



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

Peace Corps | West Africa



System of Rice Intensification (SRI) Trainer Handbook

Peace Corps Publication No. Mo118T *November 2015*



USAID
FROM THE AMERICAN PEOPLE



Prepared by Devon Jenkins – Returned Peace Corps Volunteer, Niger 2004-2005 / Peace Corps Response Volunteer, Benin 2012-2013.

Cover photo: Devon Jenkins

Participants get their hands dirty transplanting a field of SRI seedlings during the first West Africa Food Security Partnership SRI training, September 2012 at the SAIN farm school in Kakanitchoué, Benin.

CONTENTS

Handbook Preface	1
1.1 Teaching SRI	2
1.2 Training Session Order and Flow	3
1.3 Variable Training Lengths	3
1.4 Session Plans	4
1.5 Preparation Timeline	5
1.6 Setting Up Field Demonstration Plots	6
1.7 Trainee Assessments	7
Appendix A – PCV Pre-Training Questionnaire	8
Appendix B – Pre/Post-Training Assessment	11
Appendix C – Training Handouts	12

Handbook Preface

As part of Peace Corps' West Africa System of Rice Intensification (SRI) Toolkit, this handbook is designed for Peace Corps programming and training staff to assist with planning and executing SRI training programs, and any PCVs who are also involved in the planning and execution of these trainings. The SRI Toolkit also includes sample session plans and accompanying presentations, as separate files. In addition to this *SRI Trainer Handbook*, the toolkit also includes an *SRI PCV Handbook*. These two handbooks are designed to play complementary roles:

- The *SRI PCV Handbook* provides a detailed description of SRI, its principles, practices, and implementation, and is designed to be a resource for PCVs at post as they plan, design, and execute a first season of SRI trials with their counterparts.
- The *SRI Trainer Handbook* provides instruction on how to set up and execute training and explain SRI to training participants.

Please take into account these important considerations for using this handbook:

1. PCVs that attend an SRI training should be given the *SRI PCV Handbook*, in advance if possible, and have a copy to take with them to post.
2. Appendix A in this *SRI Trainer Handbook* contains a pre -training questionnaire that can be given to Volunteers and trainees in advance, to help them develop a better understanding of their local rice production systems, and be more prepared for the training. Read through this questionnaire before sending it to trainees and make any necessary adjustments, taking into account previous community assessments PCVs have already done, and making modifications to reflect important characteristics of local rice production systems.
3. Appendix B includes an assessment that can be used at the beginning and end of the training to determine the level of knowledge that trainees acquired during the event.
4. Peace Corps staff involved in planning or leading an SRI training should thoroughly read the *SRI PCV Handbook* as early as possible in the planning process. Where essential background reading is necessary, references to specific sections of the *SRI PCV Handbook* occur throughout this *SRI Trainer Handbook*.
5. SRI already exists in all of the Peace Corps countries in West Africa, to varying degrees. Where possible, connect with existing SRI practitioners to share local knowledge of SRI adaptation with training participants, and ideally to also arrange a site visit. The SRI West Africa Facebook group ([facebook.com/groups/sriwestafrica](https://www.facebook.com/groups/sriwestafrica)) can be useful in identifying SRI practitioners in a given country, if none are already known.

As with the *SRI PCV Handbook*, the material covered here is intended to be applicable as well to Peace Corps staff in other parts of the world beyond West Africa.

1.1 Teaching SRI

SRI is a flexible methodology that requires adaptation based on a thorough understanding of its principles. To facilitate participants developing this kind of understanding, consider the following points:

1. Flexibility and experimentation

SRI is a flexible approach, not a one-size-fits-all technology – participants are free to experiment and adapt SRI, and they should be encouraged to do so. The ideas that participants learn at the training should guide a process of experimentation aimed at making SRI work the best it can for their local conditions, and for adapting their local conditions to make them work better for SRI.

2. Synergy

SRI follows four basic principles, and when these are used together they create synergy. Participants should attempt to maximize the synergistic effect created by SRI, in a cost-effective manner given their local conditions. Accomplishing ideal SRI management isn't always possible or feasible for many farmers, but practical adaptations can increase yields while reducing input use and improving plant and soil health. As much as possible, these adaptations should be aimed at making all four of the SRI principles feasible, and not just adopting one or two of the principles.

