Intermediate	Partial factor productivity of N input and N output/input ratio	• kg grain yield / kg N input and • kg N output/ kg N input (unitless ratio)	• Dates of fertilizer application • Amount of fertilizer applied (kg) • Type of fertilizer applied (with labeled N analysis or estimated N content according to table) • Grain yield (measured at level 2) • Estimated straw yield (approximately equivalent to grain yield) • Estimated straw and grain N content (according to table)	• Farmer records • Farmer recall survey	Farmer Farmer group Fertilizer retailer Service provider
Advanced	Partial factor productivity of N: kg grain yield/ kg N input (from fertilizers & soil) and N output/input ratio: kg N removed from field/ kg N added to field (organic + inorganic +soil supplied N)	• kg grain/ kg N • unitless ratio	Same as level 2 except: • Analysis of N content for any organic material applied at >1 t/ha • Grain yield measured at level 3 • Estimate or measurement of straw removed from field • Estimate of soil-supplied N	• Standard laboratory method (refer to a list of methods for different types of samples) • (see Indicator #3) • Weight of straw removed (preferred) or estimate from height of harvest • Nutrient omission plot trials (preferred) OR soil analysis: total organic carbon & % clay content	Service Provider Research and Development Expert (Scientist)

Indicator: Nitrogen-use efficiency

The nutrient use efficiency is defined as the recovered gain yield per unit of nitrogen input. An increase over time would be considered desirable. The partial nutrient balance measures the output/input ratio of nitrogen. A value >1 means that the soil is being mined of its N content. A value <1 indicates inefficient use of N and possible release of excess N into the environment.

Rationale: 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, transportation and use of N-containing fertilizers. Organic and synthetic sources of N are both included.

Measurement details:
Basic: Provides a rough estimate in local units for the N fertilizer use efficiency as the amount of grain produced divided by the amount of N-containing fertilizer used. The focus for farmer learning and self-improvement in nitrogen management is awareness of the amount and timing of fertilizer application and how this affects grain yield. It is important for the farmer to keep a record of what types of nutrients were added to the field and when they were added, and to be aware of the presence of N in organic inputs, such as manure or straw, even though it may not be labeled. The farmer-reported dates of application are used to check the appropriateness of the timing of application relative to the stage of the rice crop. If it is feasible to delay the addition of some N until one to two months after crop establishment, that will improve fertilizer-use efficiency.

Intermediate: Provides two robust assessments of N-use efficiency, one as a unitless ratio of N uptake/ N input, and one as partial factor productivity of N as the amount of grain produced (in kg) per unit of N applied (in kg). Requires an accurate record of the total amount of elemental N that is applied to a field, and requires an accurate yield estimation (see level 2 of Indicator #3). Records are kept of the total amount in kilograms of each type of fertilizer or soil conditioner applied to each rice field either prior to planting or during the season and the date of application. 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). The amount of elemental N applied to the field is calculated from the amount of fertilizer multiplied by the N content (% elemental N) of the fertilizer. For packaged fertilizers, the amount of N is usually included on the label. For various types of organic materials no computation is needed, the amount of N can be estimated according to the table below.

SOURCES OF N	PERCENTAGE OF ELEMENTAL N (%)
Rice straw	0.65
Cattle manure	0.5
Poultry manure	1.5
Pig manure	0.85
Compost (mostly cattle manure)	1.5
Compost (mostly poultry manure)	0.3
Compost (mostly kitchen scraps)	0.6

From Dobermann and Fairhurst, 2000

For the output/input ratio, the output is considered the amount of N taken up by the rice plant (both straw and grain, but not roots), and is calculated by multiplying the grain yield by 1.1 (the average N content of rice grain), estimating the straw production by assuming it to be approximately equivalent by weight to the harvested grain and then multiplying the amount of straw by 0.65 (the average N content of rice straw) and adding it to the N in the grain. The input is considered the amount of N added to the field by the farmer as described above.

N output = (grain yield * 1.1) + (straw * 0.65)
N input = (fertilizer-1 * N content) + (fertilizer-2 * N content) + (fertilizer-3 * N content) + etc.

The reported dates of N application are used to check the appropriateness of the timing of application relative to the stage of the rice crop.

Advanced: Provides an accurate measurement of the total amount of N being added to a field, an estimate of the N supplied by the soil, and an accurate measurement of the amount of N removed from the field in grain and straw. This indicator requires accurate grain yield measurement (see level 3 for Indicator #3) and an estimate of straw biomass removed from the field, either through the weighing of a sub-sample of post-threshing straw harvest from a known field area or through estimation of straw removal based on height of stubble remaining in field. Actual N content of any organic input > 1 t/ha must be measured in a laboratory and labeled N content of fertilizers must be verified.

The preferred method for estimating soil-supplied N is through the use of a N-omission plot in the field, in which the grain yield is measured in a small area of the field which has not received any N fertilizer, and this is compared with the grain yield of a fully-fertilized area of the field. The difference in the amount of N between these two plots is considered to be equivalent to the N supplied by the soil. If N-omission plot data is not available, soil tests for organic carbon content and clay content may be used to estimate the soil-N supplying capacity.

6. Performance Indicator: Nutrient use efficiency: P

Data Level	Indicator Description	Units	Data to be collected	Measurement Methods	Responsible Stakeholders
Basic	P fertilizer productivity amount of grain produced/ unit fertilizer added	• local units for grain yield and fertilizer amount	• No. of times P-containing fertilizer was applied • Amount of fertilizer applied • Type of fertilizer applied (synthetic or organic) • Amount of grain harvested	• Farmer records • Farmer recall survey	• Farmer • Farmer group
Intermediate	Partial factor productivity of P input and P output/input ratio	• kg grain yield/kg P input and • kg P output/kg P input (unitless ratio)	• Dates of P fertilizer application • Amount of fertilizer applied (kg) • Type of fertilizer applied (with labeled P analysis or estimated P content according to table) • Grain yield (level 2) • Estimated straw yield (approximately equivalent to grain yield) • Estimated straw and grain P content (according to table)	• Farmer records • Farmer recall survey	• Farmer • Farmer group • Fertilizer retailer • Service provider

Advanced	Partial factor productivity of P kg grain yield/kg P input (from fertilizers & soil) and P output/input ratio kg P removed from field/ kg P added to field	kg grain/ kg P unitless ratio	Same as level 2 except: • Analysis of P content for any organic material at > 1 t/ha • Grain yield measured at level 3 • Estimate or measurement of straw removed from field • Estimate of soil-supplied P	• Standard laboratory method (refer to a list of methods for different types of samples) • (see Indicator #3) • Weight of straw removed (preferred) or estimate from height of harvest • Nutrient omission plot trials (preferred) OR soil analysis: P availability extraction (Olsen, Bray, or Mehlich)

Indicator: Phosphorus-use efficiency

Phosphorus use efficiency is defined as the recovered grain yield per unit of phosphorus input. An increase over time would be considered desirable. The partial nutrient balance measures the output/input ratio of phosphorus. A value >1 means that the soil is being mined of its P content. A value <1 indicates inefficient use of P.

