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Sustainable Rice Platform

**DRAFT**

**SRP Performance Indicators**

for Sustainable Rice Cultivation

Version 1.6

November 2018

[www.sustainablerice.org](http://www.sustainablerice.org/)

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# 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. The new Version 2.0 displays significant changes, such as the replacement of Indicators and the opportunity to measure most Indicators at three different levels: Basic/Intermediate/Advanced. The Version 2.0 below was a result of a comprehensive review and revision of the Performance Indicators that started in August 2017 and was completed in XXX. Version 1.0 was revised in accordance with SRP Terms of References that were developed in compliance with ISEAL Code of Good Practice for Setting Social and Environmental Standards (P005, Version 5.01, June 2010). At XXX, the SRP membership approved the SRP Performance Indicators Version 2.0.

#### Table 0: 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 levels 1 & 3 | 1. Profitability |
| 2. Labor productivity | * Added levels 1 & 3 | 2. Labor productivity |
| 3. Productivity: grain yield | * Added levels 1 & 3 | 3. Productivity: grain yield |
| 4. Food safety | * Moved Indicator No. 4 to 9 * Added household nutrition * Added levels 1 & 3 | (see Indicator No. 9 below) |
| 5. Water use efficiency | * Moved to Indicator No. 4 * Added water quality * Added levels 1 & 3 | 4. Water productivity & quality |
| 6. Nutrient-use efficiency: N | * Moved to Indicator No. 5 * Added levels 1 & 3 | 5. N-use efficiency |
| 7. Nutrient-use efficiency: P | * Moved to Indicator No. 6 * Added 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 levels 1 & 3 | 8. Greenhouse gas emissions |
| (See insertion Version 2.0) | * Moved Indicator No. 4 to 9 * Added household nutrition * Added levels 1 & 3 | 9. Food safety & household nutrition |
| 10. Worker health & safety | * Added levels 1 & 3 | 10. Worker health & safety |
| 11. Child labor | * Added youth engagement * Added levels 1 & 3 | 11. Child labor & youth engagement |
| 12. Women’s empowerment | * Developed new scorecard * Added levels 1 & 3 | 12. Women empowerment |

# SRP Performance Indicators (PIs) Version 2.0

### Introduction

The Sustainable Rice Platform (SRP) is a multi-stakeholder partnership to promote resource efficiency and sustainability both on-farm and throughout the rice value chain. The SRP is developing a range of tools to promote sustainable rice cultivation, including the Performance Indicators (PIs), a Standard, an Assurance Framework, 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 went parallel with 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 support the Standard by measuring changes resulting from adoption of on-farm sustainable best practice, e.g. through compliance with the SRP Standard, or other interventions of interest to SRP members. The PIs thus offer a 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 field implementation phase of Performance Indicators and Standard Version 2.0 will be an important next step to ensure relevance, robustness and user-friendliness while demonstrating their utility as scalable tools for driving wide-scale adoption of sustainable best practice. The implementation might show that one set of Standard and PIs might not address all the national or regional sustainability challenges. For these scenarios the SRP is offering members and stakeholders worldwide the opportunity to set up National SRP Chapters who can follow a Protocol for Developing SRP National or Regional Interpretation Guidelines. The emerging draft National or Regional Guidelines will be reviewed in order to ensure that they are at least as stringent as the International Standard and PIs.

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. 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).

This document is intended to be used in conjunction with the SRP Standard and the SRP Assurance Framework. The revised Standard, PIs, Assurance Framework and Training Tools and Templates will all be available for download (once finalized) at the Members’ Area of the SRP website: [www.sustainablerice.org.](http://www.sustainablerice.org/)

The SRP PIs are designed to assess sustainability improvements resulting from changes in farm practice. The revised PIs make measurement more simple 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 1 below summarizes the Indicators and basis for measurement at the three different levels: Basic/Intermediate/Advanced.

#### Table 1: 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 / day |
| Intermediate | * Kg paddy rice/ day * Days/ ha/ crop cycle |
| Advanced | * $ gross production / 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% mc), 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) |
| **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 & household nutrition** | Basic | * Checklist for food safety risk assessment completed * Checklist for farm product diversity completed |
| Intermediate | * Milled grain samples submitted to laboratory for analysis * Checklist for dietary diversity |
| Advanced | * Evidence of corrective action based on laboratory analysis results * Food insecurity checklist |
| **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 | * (not yet decided) |
| Intermediate | * PI 11 scorecard completed |
| Advanced | * (under development) |
| **Social** **Development** | | |
| **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 2. 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 next sections outline the overall methodology for measuring the Performance Indicators (PIs), followed by a more detailed description of the PIs including definitions, rationale, measurement units, and more detailed information on the measurement details and data collection. The Annex contains the Scorecards and Checklists to be used for assessing key PIs:

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

### 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 their activities over the previous period.

##### Number of indicators to measure

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

##### Frequency of data collection

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

Baseline assessment

Intervention (intermediate data collection)

End of

crop cycle

assessment

It is recommended to measure PIs for at least 2 consecutive crop cycles (for example between April 2019 and June 2020).