3. Start small

SRI is different, and change can be daunting at first. Participants should be encouraged to give themselves the best possible chance of success early on. Confidence is built through small successes, leading to more experimentation and progressively larger successes. Small trial plots can yield small, quick successes, which can encourage farmers to do more next year. Large initial trial plots can be overwhelming and lead to setbacks that discourage farmers from trying SRI again in the future.

4. Seeing is believing

When participants attend a training they often get excited, but translating this excitement to the community at post is challenging. Neighbors won't believe that this new system works just by hearing about it – and they won't have had the benefit of attending the training themselves. SRI is visually striking, and seeing a trial plot is a great conversation starter. Encourage participants to make their trial plots visible – alongside a major path or road if possible – and to use this visibility to convince other farmers to try SRI for themselves. The biggest barrier to SRI adoption is often not technical, but rather mental. Farmers, researchers, and technicians alike will often not believe that SRI is possible until they see it – and try it – for themselves.

1.2 Training Session Order and Flow

Classroom and field sessions can be mixed together or presented in single blocks. Ideally they would be mixed to allow for hands-on experience as a way of reinforcing classroom presentations and to prevent classroom fatigue by engaging participants in active exercises. In circumstances where the classroom and field are not immediately adjacent, mixing sessions in this manner may be impractical.

Sessions should also present SRI concepts in a progressive and iterative manner. Moving gradually from simple explanations of SRI to more detailed technical explanations allows participants to process and comprehend SRI concepts, while repetition of key concepts facilitates greater memory retention.

Below is a list of sessions, presented in an order that mixes **classroom** and **field** sessions, and provides for a progressive and iterative presentation of key concepts:

- | | | |
|--------------|---|---|
| Introductory | { | 1. Introduction with short films – 30-60 min – <i>classroom</i> |
| | | 2. Comparison of SRI and conventional plots – 30 min – <i>field</i> |
| | | 3. Seed sorting and soaking – 15-30 min – <i>field or classroom</i> |
| In-depth | { | 4. Technical presentation – 60 min – <i>classroom</i> |
| | | 5. Field and nursery preparation – 90 min – <i>field</i> |
| | | 6. Transplanting – 60 min – <i>field</i> |
| | | 7. Setting up a comparison trial – 30 min – <i>classroom</i> |
| | | 8. Weed management – 30 min – <i>field</i> |
| | | 9. Harvesting and data collection – 30 min – <i>field</i> |

The first part of the training is a basic overview of SRI, while the second part delves deeper into the hands-on practice of SRI. Here again the principles and theory of SRI are reinforced, using tangible examples to complement classroom learning, while also building up participant confidence that will make conducting a field trial at post much easier. By the end of the training, participants should be able to describe SRI principles, practices, and adaptation with ease.

1.3 Variable Training Lengths

Depending on time availability and training objectives, an SRI training could take place in a single day, or cover several days. Below are suggested agendas for variations in training length:

1. **One-day technical training** – *For a short technical training, some of the sessions can be skipped, focusing instead on the core technical capacities.*
 - a. Introduction – 60 min – *classroom*
 - b. Seed sorting and soaking – 30 min – *field or classroom*
 - c. Technical presentation – 60 min – *classroom*
 - d. Field and nursery preparation – 90 min – *field*
 - e. Transplanting – 60 min – *field*

2. **Two-day technical and planning training of trainers** – *For a longer, multi-day training of trainers, additional sessions can be added to allow PCVs and counterparts to work together in small groups to detail their current rice production systems, and to plan how they might adapt SRI to their local conditions, focusing on what practices would work best to support each of the four principles, and potentially developing regional action plans for planning future activities, such as regional trainings, etc.*
- Introduction – 60 min – *classroom*
 - Comparison of SRI and conventional plots – 30 min – *field*
 - Seed sorting and soaking – 30 min – *field or classroom*
 - Technical presentation – 90 min – *classroom*
 - Group work session – detailing current rice production systems and possible adaptations for SRI – 60-90 min – *classroom*
 - Group presentations – 60 min – *classroom*
 - Field and nursery preparation – 90 min – *field*
 - Transplanting – 60 min – *field*
 - Setting up a comparison trial – 30 min – *classroom*
 - Weeding – 30 min – *field*
 - Harvest / data collection – 60 min – *field*
 - Group work session – regional action plan development (60 min) – *classroom*
 - Group presentations – 60 min – *classroom*
 - Summary / closure – 60 min – *classroom*