Rationale: 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, transportation, and use of P-containing fertilizers. Organic, mineral, and synthetic sources of P are all included.

Measurement details:
Basic: Provides a rough estimate in local units for the P fertilizer use efficiency as the amount of grain produced divided by the amount of P-containing fertilizer used. The focus for farmer learning and self-improvement in phosphorus management is awareness of the amount and timing of fertilizer application and how this affects grain yield. It is important for the farmer to keep a record of what types of nutrients were added to the field and when they were added, and to be aware of the presence of P in organic inputs, such as manure or straw, even though it may not be labeled. The farmer-reported dates of application are used to check the appropriateness of the timing of application relative to the stage of the rice crop. P-containing fertilizers may be applied at any time during the season and are usually applied just before or after crop establishment.

Intermediate: Provides two robust assessments of P-use efficiency, one as a unitless ratio of P uptake/ P input, and one as partial factor productivity of P as the amount of grain produced (in kg) per unit of P applied (in kg). Requires an accurate record of the total amount of elemental P that is applied to a field, and requires an accurate yield estimation (see level 2 of Indicator #3). Records are kept of the total amount in kilograms of each type of fertilizer or soil conditioner applied to each rice field either prior to planting or during the season and the date of application. 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 P that are not readily controlled by the farmer are excluded (e.g. indigenous soil P supply and P contributed through decomposition of roots from previous seasons).

The amount of elemental P applied to the field is calculated from the amount of fertilizer multiplied by the P content (% elemental P) of the fertilizer. For packaged fertilizers, the amount of P is usually included on the label as % P_2O_5, which can be converted to elemental P (see example below). For various types of organic materials, the amount of P can be estimated according to the table below.

Example of elemental P calculation from a P_2O_5-labeled fertilizer:

Fertilizer label: 14 % P_2O_5 (which is 44% elemental P)
Amount fertilizer used: 60 kg
Amount of elemental P in fertilizer = 60 * 0.14 * 0.44 = 3.7 kg elemental P

SOURCES OF P	PERCENTAGE OF ELEMENTAL P (%)
Rice straw	0.1
Cattle manure	0.15
Poultry manure	0.65
Pig manure	0.25
Compost (mostly cattle manure)	1.2
Compost (mostly kitchen scraps)	0.2
Compost (mostly rice straw)	0.1

From Dobermann and Fairhurst, 2000

For the output/input ratio, the output is considered the amount of P taken up by the rice plant (both straw and grain, but not roots), and is calculated by multiplying the grain yield by 0.2 (the average P content of rice grain), estimating the straw production by assuming it to be approximately equivalent by weight to the harvested grain and then multiplying the amount of straw by 0.1 (the average P content of rice straw) and adding it to the P in the grain. The input is considered the amount of P added to the field by the farmer as described above.

P output = (grain yield * 0.2) + (straw yield * 0.1)
P input = (fertilizer-1 * P content) + (fertilizer-2 * P content) + (fertilizer-3 * P content) + etc.

Advanced: Provides an accurate measurement of the total amount of P being added to a field, an estimate of the P supplied by the soil, and an accurate measurement of the amount of P removed from the field in grain and straw. This indicator requires accurate grain yield measurement (see level 3 for Indicator #3) and an estimate of straw biomass removed from the field, either through the weighing of a sub-sample of post-threshing straw harvested from a known field area or through estimation of straw removal based on height of stubble remaining in field. Actual P content of any organic input > 1 t/ha must be measured in a laboratory and labeled P content of fertilizers must be verified by laboratory analysis.

The preferred method for estimating soil-supplied P is through the use of a P-omission plot in the field, in which the grain yield is measured in a small area of the field which has not received any P fertilizer, and this is compared with the grain yield of a fully-fertilized area of the field. The difference in the amount of P uptake between these two plots is considered to be equivalent to the P supplied by the soil. If P-omission plot data is not available, soil extractions for plant-available P may be used (e.g. Olsen, Bray, or Mehlich).

7. Performance Indicator: Biodiversity

Data Level	Indicator Description	Units	Data to be collected	Measurement Methods	Responsible Stakeholders
Basic	• Pest and beneficial organism sighting • Pesticide use • Cases of land conversion due to rice farming since 2009	• Checklist • No. of sprays/ season • No. of land conversion	• Checklist for PI 7 • Number of times pesticide was used • Total number of land converted to rice farming since 2009 (ha)	• Farmer recall survey	• Farmers • Farmer groups
Intermediate	• Pest damage rating • Pesticide use	• Score • Number of individual product applications/ season	• Pest damage data • Number of times any pesticide was used, differentiating between synthetic vs. biopesticides	• Savary and Castilla (2010) • Transect field walk	• Farmer groups • Extension workers • Service providers
Advanced	• Area of natural habitat conversion since 2009 • Enhancement of edge habitat • Abundance of protected or conservation target species • Abundance of biodiversity indicator species	• % of landscape • % of arable land • Number of individuals per 100 ha of landscape	• Total area of landscape (ha) • Area converted to rice farming since 2009 (ha) • Abundance of species on the country-specific checklist for PI 7	• Mapping from satellite images • Farmer or farmer group survey • Transect field survey • Spot counts	• Service Providers • Research and Development Experts (Scientist)

Indicator: Biodiversity

This indicator measures changes in biodiversity value of areas under rice cultivation and tracks the usage of pesticides and biocontrol agents. The indicator acknowledges that rice cultivation can, if managed appropriately, actually enhance the value of farmland for biodiversity. It focuses on understanding the impacts of rice cultivation techniques on the abundance of pests and beneficial organisms, and also threatened species that use rice-fields. For number of synthetic pesticides used per season, a value of <4 is considered desirable. For the checklist and scorecard, specific score interpretation can be found in the tools.