##### Sampling approach

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

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

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

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

Control farmers may live in the same village as farmers in the project, in 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 should also be matched. It is however important to avoid selecting control farmers who may be influenced by project interventions (spin-off from the project) or who may benefit from other ongoing interventions.

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

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

Table: sample sizes

|  |  |  |
| --- | --- | --- |
| **Population (N)** | **Sample size target group** | **Control Group** |
| N = ≤50 | 5 | 5 |
| N = 50-3500 | 10% | 5% of sample size |
| N = ≥ 3500 | 350 | 35 |

**Data collection tool**

SRP is developing an IT based data collection tool to facilitate the task of consistent data collection, data aggregation and analysis. The data collection tool will be supported with standardized formats for farm record keeping on the required records to measure the Performance Indicators. Data ownership, privacy, use and type of reporting will be considered during the development of the IT database.

# Detailed description of the performance indicators

## 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/ season | * Amount of rice produced * Sale price of rice * Cash costs for inputs (land, seed, labor, agrochemicals) | Farmer-diary record  Recall survey | Farmer  Farmer group |
| **Intermediate** | Net income from rice, considered within the context of total farm income | USD/ ha/ season | 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 |

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

## 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 /season | * 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 |

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

## 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) | 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 of paddy at time of weighing | * Measuring tape or map calculation * Weighing scale * Moisture meter (or oven-drying and re-weighing a subsample) | Service provider  Research and development expert |

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| --- |
| **Indicator:** Grain yield  The indicator measures productivity, defined as the recovered grain yield per hectare. An increase over time would be considered desirable. |
| **Rationale:** The rationale for this indicator is based on the SRP guiding principle: Improved Livelihoods. The assumption is that increased productivity leads to increased household food security, an increase in marketable surplus and increased national and international food security. |
|  |
| **Measurement details:**  **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. 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. |
|  |

## 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 cropping season * Incoming (irrigation) water quality risk assessment checklist completed | * Actual observations (e.g. farm diary) or recall survey * Checklist # xx | Farmer or  Farmer group or  Water association |
| **Inter- mediate** | * 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 growing season (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 growing season * 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) | * 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 * Rain gauge or remote sensing data or modeled from regional weather data * Laboratory analysis using an approved standard method for the listed parameters | Water association or  Service provider or  Research & development expert |

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| **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. A decrease in # of identified risks would be considered desirable. |
| **Rationale:** The rationale for the water productivity part of this indicator is based on the SRP guiding principle: Resource Use Efficiency. The assumption is that savings in irrigation or rain water can be used for other important purposes (i.e. water availability increases). 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. |
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| **Measurement details: (narrative form of Table 4)**  **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 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.  Suggested methods for measuring salinity in irrigation water include:  (reference to be provided)  **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, most service laboratories will provide information about which standard method(s) were used, and this information should be included with any report for SRP. The table below provides a list of possible methods, but there are many others that may be acceptable if there is an adequate laboratory quality assurance system.   |  |  | | --- | --- | | Water quality parameter | Suggested laboratory analysis methods (to be provided) | | pH | (to be provided) | | salinity | (to be provided) | | turbidity | (to be provided) | | dissolved oxygen concentration | (to be provided) | | total dissolved solids | (to be provided) | | nitrate concentration | (to be provided) | | phosphate concentration | (to be provided) | | pesticide concentration | (to be provided) | |

## Performance Indicator: Nutrient use efficiency: N

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| **Performance Indicator 5: NITROGEN USE EFFICIENCY** | | | | | |
| **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 | * 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 rationale for this indicator is based on the SRP guiding principle: Resource Use Efficiency. The assumption is that improved N management leads to improved yields or reduced input costs, higher farm profitability, increased food security, less N lost to the environment, reduced eutrophication of waterways, reduced emissions of greenhouse gases (GHG) from paddy fields, and reduced energy consumption and GHG emissions from production, transportation and use of N-containing fertilizers. Organic and synthetic sources of N are both included.