1.4 Session Plans

Session plans are available as part of this SRI Toolkit (see separate files for the session plans and accompanying PowerPoint presentations) for the following sessions:

Session Plan Name	Accompanying Material	Duration	For More Information
1. Introduction to SRI	<ul style="list-style-type: none"> <u>PowerPoint</u> – <i>Introduction to SRI</i> <u>Videos</u> – trainer must select which clips to show (suggestions for videos, but not actual video files, are provided as part of this toolkit) 	30-60 minutes	See <u>Sections 1.1 and 1.2</u> in the <i>SRI PCV Handbook</i> and the corresponding session plan for more information about locating videos to use.
2. Comparison of SRI and conventional plots		30 minutes	See Sections 1.1, 1.2, and 2.5 in the <i>SRI PCV Handbook</i> .
3. Seed sorting and soaking		15-30 minutes	See <u>Sections 3.3.3 and 3.3.4</u> in the <i>SRI PCV</i>

Session Plan Name	Accompanying Material	Duration	For More Information
			<i>Handbook.</i>
4. Technical presentation	<ul style="list-style-type: none"> • <u>PowerPoint</u> – SRI <i>Technical Presentation</i> 	60 minutes	See <u>Sections 1.1 - 1.5</u> in the <i>SRI PCV Handbook</i> .
5. Field and nursery preparation		60-90 minutes	See <u>Sections 3.1 and 3.3.2</u> in the <i>SRI PCV Handbook</i> .
6. Transplanting		60 minutes	See <u>Section 3.3</u> in the <i>SRI PCV Handbook</i> .
7. Setting up a comparison trial		30 minutes	See <u>Sections 2.5-2.7</u> in the <i>SRI PCV Handbook</i> .
8. Weed management		30 minutes	See <u>Sections 1.4 and 3.5.2</u> in the <i>SRI PCV Handbook</i> .
9. Harvesting and data collection		30 minutes	See <u>Sections 2.9, 3.5.4, 3.6, and Appendices C and D</u> in the <i>SRI PCV Handbook</i> .

1.5 Preparation Timeline

The preparation timeline will depend on the ability to prepare for the training in advance. The major field sessions of an SRI training are:

1. Comparison of SRI and conventional plots
2. Field and nursery preparation
3. Transplanting
4. Weed management

If little advance preparation is available, then consider only doing the middle two components, as these form the core of an SRI training:

1. Field and nursery preparation
2. Transplanting

If there are farmers in the region who are already practicing SRI, and the seasonal timing is right for the training, consider visiting a farmer's SRI field during the training to do the comparison and weeding sessions.

Timing	Activities	Related Training Sessions
<i>2-4 weeks prior to the training start</i>	Distribute materials to PCVs: <ul style="list-style-type: none"> • PCV SRI Handbook • PCV Pre-Training Questionnaire (see 	

	Appendix A)	
<i>10 days prior</i>	Start the SRI nursery, including all steps of SRI nursery establishment and management	<ul style="list-style-type: none"> • Transplanting
<i>1-2 days prior</i>	Water the field area that will be used for the transplanting and nursery sessions	<ul style="list-style-type: none"> • Field and nursery preparation • Transplanting
<i>The following is optional, depending on timing, or may be substituted by a visit to a farmer's SRI field:</i>		
<i>4-5 weeks prior, and ongoing until the training</i>	Start the SRI and conventional plots; transplant the SRI plot at the two-leaf stage; follow SRI management for the SRI plot	<ul style="list-style-type: none"> • Comparison of SRI and conventional plots • Weeding

1.6 Setting Up Field Demonstration Plots

Field demonstrations are an important component of an SRI training, and setting them up is easy. Having a nursery planted ahead of time, and a space to practice field prep, transplanting, and weeding will make it much easier for trainees to set up their first SRI trial at post. This handbook assumes you will use a 100m² demonstration field (10m x 10m); if your field size is different than this, simply adjust the amount of seed, compost, and area for your nursery using the calculations in [Appendix C, Handout 2](#). A nursery should be prepared and sown 10 days or so prior to the training, so that the seedlings will be at the two-leaf stage when transplanting. During the training, participants will prepare the field for planting, prepare a separate nursery (in order to have practice doing so), and then transplant the seedlings from the pre-prepared nursery into the field.