Rationale: The main assumption of this indicator is that improved crop management practices lead to improvements in biodiversity,which in turn lead to a favorable tilting of the ecological balance between pests and beneficial organisms. Improved crop management practices should not lead to increased loss of natural habitats, especially in protected areas or proposed protected areas, or areas that have been identified through objective processes to be of high importance for biodiversity (such as Key Biodiversity Areas). Such habitats are frequently protected under law, and their degradation or destruction is illegal. Greenhouse gasses are released if these habitats are destroyed, whilst this is especially true of forests, below-ground carbon in wetland habitats can also be substantial, and this carbon is released when they are ploughed. Natural habitats can also support populations of species that are beneficial to the farmer and reduce the need for farmers to use chemical or lethal control of pests, and they also possess other ecological, aesthetic or intrinsic values.

The Indicator monitors both the impacts of rice cultivation on wildlife, and the impacts of wildlife on rice cultivation. Populations of pests are monitored to test the assumption that pest management practices under the SRP Standards are effective. The populations of beneficial species are monitored to test the assumption that through improved crop management practices, the populations of beneficial species increase and can lead to incremental improvements in pest control.

The Indicator assumes that growing rice sustainably does not lead to declines in species of conservation concern, or degradation of the environment. In doing so it places rice cultivation within the context of a thriving and productive ecosystem that is beneficial to people and biodiversity alike. It articulates a broad vision for sustainable rice cultivation and the benefits that it can deliver.

Measurement details:

Basic: Provides a self-assessment checklist for presence of pests and management of pesticides. The focus for farmer learning is an awareness of pest presence, of the role of beneficial organisms, and of the link with pesticide use. The checklist for PI 7, Section A, provides example photos to help farmers identify the presence of key organisms. The farmer estimates pesticide usage by recording the number of times pesticides were applied, without needing to record amounts and active ingredients. Cases of land conversion are identified through recall by farmers.

Intermediate: Provides a pest damage assessment and a more precise record of pest control products applied during the season (including details about method of application, active ingredient, amount).

Farm records should be kept in a Farm Diary on the following topics:

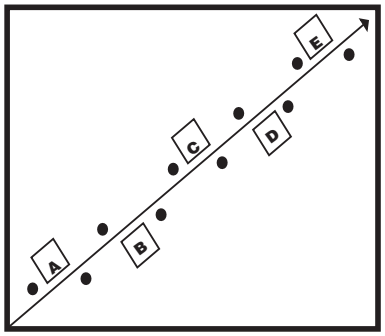
- The trade name and active ingredient of the pesticide
- Total amount of pesticides applied to each rice crop cycle season in kilogram or liter of pesticide applied.
- For multiple applications of the same pesticide, the farmer should record each separate application.
- All active ingredient applications are added throughout the season, so that if two active ingredients are applied in one product, it is counted as 2.

The crop status is determined by examining the entire field and scoring it according to the following table:

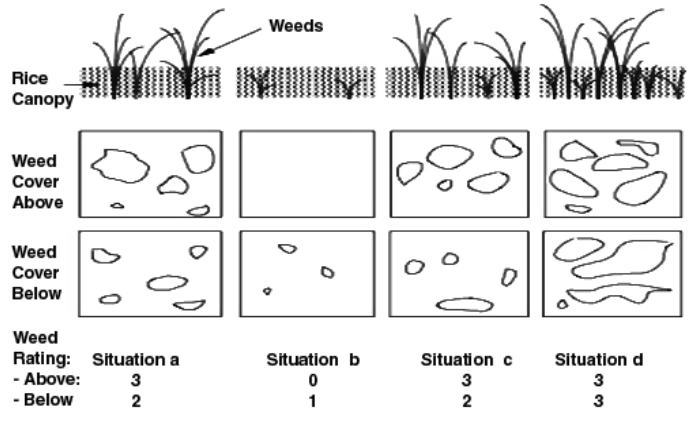
Overall crop canopy structure (A)		Folinge color (B)		Crop Density (C)		Overall crop assessment and rating (A+B+C)	
Description	Point Mark	Description	Point Mark	Description	Point Mark	Category	Total
Regular height, very homogeneous	5	Homogeneous dark green	5	Full crop closure	5	Very good	15
A few irregularities in height and/ or off-types	4					Good	12-14
Fairly regular, some irregularities in height and/or off-types	3	Green homogeneous	3	Some gaps (less than 1% of ground cover)	3	Average	8-11
Not regular, irregular crop height and/or many off-types	2	Irregular color, or overall pale/yellowing color	2	Gaps (more than 1% but less than 5% of ground cover)	2	Poor	6-7
Very irregular crop height and/or many off-types, or overall stunted growth	1	Pale or yellowish, or large fraction of plants discolored	1	Many gaps (over 5% of ground cover)	1	Very poor	3-5

Four broad categories of injury caused by animal pests are covered: these are injuries affecting tillers, panicles, leaves, and systemic injuries. Injury to tillers reduces the number of potentially or actually fertile tillers, and include deadhearts (caused by stemborers), silvershoot (caused by gall midge), and panicle mite injury on the leaf sheath. For each hill or quadrat, the number of injured tillers is entered in the recording form. Injury to panicles is caused by sucking or grain-damaging insects, and is represented by rice bug or stink bug injury, panicle mite injury on the panicles and whitehead (caused by stemborers). For each injury, the number of injured panicles is entered in the recording form. Although panicle mites feed on both leaf sheaths and panicles, the number of tillers with injured sheath or grains is counted per hill or quadrat. Leaf injury is caused by insects such as leaf folder, leaf miner, rice hispa and whorl maggot. For this category, the number of injured leaves in each sample hill or quadrat is recorded. Injuries caused by other defoliators, such cutworm, green hairy caterpillar, caseworm, and rice semilooper are entered in the "other" category. The fourth category is systemic injury, such as hopperburn (caused by brown planthopper and white-backed planthopper) and bugburn (caused by rice black bug). In contrast to injuries belonging to the other categories, systemic injuries affect the entire plant and cannot therefore be assessed accurately by counting affected leaves, tillers or panicles. To assess systemic injury caused by insect pests, five areas (A, B, C, D, E), each measuring 1m x 1m, should be sampled as shown in the figure below. The percentage of each area affected by an injury, disease, or weed coverage is rated based on the following five-point rating scale (0 to 4):

0 : No injury or no weed
1 : Severity or weed cover below 10 % (low)
2 : Severity or weed cover from 10 % to 30 % (moderate)
3 : Severity or weed cover from 30 % to 60 % (high)
4 : Severity or weed cover above 60 % (very high)



Crop growth and crop health assessments in the a farmer's field are done by passing through the field. The diagonal line represents the recommended path across the field. Circles represent the 10 hills (or 10 cm x 10 cm quadrats for direct-seeded rice). Assessments of weeds and systemic diseases and injuries caused by animal pests are done by selecting five areas, each measuring 1m x 1m. The squares marked A, B, C, D and E represent the five areas and the circles represent the 10 hills or quadrats.