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| **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, 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 xx (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 \* 0.x) + (straw \* 0.65)  N input = (fertilizer-1 \* N content) + (fertilizer-2 \* N content) + (fertilizer-3 \* N content) + etc.  The farmer 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. |

## Performance Indicator: Nutrient use efficiency: P

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| **PI 6: PHOSPHORUS USE EFFICIENCY** | | | | | |
| **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) | * Service Provider * Research and Development Expert (Scientist) |

**Indicator:** Phosphorus-use efficiency

The nutrient use efficiency is defined as the recovered gain 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 rationale for this indicator is based on the SRP guiding principle: Resource Use Efficiency. The assumption is that improved P management leads to improved yields or decreasing input costs, higher profitability for the farmer; less P lost to the environment, reduced eutrophication of waterways, and reduced energy consumption and GHG emissions from production, transportation, and use of P-containing fertilizers. Organic, mineral, and synthetic sources of P are all included.

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| **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 % P2O5, 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 P2O5-labeled fertilizer:  Fertilizer label: 14 % P2O5 (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 xx (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.x) + (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). |

## Performance Indicator: Biodiversity

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| **Data Level** | **Indicator Description** | **Units** | **Data to be collected** | **Measurement Methods** | **Responsible Stakeholders** |
| **Basic** | * Pest and beneficial organism sighting * Pesticide use | * Checklist * No. of sprays/ season | * Checklist for PI 7 * Number of times pesticide was used | * 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 land 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) |

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| **Indicator: Biodiversity**  This indicator measures changes in pest and beneficial organism biodiversity and tracks the usage of pesticides and biocontrol agents. 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 rationale for this indicator is based on the on the SRP guiding principle: Protecting the natural environment. The assumption is that improved crop management practices improve biodiversity and the ecological balance between pests and beneficial organisms. |
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| **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.  **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 pest damage scorecard is used as follows:    The crop status is determined by examining the entire field and scoring it according to the following table:        Four broad categories of injuries caused by animal pests are considered. These are injuries that affect the tillers, panicles, leaves, and systemic injuries.The first category is injury on tillers, which reduces the number of potentially or actually fertile tillers. This category consists of 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. The second category is injury on panicles that is caused by sucking or grain-damaging insects. This category 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 mite feeds on both the leaf sheaths and panicles, the number of tillers with injured sheath or grains are counted per hill or quadrat. The third category is injury on the leaves, caused by leaf-feeding insects. This represents injuries caused by leaffolder, leaf miner, rice hispa and whorl maggot. For these injuries, the information to be entered is the number of injured leaves counted in each of the sampled hills or quadrats . 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 injuries 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. 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 of land area converted to rice since 2009, of land area reserved for enhancing habitats (i.e. not cropped or built on), and of changes over time in abundance of key indicator species. [Needs more detail, with references] |
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## Performance Indicator: Greenhouse gas emissions

**Table 8. Greenhouse gas emissions (Indicator #8)**

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| **Data Level** | **Indicator Description** | **Units** | **Data to be collected** | **Measurement Methods** | **Responsible Stakeholders** |
| **Basic** | * Greenhouse gas awareness |  | * 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) |

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| **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:** This indicator is based on the SRP guiding principle: Climate Action. The assumption is that reduced methane emissions from rice fields during crop growth decrease the contribution of rice cultivation to climate change. |
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| **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 [insert reference] 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 calculations are based on the same farm-diary data as the intermediate level, plus:   1. Water depth before and during the growing season (see PI 4 Intermediate for explanation of how to measure it) 2. Methane and nitrous oxide emission measurements on reference fields (not every farmer’s field) [Ole, please insert your preferred reference to emission measurement method] |

## Performance Indicator: Food Safety & Household Nutrition

**Table 9. Food safety and household nutrition (indicator #9)**

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| **Data Level** | **Indicator Description** | **Units** | **Data to be collected** | **Measurement Methods** | **Responsible Stakeholders** |
| **Basic** | * Food safety risk assessment * Farm production diversity assessment | * Scorecard 9.1 * Scorecard 9.2 | * Checklist in scorecard 9.1 * Checklist in scorecard 9.2 | Checklist self-assessment | Farmer  Farmer group |
| **Intermediate** | * Food safety risk assessment with samples submitted for any identified risks * Farm production diversity assessment * Dietary diversity | * Scorecard 9.1 * Scorecard 9.2 * Scorecard 9.3 | * Checklist in scorecard 9.1 * Submission of a grain sample if risks are identified * Checklist in scorecard 9.2 * Checklist in scorecard 9.3 | * 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, plus:   * Food frequency questionnaire * Food insecurity experience assessment | Same as Intermediate level, plus:   * Index scores | * Checklists in scorecard for PI no. 9 * Laboratory results of grain sample analysis * Evidence of corrective action if necessary based on laboratory results * Food frequency questionnaire * Food insecurity experience scale survey | * Completion of scorecard for PI no. 9 * Service laboratory uses a certified method of analysis * Consultation with a remediation expert * xxx [ref from Ces] * FAO FIES (see link in narrative section below) | Service Laboratory  Service provider  Research and development expert |