An optional step is to also prepare a visual demonstration of SRI in the field, with established plants that are 1½ to 2 months old. This will allow participants to see the difference for themselves between SRI plants and conventional plants, at an age when root growth and tillering is quite visibly different. To set this up, simply set aside a small demonstration plot (e.g., 100m²) and follow the process outlined in the *SRI PCV Handbook* in [Part 3](#), starting the nurseries 1½ to 2 months before the training.

1.7 Trainee Assessments

Evaluating trainee knowledge at the beginning and end of the training can serve multiple purposes:

1. Identifying areas where the training should focus its energies (i.e., collective knowledge gaps)
2. Signaling to trainees what knowledge gaps they have going into the training, and therefore where they should focus their energy and attention during the training
3. Evaluating how effective the training was at addressing these knowledge gaps

A sample trainee assessment is presented in Appendix B.

Appendix A – PCV Pre-Training Questionnaire¹

This questionnaire is designed to help PCVs come to a training prepared with a detailed knowledge of the current rice production systems in their area. It should be adapted to reflect local variations in rice production systems and any previous community assessment that trainees have done.

RICE SYSTEM INFORMATION

Some farmers/regions have multiple rice cropping seasons, and may even farm rice under different conditions and using different methodologies. This might mean farming rainfed upland rice on their higher plots of land, and lowland (flooded) rice in a nearby river valley, for example. If farmers in your region practice more than one noticeably distinct rice farming system, then fill out a separate survey for each.

Climate/geography

What is the climate in your village (*give a short description if need be*)?

Approximate altitude (*meters above sea level*):

Total yearly rainfall amount (*mm*):

Rainy season (*number of rainy seasons per year, period, and length in months for each*):

What types of rice cropping systems are practiced?

Irrigated – lowland (rainfed valley) – upland (rainfed but no flooding) – swamp system

What is the rice season or cropping calendar for this production system? (*Please list all rice cropping seasons just for this production system, if there are more than one*)

Timing of rice season (*month/date, duration*):

Land preparation (*date*):

Nursery establishment (*date*):

Planting (*date*):

Harvesting (*date*):

Is there water control? *Explain:*

Are the fields naturally inundated during the cropping season?

If yes, provide calendar period (*start, finish, # of months*):

Availability of water in irrigation schemes

Time periods when water is available:

Cost of irrigation (*cost/area*):

Reliability of water access, explain:

CURRENT PRACTICES

Soil preparation – what steps to farmers do to prepare their rice fields each year or season?

¹ Developed by Erika Styger and Devon Jenkins, SRI-Rice
Peace Corps SRI Trainer Handbook for West Africa

Seed source – where do farmers usually get their seeds from? *Explain:*

Planting:

Do farmers transplant their rice seed from a nursery, or sow their rice directly in the field?

If transplanted (sown in a nursery):

- Seed treatment (*e.g., soaking of seeds*): yes/no
- Age of seedling at transplanting (*days or weeks*):
- Number of seedlings/hill:
- Distance between hills (*cm*):
- Planted in lines/random planting (*circle one*)

If direct seeded (sown directly in the field):

- Seed treatment (*e.g., soaking of seeds*): yes/no
- Seeding: broadcasting, dibbling, line planting (*circle one, or describe if different*)
- Seeding machine used: yes/no
- If yes, what type:
- Amount of seed used/area (*e.g., kg/ha*):

Fertilization

Is organic matter used? Why or why not?

What types are used (*e.g., compost, manure, green manure, cover crops*)?

Is rice straw/stubble used? If so, how?

How much is applied and how often?

What constraints or other issues are there for using organic matter?

Are chemical fertilizers used?

What types are used (*name of fertilizer, N:P:K values*)?

How much is used and when during the season (*kg/ha*)?

What constraints or other issues are there with chemical fertilizers?

Pest management (*insects, birds, rats, other animals*)

Are there problems with pests?

If so – what pests?

What parts of the plant are damaged?

Is there a yield reduction (*how much*)?

How often and when is it a problem (*yearly, every xx years, etc.*)?

What strategies do farmers use to manage pests?

Disease management (*fungi, bacteria, virus*)

Are there problems with diseases?

If so – what diseases?

What parts of the plant are damaged?

Is there a yield reduction (*how much*)?

How often and when is it a problem (*yearly, every xx years*)?

What strategies do farmers use to manage them (including any products used)?

Level of mechanization

What kinds of tools are used for different cropping practices?