An illustration of the procedure for rating weed cover. For each situation, the topmost figure represents the side view of a sampling area with weeds above and below the rice canopy (represented by shaded area). Frames below each figure represent the corresponding top view of the sampling area and irregular shapes within each frame represent weed cover above and below the rice canopy. Values for each situation refer to the scale that corresponds to the percent weed cover.

Advanced: Provides a landscape-level assessment conducted by service providers, researchers and/or development experts (scientists). One of the indicators is valuable ecosystem land area (such as natural habitat) converted to rice since 2009. The corresponding data to be collected is the previously natural habitat area (ha) converted to rice farming since 2009 as well as the total area of landscape (ha). The applied unit is % (converted area out of total landscape). The suggested measurement method is mapping from satellite images.

Another indicator is the % of arable land area reserved for enhancing habitats (i.e. not cropped or built on). Farmer or farmer group surveys can be used as measurement methods.

Changes over time in the abundance of biodiversity, including key indicator species, protected or conservation target species are a further indicator. The data unit is number of individuals per 100ha of landscape. Transect

field surveys and spot counts are suggested measurement methods.
There is no example yet of an advanced level country-specific Biodiversity Checklist. Country or regional biodiversity checklists should be identified or developed, due to the unique diversity and ecosystems in different regions.
Field testing in 2019 of this advanced level of data collection is expected to provide further details. An example of an advanced level country-specific Biodiversity Checklist is expected to become available in the course of 2019.

Data Level	Indicator Description	Units	Data to be collected	Measurement Methods	Responsible Stakeholders
Basic	• Greenhouse gas awareness	• Number of days of growth duration • Number of relevant entries in farm-diary	• Growth duration • Presence of bubbles	Farm-diary record	Farmer
Intermediate	• Methane emission • Nitrous oxide emission	• Mg CO2 equivalents/ha and • Mg CO2 equivalents/kg rice	• Number of days of flooding prior to crop establishment • Number of days of crop growth • Total amount and type of organic material incorporated into the soil • Number of drying events • Total N input	• Farm diary record • IPCC equations using global default emission values	Farmer Farmer group Service provider
Advanced	• Methane emission • Nitrous oxide emission	• Mg CO2 equivalents/ha and • Mg CO2 equivalents/kg rice	Same as level 2 plus: • Water level monitoring on farmer fields • Emission measurements on reference fields	• Farm diary record • Emission measurements • IPCC equation using emission values that are more specific than the global default	• Service Provider • Research and Development Expert (Scientist)

Indicator: Greenhouse gas emissions
This indicator assess the amount of methane and nitrous oxide (level 3 only) emitted per unit of land area, expressed in units of CO2 equivalence, using the 100-year global warming potential weighting for the different gases. A decrease is considered to be desirable.
Rationale: The assumption is that reduced methane emissions from rice fields during crop growth decrease the contribution of rice cultivation to climate change.

Measurement details:

Basic: The focus for farmer learning is awareness that flooded rice fields are sources of greenhouse gas emission, and that one way to decrease emission is to decrease the amount of time a field is flooded. This could be accomplished by growing a shorter-duration rice variety or by using some dry periods during the season. The farmer keeps record of how many days the rice is in the field and of whether or not there are bubbles coming up through the floodwater.

Intermediate: Provides an estimate of methane and nitrous oxide emitted from the field before and during the growing season. The focus for farmer learning is awareness that decomposition of organic materials in flooded conditions makes methane emission much worse. Calculation is from an IPCC-approved methodology [IPCC, 2016] based upon the following farm-diary data:

1. Number of days of flooding prior to crop establishment
2. Number of days of crop growth (starting at transplanting for a transplanted crop).
3. Total amount, in kilograms, and type of organic material incorporated into the soil (i.e. straw, manure or compost)
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)
5. Total N input (see PI 5 Intermediate for explanation of how to measure it)

Advanced: Provides a more accurate estimate of greenhouse gases (methane and nitrous oxide) emitted from the field before and during the growing season. As at the intermediate level, calculation is from the IPCC-approved methodology above, but with use of country- or system-specific emission values rather than the global default. These comparisons(before and after crop cycle) can therefore be made with either IPCC default standards or country-specific baselines or factors if stated in the country's National Communication. These calculations are based on the same farm-diary data as the intermediate level, plus:

6. Water depth before and during the growing season (see PI 4 Intermediate for explanation of how to measure it)
7. Methane and nitrous oxide emission measurements on reference fields (not every farmer’s field).

9. Performance Indicator: Food Safety

Data Level	Indicator Description	Units	Data to be collected	Measurement Methods	Responsible Stakeholders
Basic	• Food safety risk assessment	• Scorecard 9.1	• Checklist in scorecard 9.1, but only questions 1 to 5	• Self-assessment with Checklist D for PI No. 9 in Annex 1	Farmer Farmer group
Intermediate	• Food safety risk assessment with samples submitted for any identified risks	• Scorecard 9.1	• Checklist in scorecard 9.1, all questions • Submission of a grain sample if risks are identified	• Completion of scorecard for PI no. 9 • Submission of grain sample to a laboratory for analysis (arsenic, cadmium, mercury, mycotoxin, pesticide residues)	Farmer group Service provider
Advanced	• Same as Intermediate level	• Same as Intermediate level	• Checklists in scorecard for PI no. 9 • Laboratory results of grain sample analysis • Evidence of corrective action if necessary based on laboratory results	• Completion of scorecard for PI no. 9 • Service laboratory uses a certified method of analysis • Consultation with a remediation expert	Service Laboratory Service provider Research and development expert

Indicator: Food safety
The indicator assesses food safety risks for rice production (heavy metals, pesticide residues and mycotoxins).
Unit: The measurement unit is a 0-50 score based upon answers to multiple choice questions which describe practices related to food safety.An increase over time would be considered positive.