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| **Indicator:** Food safety and household nutrition  The indicator assesses food safety risks for rice production (heavy metals, pesticide residues and mycotoxins) and household nutrition (dietary diversity). |
| **Unit:** The measurement unit is a 0-100 score based upon answers to multiple choice questions which describe a combination of practices related to food safety and household nutrition. An increase over time would be considered positive. |
| **Rationale:** The rationale for this indicator is based on the SRP guiding principle: Consumer Needs. The assumption is that safe rice products lead to consumer assurance. Safer food reduces rice- related human exposure to specific contaminants and leads to a healthier population. The assumption is that improved dietary diversity leads to a healthier population through improved nutrition and reduces exposure to any rice food safety risks. |
| **Measurement details:**  **Basic:** Provides food safety risk assessment (Scorecard section 9.1) and farm production diversity assessment (Scorecard section 9.2). The focus for farmer learning is awareness of food safety risks and the importance of dietary diversity. The farmer is asked to complete the first two checklists on the Scorecard for PI no. 9.  **Intermediate:** Provides food safety risk assessment and dietary diversity assessment. The focus for farmer and farmer group learning is awareness of food safety risks and the importance of dietary diversity, as well as action on any risks that have been identified. The farmer is asked to complete all checklists and calculate a score for Scorecard for PI no. 9.   * 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). The quantitative food frequency questionnaire can be found at: <http://www.fsincop.net/topics/fns-measurement> (Lele et al., 2016). The Food and Agriculture Organization (FAO) global food insecurity experience scale survey (which is the Sustainable Development Goal metric for hunger measurement) can be found at: <http://www.fao.org/in-action/voices-of-the-hungry/using-fies/en/> (FAO, 2016). |
|  |

## Performance Indicator: Health & safety

**Table 10. Workers’ health & safety (Indicator #10)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Level** | **Indicator Description** | **Units** | **Data to be collected** | **Measurement Methods** | **Responsible Stakeholders** |
| **Basic** | Health & safety awareness | Scorecard for PI 10 | * Scorecard used for self-assessment | Self-assessment | Farmer  Farmer group |
| **Intermediate** | Health & safety assessment | Scorecard for PI 10 | * Scorecard with score reported | Group assessment, focusing on use of personal protective equipment during pesticide use | Farmer group  Service provider |
| **Advanced** | * Health & safety assessment * Accident rate | * Scorecard for PI 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 * 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:** This indicator is based on the SRP guiding principle: Labor Conditions. The assumption is that increased health and safety measures lead to reduced health and safety risks. Improved worker health lead to reduced health-related costs, improved continuity of work and improved livelihoods. |
| **Measurement details:** Measurement is based upon a scorecard covering the following topics:   1. Incidence of work-related accidents and illnesses 2. Safety instructions and first aid 3. Re-entry periods after pesticide application 4. Availability and use of PPE 5. Suitable maintenance of equipment for safe operation 6. Pesticide applicator training 7. Age and gender of pesticide applicator 8. Washing and changing facility for pesticide applicator 9. Storage of pesticides 10. Disposal of pesticide container The scorecard can be found in Annex 1.   **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. |
|  |

## Performance Indicator: Child labor and youth inclusion

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **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. . |  |
| **Unit:** The measurement unit is a 0-100 score based upon answers to multiple choice questions describing a combination of practices and outcomes related to child labor.  An increase over time would be considered positive. |  |
| **Rationale:** The indicator is based on the SRP guiding principle: Labor Conditions. The assumption is that the absence of child labor leads to reduced health risks and greater opportunity to attend school. |  |
| **Measurement details**: Measurement is based upon a scorecard covering the following topics:   1. Employment of children below the age of 15 years old as permanent or seasonal workers 2. Children below the age of 18 years old doing hazardous work 3. Children of school 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:** The focus for farmer learning is on self-awareness of youth engagement 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 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, with evaluation at the value chain level [needs more explanation] |  |

## Performance Indicator: Women empowerment

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Level** | **Indicator Description** | **Units** | **Data to be collected** | **Measurement Methods** | **Responsible Stakeholders** |
| **Level 1** | Women empowerment awareness | Scorecard for PI 12 | * Scorecard used for self-assessment | Self-assessment | Farmer  Farmer group |
| **Level 2** | Women empowerment assessment | Scorecard for PI 12 | * Scorecard with score reported | Group assessment | Farmer group  Service provider |
| **Level 3** | Women empowerment assessment | Scorecard for PI 12 | * Scorecard with score reported * Record of women-inclusive activities | * Group assessment * 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 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] |

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# Annex 1: Scorecards and checklists

### 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. | | | |
|

### PI No. 7 Basic: Biodiversity checklist

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 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) |  |  |  |
| 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) |  |  |  |
| 13 | Water birds (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! | | | |