Rationale: 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:

Basic: Provides food safety risk assessment (Scorecard section 9.1). The focus for farmer learning is awareness of food safety risks. The farmer is asked to complete the first five questions in the Scorecard for PI no. 9 in Annex 1.

Intermediate: Provides food safety risk assessment and dietary diversity assessment. The focus for farmer and farmer group learning is awareness of food safety risks, as well as action on any risks that have been identified. The farmer is asked to complete all questions and calculate a score for Scorecard for PI no. 9 in Annex 1.

- If any items in the checklist for 9.1a have been answered "yes", it is necessary to test at least once for heavy metals (arsenic, cadmium, mercury, chromium and lead). 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.
- If any items in the checklist for 9.1b have been answered "yes", it is necessary to test for mycotoxins. Mycotoxin tests need to be repeated every season in which a risk factor is present. 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 a national government within the last 5 years, or if any items in the checklist for 9.1c have been answered "yes".

Grain sample collection: If a mill has traceability to the farm level, the miller or extension worker can collect the samples at the mill after milling. Since most mills do not have traceability to the farm level, samples of paddy may be collected at the farm and sent to the laboratory for milling immediately prior to analysis. In both cases, sub-samples should be taken from three or more parts of the batch and mixed together to form a composite sample of at least 100 g, with records kept of the size of the batch from which the sample was taken (in kg).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.

Advanced: Provides evidence of action taken on any food safety risks identified using the checklist, and assess household food insecurity experience in addition to providing a quantitative measurement of dietary diversity. Grain samples should be analyzed if risks are identified, as described for the Intermediate level. Laboratory analysis results should be provided as evidence for corrective action to address a food safety concern (grain samples should be analyzed before and after the corrective action is implemented).

Data Level	Indicator Description	Units	Data to be collected	Measurement Methods	Responsible Stakeholders
Basic	• Health & safety awareness	• Number of Score from scorecard E for PI No. 10	• Scorecard used for self-assessment	• Self-assessment based on scorecard E for PI No. 10 in Annex 1	• Farmer • Farmer group
Intermediate	• Health & safety assessment	• Number of score from scorecard E for PI No. 10	• Scorecard with score reported	• Group assessment, assessment with scorecard E for PI No. 10 in Annex 1, focusing on use of personal protective equipment during pesticide use	• Farmer group • Service provider
Advanced	• Health & safety assessment • Accident rate	• Number of score from scorecard E for PI No. 10 • No. of serious accidents per day of labor	• Scorecard with score reported • Record of serious accidents • Total labor for season (person x days)	• Group assessment assessment with scorecard E for PI No. 10 in Annex 1 • Farm-diary records	• Service provider • Research and development specialist

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: 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 E for PI No. 10 is provided in Annex 1.

Basic: The focus for farmer learning is on self-awareness of safety topics. The scorecard is used as a self-assessment tool.

Intermediate: The scorecard is used as a group assessment tool. Scores are reported and examined over time. Training is provided on safety topics that have low scores.

Advanced: Same as Intermediate level, with the additional record-keeping of number of serious accidents per unit labor (person-day). A serious accident is defined as one which requires treatment by a medical professional.

Data Level	Indicator Description	Units	Data to be collected	Measurement Methods	Responsible Stakeholders
Basic	• Youth engagement awareness	Scorecard for PI 11	• Scorecard used for self-assessment	• Self-assessment	• Farmer • Farmer group
Intermediate	• Youth engagement assessment	Scorecard for PI 11	• Scorecard with score reported	• Group assessment, focusing on child labor	• Farmer group • Service provider
Advanced	• Youth engagement assessment	Scorecard for PI 11	• Scorecard with score reported • Record of youth-inclusive activities	• Group assessment • Farm-diary records	• Service provider • Research and development specialist

Indicator: Child Labor & Youth Inclusion

This indicator measures the incidence of child labor, respect for children's right to education, and efforts to make farming activities attractive to people aged 15 to 30. Further definition of youth might be needed according to national context.

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 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 attending school throughout the school year
4. Youth access to agricultural knowledge
5. Youth access to modern agricultural technologies
6. Youth access to capital
7. Youth access to agribusiness training

The scorecard can be found in Annex 1.

Basic: TThe focus for farmer learning is to build awareness of youth engagement topics. The scorecard F for PI No. 11 in Annex 1 is used as a self-assessment tool. For details on conducting self-assessments, please refer to the SRP Assurance Scheme.

Intermediate: The scorecard F for PI No. 11 in Annex 1 is used as a group assessment tool. Scores are reported and examined over time. Training is provided on youth engagement topics that have low scores. The scores can be triangulated by observations and records, e.g. school enrolment.

Advanced: Same as Intermediate level following scorecard F for PI No. 11 in Annex 1 with the potential of evaluation at the value chain level. Details on the evaluation at the value chain level were still under development at the time of launching PI v. 2.0 and are expected for future revisions of the SRP PI document.

Data Level	Indicator Description	Units	Data to be collected	Measurement Methods	Responsible Stakeholders
Basic	Women empowerment awareness	Number of Score from scorecard G for PI No. 12 in Annex 1	• Score from scorecard used for self-assessment	• Self-assessment based on Scorecard G for PI No. 12 in Annex 1	Farmer Farmer group
Intermediate	Women empowerment assessment	Number of Score from scorecard G for PI No. 12 in Annex 1	• Score from scorecard used for self-assessment	• Group assessment based on Scorecard G for PI No. 12 in Annex 1	Farmer group Service provider
Advanced	Women empowerment assessment	Number of Score from scorecard G for PI No. 12 in Annex 1	• Score from scorecard used for self-assessment • Record of women-inclusive activities	• Group assessment based on Scorecard G for PI No. 12 in Annex 1 • Farm-diary records	Service provider Research and development specialist

Indicator: Women's empowerment
The indicator measures women's power to make decisions relevant to their well-being.
Unit: The measurement unit is a 0-210 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 desirable.
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 G for PI No. 12 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).

Basic: The focus for farmer learning is on self-awareness of women empowerment topics. The scorecard is used as a self-assessment tool.

Intermediate: The scorecard is used as a group assessment tool. Scores are reported and examined over time. Training is provided on women empowerment topics that have low scores. The scores can be triangulated by observations and records, e.g. participation in trainings.