### PI No. 7 Intermediate: Pest damage assessment

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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) |  |  |  |  |  |  |  |  |  |  |  |
| **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) |  | |  | |  | |  | |  | |  |

### PI No. 9: Food Safety and Household Nutrition

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **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 | 10 |
| At least 5 items have “no” answers and up to 4 items have “unknown” answers | 5 |
| More than 5 items have “unknown” answers | 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 | 10 |
| At least 2 items have “no” answers and up to 2 items have “unknown” answers. | 5 |
| More than 2 items have “unknown” answers. | 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. | 10 |
| One checklist item has a “no” answer. | 5 |
| Both checklist items have “unknown” answers. | 0 |
| 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 |
| 2 | Farm production diversity | 2a. There are diverse sources of food plants produced on the farm. | How many of the following types of plants other than rice are produced on the farm? (write number of types on the blank lines)   1. Vegetables: \_\_\_\_\_\_\_\_ 2. Fruits: \_\_\_\_\_\_\_\_ 3. Leafy greens: \_\_\_\_\_\_\_\_ 4. Edible weeds: \_\_\_\_\_\_\_\_ 5. Other edible plants: \_\_\_\_\_\_\_\_   Total:  **\_\_\_\_\_\_\_\_** | There are more than 2 types of plants other than rice produced on the farm. | 10 |
| There are 1-2 types of plants other than rice produced on the farm. | 5 |
| There are no types of plants other than rice produced on the farm. | 0 |
| 2b. There are diverse sources of animal-source foods produced on the farm. | How many of the following types of animal-source foods are produced on the farm? (write number of types on the blank lines)   1. Eggs: \_\_\_\_\_\_\_\_ 2. Milk: \_\_\_\_\_\_\_\_ 3. Meat: \_\_\_\_\_\_\_\_ 4. Fish: \_\_\_\_\_\_\_\_ 5. Other aquatic animals: \_\_\_\_\_\_\_\_   Total: **\_\_\_\_\_\_\_\_** | There are 2 types of animal-source foods produced on the farm. | 10 |
| There is 1 type of animal-source food produced on the farm. | 5 |
| There are no animal-source foods produced on the farm. | 0 |
| 2c. There are diverse sources of food that are not cultivated but that can be found on the farm. | How many of the following types of foods are found on the farm? (write number of types on the blank lines)   1. Frogs: \_\_\_\_\_\_\_\_ 2. Insects: \_\_\_\_\_\_\_\_ 3. Rodents: \_\_\_\_\_\_\_\_ 4. Snakes: \_\_\_\_\_\_\_\_ 5. Other: : \_\_\_\_\_\_\_\_   Total: **\_\_\_\_\_\_\_\_** | There is at least 1 type of food from this checklist found on the farm. | 5 |
| There are no types of foods from this checklist found on the farm. | 0 |
| 3 | Household dietary diversity | 3a. The household consumes sufficient high-quality cereals daily. | How many of the following types of food are consumed by members of the household on a daily basis? (write number of types on the blank lines)   1. Brown or pigmented rice or other whole grain (including flour): \_\_\_\_\_\_\_\_ 2. White rice or other refined grain (including flour): \_\_\_\_\_\_\_\_ 3. Processed cereal products (for example, pre-packaged breakfast cereals, instant noodles, biscuits, breads, etc.): \_\_\_\_\_\_\_\_ | There is at least 1 type of whole grain (item #1 on checklist). | 8 |
| There are 0 kinds of whole grains, but at least 1 type of refined grain (item #2). | 6 |
| There are 0 kinds of whole or refined grains, but at least 1 type of processed cereal product (item #3). | 4 |
| There are no items from this checklist consumed daily. | 0 |
| 3b. The household consumes a variety of vegetables daily. | How many of the following types of vegetables are consumed by members of the household daily? (write number of types on the blank lines)   1. Yellow or orange vegetables and tubers (carrots, squash, orange-flesh sweet potatoes): \_\_\_\_\_\_\_\_ 2. Dark green leafy vegetables (spinach, bok choi, pechay, cassava leaves, moringa leaves, fern, or edible wild plants): \_\_\_\_\_\_\_\_ 3. Legumes, nuts, and seeds (beans, peas, lentils, peanuts, cashews, sunflower) or food made from these (tofu): \_\_\_\_\_\_\_\_ 4. White tubers and roots (potatoes, cassava): \_\_\_\_\_\_\_\_ 5. Other vegetables (eggplant, gourd, bamboo shoots, okra, and many others): \_\_\_\_\_\_\_\_   Total: **\_\_\_\_\_\_\_\_** | There are 2 or more types of vegetables consumed on a daily basis. | 5 |
| There is 1 type of vegetable consumed daily. | 3 |
| There are 0 types of vegetables consumed daily. | 0 |
| 3c. The household consumes a variety of fruits daily. | How many of the following types of fruits are consumed by members of the household daily? (write number of types on blank lines)   1. Vitamin-A-rich fruits (ripe mango, papaya, guava, passion fruit, melon, dragon fruit, orange): \_\_\_\_\_\_\_\_ 2. Other fruits, including wild fruits (apple, banana, rambutan, and many others): \_\_\_\_\_\_\_\_   Total: **\_\_\_\_\_\_\_\_** | There are 2 or more types of fruits consumed on a daily basis. | 5 |
| There is 1 type of fruit consumed daily. | 3 |
| There are 0 types of fruit consumed daily. | 0 |
|  |  | 3d. The household consumes a variety of animal-source foods regularly. | How many of the following types of animal-source food are consumed by members of the household daily? (write number of types on blank lines)   1. Milk and milk products (yogurt, cheese): \_\_\_\_\_\_\_\_ 2. Eggs: \_\_\_\_\_\_\_\_ 3. Fresh meat (chicken, beef, pork, duck, lamb, goat, wild game, and many others): \_\_\_\_\_\_\_\_ 4. Fresh fish (any kind) and shellfish (crabs, shrimps): \_\_\_\_\_\_\_\_ 5. Insects and other animals found on the farm (beetles, grasshoppers, crickets, snails, lizards, frogs, rodents): \_\_\_\_\_\_\_\_ 6. Processed meat or fish (sausage, hot dog, spam, canned or dried sardines, fish paste): \_\_\_\_\_\_\_\_   Total: **\_\_\_\_\_\_\_\_** | There is at least one fresh animal-source food consumed per day (items 1 to 5 on the checklist). | 7 |
|  |  |  |  | There are no fresh animal-source food consumed daily, but there is at least 1 processed meat or fish (item #6) consumed daily. | 4 |
|  |  |  |  | There are no animal-source foods consumed daily. | 0 |
| **Total Score (0 to 100)** | | | | |  |