Advanced: Same as Intermediate level, with evaluation at the value chain level [needs more explanation]

D. References

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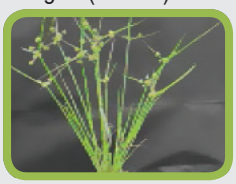
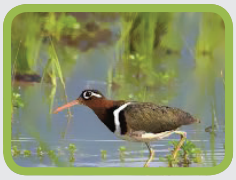
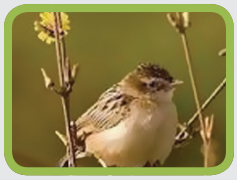
Annex 1: Scorecards and checklists

A. PI No. 4: Incoming water quality assessment checklist

NO.	ITEM	YES	NO	UNKNOWN
1	Has your irrigation source ever had high salinity levels?			
2	Is your land located within 3 km of a body of salt water?			
3	Has your land received direct saltwater intrusion within the past 5 years (e.g. flood, typhoon waves, tsunami, etc.)?			
4	Does your land experience tide-related changes in water table?			
5	Does your water table depth change by more than 10 cm between seasons?			
6	Have there been any government or community warnings in your area about soil or water salinization?			
7	Does your irrigation source get depleted towards the end of the dry season?			
Scoring & follow- up actions	Column totals			
	If you checked "yes" to any item in this checklist, it is recommended that you have your irrigation water tested for salinity. If there is a salinity problem (if the water test shows electrical conductivity (EC) > 4 mmhos/cm), please consult an expert to discuss options for improving the situation.			

Sightings of key pests and beneficial organisms: Have you seen any of the following organisms on your farm any time during this cropping season?				
NO.	ITEM	YES	NO	UNKNOWN
1	Golden apple snails or their eggs (pest, invasive species)  			
2	Plant hoppers (pest) 			
3	Stem borers (pest)  			
4	Army worms (pest) 			

Sightings of key pests and beneficial organisms: Have you seen any of the following organisms on your farm any time during this cropping season?				
NO.	ITEM	YES	NO	UNKNOWN
5	Rodent pests (rats and mice) 			
6	Water hyacinth (weed, invasive species) 			
7	Sedges (weeds)  			
8	Broadleaf plants (weeds)  			
9	Dragonflies (beneficial) 			
10	Lady beetles (beneficial) 			
11	Spiders or spider webs (beneficial) 			
12	Frogs or tadpoles (beneficial) 			

Sightings of key pests and beneficial organisms: Have you seen any of the following organisms on your farm any time during this cropping season?				
NO.	ITEM	YES	NO	UNKNOWN
13	Water birds and small bird species (beneficial)   			
14	Bats (beneficial) 			
15	Fish (beneficial) 			
Scoring & follow- up actions	Column totals for pests (items 1-8) Column totals for beneficial organisms (items 9-15)			
	If you checked “yes” for any pests, talk with an extensionist to determine severity and discuss environmentally-friendly options for controlling the pest. If you checked “no” to any of the beneficial organisms, talk with an extensionist about options for improving habitat. If you checked “no” for most pests and “yes” for most beneficials, then your farm shows healthy biodiversity--congratulations!			

B. PI No. 7 Basic: Biodiversity checklist

Crop growth stage:											Crop status:
Section A. Total numbers											
Hill no.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	Average
No. of tillers per hill (or per 10 x 10 cm2 area if direct seeded)											
No. of panicles per hill											
No. of leaves per hill											
Section B. Damage by animal pests											
No. of tillers with rat damage											
No. of panicles with bird injury											
No. of panicles with deadheart											
No. of panicles with panicle mite injury											
No. of panicles with rice bug injury											
No. of panicles with silvershoot											
No. of panicles with whitehead											
No. of leaves with leaffolder injury											
No. of leaves with leaf miner injury											
No. of leaves with rice hispa injury											
No. of leaves with whorl maggot injury											
Section C. Damage from disease											
No. of leaves infected with bacterial leaf blight											
No. of leaves infected with bacterial leaf streak											
No. of leaves infected with bakanae											
No. of leaves infected with brown spot											
No. of leaves infected with leaf blast											
No. of leaves infected with leaf scald											
No. of leaves infected with narrow brown spot											
No. of leaves infected with red stripe											
No. of panicles infected with dirty panicle											
No. of panicles infected with false smut											
No. of panicles infected with neck blast											
No. of panicles infected with sheath blight											
No. of panicles infected with sheath rot											
No. of panicles infected with other disease (specify)											

Crop growth stage:						Crop status:
Area (1m x 1m) designation	**A**	**B**	**C**	**D**	**E**	Average
Severity of injury from bugburn (0 to 4)						
Severity of injury from hopperburn (0 to 4)						
Severity of injury from grassy stunt (0 to 4)						
Severity of injury from orange leaf syndrome (0 to 4)						
Severity of injury from ragged stunt (0 to 4)						
Severity of injury from tungro (0 to 4)						
Severity of injury from SRBSDV (0 to 4)						
Severity of injury from yellowing syndrome (0 to 4)						
Weed rating above canopy (0 to 4)						
Weed rating below rice canopy (0 to 4)						
Main weed type (B = broadleaf, G = grass, S = sedge)						

D. PI No. 9: Food Safety

No	Indicator	Corresponding requirement	Checklist (Y=yes; N=no; U=unknown)	Level(s) of performance	Score
1	Food safety risk assessment	1a. If farmland is near a known potential source of contamination, these risks are identified using the checklist.	Has the rice-growing land ever been used for: 1. Sewage sludge application? Y N U 2. Industrial, electronic, battery, or hospital waste disposal? Y N U 3. Mining (large or small-scale)? Y N U 4. Is it downstream from an active or former mine, water treatment facility, livestock production facility (including poultry), or fisheries operation? Y N U 5. Is it adjacent to a busy road (like a highway or expressway)? Y N U 6. Has any cadmium-containing fungicide ever been used on it? Y N U 7. Has any arsenic-containing pesticide ever been used on it? Y N U 8. Has any mercury-containing fungicide ever been used on it? Y N U 9. Have there been any reports of groundwater or surface water contamination or has your irrigation source ever had test results outside the normal range for any contaminant? Y N U	All 9 check items have “no” answers At least 5 items have “no” answers and up to 4 items have “unknown” answers More than 5 items have “unknown” answers	10 5 0
		1b. If there are any potential mycotoxin contamination sources, these risks are identified using the checklist.	1. Was there any visible mold or dirt on the harvest equipment or storage containers? Y N U 2. At 24 hours after harvest, was the moisture content of the grain higher than 15% Y N U 3. Was there any visible mold or mildew on the stored grain (either paddy or milled)? Y N U 4. Has any pesticide been used on the stored grain	All 4 checklist items have “no” answers At least 2 items have “no” answers and up to 2 items have “unknown” answers. More than 2 items have “unknown” answers.	10 5 0
		1c. If there are potential pesticide residue risks, they are identified using the checklist.	1. Was any pesticide applied less than 3 weeks prior to harvest? Y N U 2. Has any pesticide been used on the stored grain? Y N U	Both checklist items have “no” answers. One checklist item has a “no” answer. Both checklist items have “unknown” answers	10 5 0

No	Indicator	Corresponding requirement	Checklist (Y=yes; N=no; U=unknown)	Level(s) of performance	Score
		1d. Appropriate investigative action is taken on any food safety risks that have been identified in 1a - 1c		There are no known potential contamination sources at this rice-growing site ("no" answers to all of the questions in Checklist 9 Section A).	10
				There is a known soil risk (a "yes" answer) and soil and grain samples have been sent for analysis to determine risk level.	10
				There is the potential for an unknown risk, and a grain sample has been submitted for analysis.	10
				There has been no sample submitted for analysis after identification of a "yes" or "unknown" risk in Checklist 9 Section A.	0
		1e. Appropriate action taken on any food safety risks that have been confirmed through laboratory analysis.		There are no known potential food safety risks for this site ("no" answers to all of the conditions in Checklist 9 Section A).	10
				Soil and/or grain samples were submitted in response to known or unknown risks, and laboratory analyses have confirmed that soil and/or grain samples are safe.	10
				Soil and/or grain samples were submitted in response to known or unknown risks, and the laboratory analysis results have not yet been received.	5
				Laboratory analysis has confirmed a risk of contamination from soil, and appropriate remediation measures have been taken.	5
				Laboratory analysis has confirmed a risk of contamination from soil, and no remediation measures have been taken.	0
				Total Score (0 to 50)	

E. PI No. 11: Health and Safety

No	Indicator	Corresponding requirement	Level(s) of performance	Score
1	Incidence of work-related accidents	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. Examples of accidents that could result in injuries or ill health include but are not limited to: • Fires, explosions, emissions, spills, accidents with vehicles or machinery, collapses, cuts, accidents during pesticide use Examples of injuries or ill health include but are not limited to: • Fractures, cuts, infections, burns, respiratory and other diseases related to pesticide use, snake bites, leptospirosis We distinguish a minor and major degree of severity of injuries or ill health: • 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 b) No major work related injuries or ill health, but minor cases in a lower frequency compared to the last crop cycle c) Any major work related injuries or minor cases in an equal or higher frequency compared to the last crop cycle	10 5 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. b) Workers, including working household members, receive regular safety instruction and first aid supplies are available on-farm. c) Workers, including working household members, receive regular safety instruction, but no first aid supplies are available on-farm. d) There is no safety instruction and there are no first aid supplies available on- farm.	10 10 5 0

3	Calibration	Tools and equipment for farm operations (e.g. seeders, sprayers, etc.) and post-harvest processed are frequently maintained and calibrated.	a) Calibration and maintenance within current crop cycle. b) Calibration and maintenance within the past 2 years. c) No calibration and maintenance within the past 2 years.	10 5 0
4	Training pesticide applicators	Pesticide applicators receive training on handling and use of pesticides. Untrained people do not apply pesticides.	a) There is no use of pesticides. b) Pesticide applicators participated in a training session in the past 3 years. c) Pesticide applicators participated in a training session in the past 5 years. d) Pesticide applicators did not participate in a training session in the past 5 years.	10 10 5 0
5	Personal Protective Equipment (PPE)	Pesticide applicators use good quality Personal Protective Equipment (PPE), including: • gloves • masks • boots • protective clothing. Protective clothing is washed after use.	a) There is no use of pesticides. b) Pesticide applicators use at least 3 ofthe listed PPE items, butalways gloves, (or at least whatis required on the product label) of good quality and clothing is washed after use. c) Pesticide applicators use at least 2 of the listed PPE4 items, but always gloves, of good quality and clothing is washed after use. 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.	10 10 5 0
6	Washing and changing facility	Washing and changing facilities are available for pesticide applicators.	a) There are no workers employed who apply pesticides. b) Washing and changing facilities are available. c) A washing or changing facility is available. d) No washing or changing facility is available.	10 10 5 0
7	Applicator restrictions	Pesticides are not applied by pregnant or lactating women, by children below 18 years, or by persons who suffer from respiratory diseases.	a) There is no use of pesticides. 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. 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.	n/a 3 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. b) Recommended, or 48-hours re-entry times are observed and communicated by placing warning signs on the fields. c) Recommended, or 48-hours re-entry times are observed and communicated verbally. d) Recommended, or 48 hours re-entry times are not observed or not communicated.	10 10 5 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. b) Pesticides and inorganic fertilizers are labeled and stored in a locked and separate place. c) Pesticides and inorganic fertilizers are labeled and stored in a general farm storage area. d) Pesticides and inorganic fertilizers are not labeled or stored.	10 10 5 0

10	Pesticide disposal	Empty pesticide containers and obsolete pesticides are properly disposed of.	a) There is no use of pesticides. b) Farmer participates in a collection, return or disposal system. c) In absence of such a system: • 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. 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).	10 10 10 0
				Total score (0-100)

F. PI No. 12: Child Labor and Youth Inclusion Scorecard

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).	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. 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. 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.	15 7 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: • 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. b) Children below 18 years are working on the farm and all listed conditions are met. c) Children below 18 years are working on the farm and they use harvest knives, but all of the other listed conditions are met. d) Children below 18 years are working on the farm, and one or more of the other listed conditions are not met.	15 15 10 0