### 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   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 | 10 |
| b) No major work related injuries or ill health, but minor cases in a lower frequency compared to the last crop cycle | 5 |
| c) Any major work related injuries or minor cases in an equal or higher frequency compared to the last crop cycle | 0 |
| 2 | Safety instructions and first aid | Workers, including working household members, receive regular safety instruction to prevent work related accidents or diseases, and first aid supplies are available on-farm | a) No workers or working family members, and first aid supplies are available on- farm. | 10 |
| b) Workers, including working household members, receive regular safety instruction and first aid supplies are available on-farm. | 10 |
| c) Workers, including working household members, receive regular safety instruction, but no first aid supplies are available on-farm. | 5 |
| d) There is no safety instruction and there are no first aid supplies available on- farm. | 0 |
| 3 | Calibration | Tools and equipment for farm operations (e.g. seeders, sprayers, etc.) and post-harvest processed are frequently maintained and calibrated. | a) Calibration and maintenance within current crop cycle. | 10 |
| b) Calibration and maintenance within the past 2 years. | 5 |
| c) No calibration and maintenance within the past 2 years. | 0 |
| 4 | Training pesticide applicators | Pesticide applicators receive training on handling and use of pesticides. Untrained people do not apply pesticides. | a) There is no use of pesticides. | 10 |
| b) Pesticide applicators participated in a training session in the past 3 years. | 10 |
| c) Pesticide applicators participated in a training session in the past 5 years. | 5 |
| d) Pesticide applicators did not participate in a training session in the past 5 years. | 0 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 5 | Personal Protective Equipment (PPE) | Pesticide applicators use good quality Personal Protective Equipment (PPE), including:   * gloves * masks * boots * protective clothing.   Protective clothing is washed after use. | a) There is no use of pesticides. | 10 |
| b) Pesticide applicators use at least 3 of the listed PPE items, but always gloves, (or at least what is required on the product label) of good quality and clothing is washed after use. | 10 |
| c) Pesticide applicators use at least 2 of the listed PPE4 items, but always gloves, of good quality and clothing is washed after use. | 5 |
| d) Pesticide applicators use less than 2 of the 4 items, or do not use gloves, or use items of low quality, or clothing is not washed after use. | 0 |
| 6 | Washing and changing facility | Washing and changing facilities are available for pesticide applicators. | a) There are no workers employed who apply pesticides. | 10 |
| b) Washing and changing facilities are available. | 10 |
| c) A washing or changing facility is available. | 5 |
| d) No washing or changing facility is available. | 0 |
| 7 | Applicator restrictions | Pesticides are not applied by pregnant or lactating women, by children below 18 years, or by persons who suffer from respiratory diseases. | a) There is no use of pesticides. | n/a |
| b) Pesticides are not applied by pregnant or lactating women or by children below 18 years, or by persons who suffer from chronic or respiratory diseases. | 3 |
| c) Pesticides are applied by pregnant or lactating women or by children below 18 years, or by persons who suffer from chronic or respiratory diseases. | 0 |
| 8 | Re-entry times | Recommended re-entry times after use of pesticides are observed and communicated (or 48 hours if label does not give a recommendation). | a) There is no use of pesticides. | 10 |
| b) Recommended, or 48-hours re-entry times are observed and communicated by placing warning signs on the fields. | 10 |
| c) Recommended, or 48-hours re-entry times are observed and communicated verbally. | 5 |
| d) Recommended, or 48 hours re-entry times are not observed or not communicated. | 0 |
| 9 | Pesticide storage | Pesticides and inorganic fertilizers (including empty containers) are labeled and stored in a locked place, separate from fuel, food and out of reach of children. | a) There is no use of pesticides or inorganic fertilizers. | 10 |
| b) Pesticides and inorganic fertilizers are labeled and stored in a locked and separate place. | 10 |
| c) Pesticides and inorganic fertilizers are labeled and stored in a general farm storage area. | 5 |
| d) Pesticides and inorganic fertilizers are not labeled or stored. | 0 |
| 10 | Pesticide disposal | Empty pesticide containers and obsolete pesticides are properly disposed of. | a) There is no use of pesticides. | 10 |
| b) Farmer participates in a collection, return or disposal system. | 10 |
| c) In absence of such a system:   * empty containers rinsed 3 times with water and made unusable by crushing or puncturing before burying them on the farm and are not recycled. * surplus spray and wash water is applied over an unmanaged part of the farm, away from water bodies. * obsolete pesticides (past shelf life or banned pesticides) are returned to the dealers and if not possible disposed of in a manner that minimizes exposure to humans and the environment. | 10 |
| d) There is a collection, return or disposal system, but it is not used. In absence of such a system, empty pesticide containers and obsolete pesticides are not disposed of as described under c). | 0 |
|  |  |  | **Total score (0-100)** |  |

### 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. | 15 |
| 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. | 7 |
| c) Children below the minimum age are working on the farm, and no deliberate and evidenced efforts were made to stop the children from working and to get them into education. | 0 |
| 2 | Hazardous work | Children below 18 years do not conduct hazardous work or any work that jeopardizes their physical, mental or moral wellbeing (ILO Convention 182). The following conditions are met:   * 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. | 15 |
| b) Children below 18 years are working on the farm and all listed conditions are met. | 15 |
| c) Children below 18 years are working on the farm and they use harvest knives, but all of the other listed conditions are met. | 10 |
| d) Children below 18 years are working on the farm, and one or more of the other listed conditions are not met. | 0 |
| 3 | Education | Children living on the farm in the age of compulsory schooling go to school throughout the full school year. | a) There are no children living on the farm within the age of compulsory schooling. | 30 |
| b) Children living on the farm within the age of compulsory schooling go to school throughout the full school year. | 30 |
| c) Children living on the farm within the age of compulsory schooling go to school, but not throughout the full school year. | 20 |
| 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. | 5 |
| d) Children living on the farm within the age of compulsory schooling do not go to school, and no deliberate and evidenced efforts are taken to get them into education. | 0 |
| 4 | Access to agricultural knowledge | Youth should have access to formal and informal opportunities to gain agricultural knowledge. | 1. Youth get knowledge and information from agricultural extension workers and researchers through training, meetings, field days, etc. | 10 |
| b) Youth get information from family members, relatives, neighbours and friends. | 4 |
| c)Youth do not have access to agricultural information. | 0 |
| 5 | Access to modern agricultural technologies | Youth should have access to modern agricultural technologies and information. | 1. Youth have access to modern technologies from public and/or private sector. | 10 |
| b) Youth do not have access to modern technologies. | 0 |
| 6 | Access to capital | Youth should have access to capital for engaging in entrepreneurial activity in rice value chains. | 1. Youth have access to formal sources of credit. | 10 |
| b) Youth have access to informal sources of credit. | 4 |
| c) Youth do not have access to credit. | 0 |
| 7 | Agribusiness training | Youth should be trained to engage in rice value chains as a commercial activity. | 1. Youth are trained by public sector and/or private sector actors. | 10 |
|  |  |  | b) Youth have no agribusiness training opportunities. | 0 |
| **Total score (0-100)** | | | |  |