3	Education	Children living on the farm in the age of compulsory schooling go to school throughout the full school year.	a) There are no children living on the farm within the age of compulsory schooling. b) Children living on the farm within the age of compulsory schooling go to school throughout the full school year. c) Children living on the farm within the age of compulsory schooling go to school, but not throughout the full school year. 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. 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.	30 30 20 5 0
	The following Indicators are part of the Youth Inclusion Scorecard. Note that there is no clear definition of youth and therefore a risk of error is self-reporting. Youth to be defined in national context.			
4	Access to agricultural knowledge	Youth should have access to formal and informal opportunities to gain agricultural knowledge.	a) Youth get knowledge and information from agricultural extension workers and researchers through training, meetings, field days, etc. b) Youth get information from family members, relatives, neighbours and friends. c)Youth do not have access to agricultural information.	10 4 0
5	Access to modern agricultural technologies	Youth should have access to modern agricultural technologies and information.	a) Youth have access to modern technologies from public and/or private sector. b) Youth do not have access to modern technologies.	10 0
6	Access to capital	Youth should have access to capital for engaging in entrepreneurial activity in rice value chains.	a) Youth have access to formal sources of credit. b) Youth have access to informal sources of credit. c) Youth do not have access to credit.	10 4 0
7	Agribusiness training	Youth should be trained to engage in rice value chains as a commercial activity.	a) Youth are trained by public sector and/or private sector actors. b) Youth have no agribusiness training opportunities.	10 0
			Total score (0-100)	

G. PI No. 13: Women's Empowerment Scorecard

No	Indicator	Corresponding requirement	Level(s) of performance	Score
1	Women's control over household agricultural production and marketing decisions	1a. Women should have decision-making control over the choice of crops/varieties to be planted in own or leased-in farms	Women have at least equivalent decision-making power. Someone else makes the decision, but women have a significant say in the decision Somebody else makes the decision, but the women are consulted Women are not involved in decision-making	10 6 3 0
		1b. Women should have decision-making control over the choice of technology/management practices (through rice production to post-harvest processing)	Women have at least equivalent decision-making power. Someone else makes the decision, but women have a significant say in the decision Somebody else makes the decision, but the women are consulted Women are not involved in decision-making	10 6 3 0
		1c. Women should have decision-making control over the use of inputs (including fertilizers, pesticides, irrigation, etc.) in rice cultivation	Women have at least equivalent decision-making power. Someone else makes the decision, but women have a significant say in the decision Somebody else makes the decision, but the women are consulted Women are not involved in decision-making	10 6 3 0
		1d. Women should have decision-making control over the use of rice produced (e.g. home consumption and sale)	Women have at least equivalent decision-making power. Someone else makes the decision, but women have a significant say in the decision Somebody else makes the decision, but the women are consulted Women are not involved in decision-making	10 6 3 0
2	Women's control over use of household income	2a. Women should have decision-making control over the use of income from rice	Women have at least equivalent decision-making power. Someone else makes the decision, but women have a significant say in the decision Somebody else makes the decision, but the women are consulted Women are not involved in decision-making	10 6 3 0
		2b. Women should have decision-making control over the use of off-farm income	Women have at least equivalent decision-making power. Someone else makes the decision, but women have a significant say in the decision Somebody else makes the decision, but the women are consulted Women are not involved in decision-making	10 6 3 0
3	Women's control over decisions regarding use of her time and labor	3a. Women should have full control over the use/ allocation of her own time for income-generating activities, unpaid tasks (including household chores, child care), and leisure	Women have at least equivalent decision-making power. Someone else makes the decision, but women have a significant say in the decision Somebody else makes the decision, but the women are consulted Women are not involved in decision-making	10 6 3 0

		3b. Women should have decision-making control over their contribution of labour in rice value chain related activities--both amount and activities	Women have at least equivalent decision-making power. Someone else makes the decision, but women have a significant say in the decision Somebody else makes the decision, but the women are consulted Women are not involved in decision-making	10 6 3 0
		3c. Women should have decision-making control over use of drudgery- or labor-reducing technologies	Women have at least equivalent decision-making power. Someone else makes the decision, but women have a significant say in the decision Somebody else makes the decision, but the women are consulted Women are not involved in decision-making	10 6 3 0
		3d. Nursing mothers have access to appropriate facilities and time to feed their infants and children while working on rice farms, processing and trading units	Women have access to facilities and are able to nurse their children Women do not have access and are constrained from nursing their children	10 0
4	Women's access to and control of productive resources and markets	4a. Women have control over the decisions on use of farm land (owned or leased), including decisions around purchase, sale or leasing in and out	Women have at least equivalent decision-making power. Someone else makes the decision, but women have a significant say in the decision Somebody else makes the decision, but the women are consulted Women are not involved in decision-making	10 6 3 0
		4b. Women have control over the decisions on use of farm machinery and tools (owned or hired), including decisions around purchase, sale, or hiring in and out	Women have at least equivalent decision-making power. Someone else makes the decision, but women have a significant say in the decision Somebody else makes the decision, but the women are consulted Women are not involved in decision-making	10 6 3 0
		4c. Women should have access to agricultural knowledge, information and capacity building	Women get knowledge and information from agricultural extension workers and researchers through training, meetings, field days, etc. Women get agricultural information from family members, relatives, neighbours, and friends. Women do not have access to agricultural information.	10 4 0
		4d. Women should have access to formal and informal sources of credit/microfinance.	Women can borrow from formal sources. Women can borrow from informal sources. Women have no access to loans.	10 3 0
		4e. Women should have decision-making power over the use of loans	Women have at least equivalent decision-making power. Someone else makes the decision, but women have a significant say in the decision Somebody else makes the decision, but the women are consulted Women are not involved in decision-making	10 6 3 0

		4f. Women should have access to markets	Women can freely engage in markets for purchase and sale of agricultural produce or products. Women need permission from a household member or need to be accompanied in order to engage in market transactions. Women are not free to engage in markets.	10 3 0
5	Women's mobility, social capital, leadership and domestic violence	5a. Women can make decisions about their movements in public places such as hospitals, markets, etc.	Women can move around freely without asking for permission. Women need to get permission from other household members to go to public places. Women need to be accompanied by family members to go to public places. Women are not allowed to go to public places.	10 4 2 0
		5b. Women participate in formal and informal village and community organizations	Women are active members of community organizations and influence group decisions Women are passive members of organizations Women are not members of community organizations	10 4 0
		5c. Women are leaders of village/community organizations	Women are elected as leaders of community/village organizations. Women are nominated to be leaders of community/village organizations. Women are not leaders of community/village organizations.	10 5 0
		5d. Women should be free from domestic violence	There are no cases of violence in the community There is at least one case of violence in the community	10 0
6	Women's wage gap	Women do not experience wage gap in the rice value chain	Women and men are paid equal wages for the same type of work. Women are paid lower wages than men for the same type of work.	10 0
				Total score (0-100)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