1. **PI No. 13: Women’s Empowerment Scorecard**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No** | **Indicator** | **Corresponding requirement(s)** | **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 make the decision | 10 |
| Someone else makes the decision, but women have a significant say in the decision | 6 |
| Somebody else makes the decision, but the women are consulted | 3 |
| Women are not involved in decision-making | 0 |
| 1b. Women should have decision-making control over the choice of technology/management practices (through rice production to post-harvest processing) | Women make the decision | 10 |
| Someone else makes the decision, but women have a significant say in the decision | 6 |
| Somebody else makes the decision, but the women are consulted | 3 |
| Women are not involved in decision-making | 0 |
| 1c. Women should have decision-making control over the use of inputs (including fertilizers, pesticides, irrigation, etc.) in rice cultivation | Women make the decision | 10 |
| Someone else makes the decision, but women have a significant say in the decision | 6 |
| Somebody else makes the decision, but the women are consulted | 3 |
| Women are not involved in decision-making | 0 |
| 1d. Women should have decision-making control over the use of rice produced (e.g. home consumption and sale) | Women make the decision | 10 |
| Someone else makes the decision, but women have a significant say in the decision | 6 |
| Somebody else makes the decision, but the women are consulted | 3 |
| Women are not involved in decision-making | 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 make the decision | 10 |
| Someone else makes the decision, but women have a significant say in the decision | 6 |
| Somebody else makes the decision, but the women are consulted | 3 |
| Women are not involved in decision-making | 0 |
| 2b. Women should have decision-making control over the use of off-farm income | Women make the decision | 10 |
| Someone else makes the decision, but women have a significant say in the decision | 6 |
| Somebody else makes the decision, but the women are consulted | 3 |
| Women are not involved in decision-making | 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 make the decision | 10 |
| Someone else makes the decision, but women have a significant say in the decision | 6 |
| Somebody else makes the decision, but the women are consulted | 3 |
| Women are not involved in decision-making | 0 |
| 3b. Women should have decision-making control over their contribution of labour in rice value chain related activities--both amount and activities | Women make the decision | 10 |
| Someone else makes the decision, but women have a significant say in the decision | 6 |
| Somebody else makes the decision, but the women are consulted | 3 |
| Women are not involved in decision-making | 0 |
| 3c. Women should have decision-making control over use of drudgery- or labor-reducing technologies | Women make the decision | 10 |
| Someone else makes the decision, but women have a significant say in the decision | 6 |
| Somebody else makes the decision, but the women are consulted | 3 |
| Women are not involved in decision-making | 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 and are able to nurse their children | 10 |
| Women do not have access and are constrained from nursing their children | 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 make the decision | 10 |
| Someone else makes the decision, but women have a significant say in the decision | 6 |
| Somebody else makes the decision, but the women are consulted | 3 |
| Women are not involved in decision-making | 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 make the decision | 10 |
| Someone else makes the decision, but women have a significant say in the decision | 6 |
| Somebody else makes the decision, but the women are consulted | 3 |
| Women are not involved in decision-making | 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. | 10 |
| Women get agricultural information from family members, relatives, neighbours, and friends. | 4 |
| Women do not have access to agricultural information. | 0 |
| 4d. Women should have access to formal and informal sources of credit/microfinance. | Women can borrow from formal sources. | 10 |
| Women can borrow from informal sources. | 3 |
| Women have no access to loans. | 0 |
| 4e. Women should have decision-making power over the use of loans | Women make the decision | 10 |
| Someone else makes the decision, but women have a significant say in the decision | 6 |
| Somebody else makes the decision, but the women are consulted | 3 |
| Women are not involved in decision-making | 0 |
| 4f. Women should have access to markets | Women can freely engage in markets for purchase and sale of agricultural produce or products. | 10 |
| Women need permission from a household member or need to be accompanied in order to engage in market transactions. | 3 |
| Women are not free to engage in markets. | 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. | 10 |
| Women need to get permission from other household members to go to public places. | 4 |
| Women need to be accompanied by family members to go to public places. | 2 |
| Women are not allowed to go to public places. | 0 |
| 5b. Women participate in formal and informal village and community organizations | Women are active members of community organizations and influence group decisions | 10 |
| Women are passive members of organizations | 4 |
| Women are not members of community organizations | 0 |
| 5c. Women are leaders of village/community organizations | Women are elected as leaders of community/village organizations. | 10 |
| Women are nominated to be leaders of community/village organizations. | 5 |
| Women are not leaders of community/village organizations. | 0 |
| 5d. Women should be free from domestic violence | There are no cases of violence in the community | 10 |
| There is at least one case of violence in the community | 0 |
| 6 | Women’s wage gap | Women do not experience wage gap in the rice value chain | Women and men are paid equal wages when hired as labour in rice production and post-harvest activities | 10 |
| Women are paid lower wages than men | 0 |
|  |  |  | **Total score (0-210)** |  |