- Soil preparation:
- Planting/direct seeding:
- Weeding:
- Harvesting:

Are these tools common and available to most farmers (*explain*)?

What issues limit mechanization (*cost, availability, social or other issues*)?

Weeding

How is weeding done (*e.g., by hand, tractor, simple hand tools*)?

How many times per season?

Are there specific problems with weeds (*certain species, certain location in village, etc.*)?

Availability of labor

Is the labor for rice crop family labor, village exchange labor, or hired labor?

What is the cost for hired labor?

Socioeconomic factors (*labor availability in the village, competing demands for labor*):

Production information (*if there are multiple rice seasons per year, list each separately*)

Average yields obtained (*t/ha*):

Average yields in good years (*t/ha*) – *explain*:

Average yields in bad years (*t/ha*) – *explain*:

What are the primary reasons for variability between seasons (*e.g., rainfall*)?

PRODUCER BACKGROUND

Crop Production

Average rice plot size per household (*in hectares*):

What food crops are grown?

What cash crops are grown?

Prioritize crops by relative importance:

Animal production

Livestock/animal species (*and average number per household per species*):

Importance compared to crop production:

Subsistence livestock production – *or* – some commercial production (*circle one and explain*)?

How is the manure typically used?

Horticultural crops/forest species (*list any commonly used and describe their significance economically, seasonally, etc.*):

Appendix B – Pre/Post-Training Assessment

The following assessment can be used at the beginning and end of the SRI training to determine the level of knowledge that trainees acquired during the training. Inform trainees that they aren't expected to know the answers to all of these questions at the start of the training, but to do their best. By the end of the training, all participants should be able to answer each question.

1. How are rainfed upland and lowland rice systems different in respect to SRI?

2. What are the four principles of SRI, and how do they interrelate?

3. What does tillering mean, and why is it important to SRI?

4. Name five sources of organic matter that could be available in your area.

5. List five practices (e.g., types of field preparation practices) that can be used for adapting SRI to rainfed lowland rice.

Appendix C – Training Handouts

The following pages contain handouts that can be distributed to trainees during a training. These handouts can also be provided to PCVs who plan on doing trainings at post.

All training materials are based on using a demonstration field site of 100m². For larger or smaller demonstration plots, make sure to adjust the appropriate measurements as necessary (i.e., for quantity of seed needed, size of nursery, etc.). The second handout contains common formulas and conversions to help with this, and a variation is also presented as an appendix within the SRI PCV Handbook.

SRI Training – Handout 1

SRI Training of Trainers Material List		
Item	Quantity/Instructions	Notes
Field space	100m ²	The size of the field area used for demonstration purposes can vary. This list is based on a size of 100m ² (10m x 10m); if the size used is different than this, adjust the calculations below (for nursery size, manure /compost, and seed use) accordingly.
	Will be prepared with participants during the training	
Set up nursery	1m ² nursery area	See Section 3.3 in the <i>PCV SRI Handbook</i>
	Carefully prepare seed bed with equal parts soil, sand, and sifted aged compost	
	Sow the nursery 10 days prior to the start of the training	
	Sow with 85g of sorted, high-quality seed	
	Sow evenly to avoid dense clusters of plants, and cover with 1cm fine sand, and palm fronds if necessary	
	Water daily, as needed	
	Remove palm fronds when plants emerge	
Large dabas/hoes	5-10	Large hoes used for soil preparation
Small hoes	2	Small hoes used for weeding
Manure	50kg dried, sifted manure or compost	If using manure, it should not be fresh as it could hurt the plants
1m ² harvest square	1	Made of wood boards – make sure the inside dimensions are exactly 1m per side
Field measuring tape	1	
Precision scale	Resolution of 10-50g or better	
Machete or scythe	1	
Empty rice sacks	5	
Rice seed	2kg	85g of this will be used for the nursery sowing demo, but extra seed will be needed for people to get hands-on practice
Buckets	6	
Salt	2kg	
Eggs	6	
Clean water	Enough for six buckets	
String or rope	50-100 meter length	
SRI mechanical weeders	2 mandava style weeders	
	2 conoweeders	
Locally used planting/land preparation/weeding machines	1-2 locally used machine weeders/seeder	If there is a locally available weeder or direct seeding tool/machine (such as those commonly found in Senegal), demonstrate how this could be used for SRI
Marked rope	Mark the rope at 25cm intervals, tying string directly in between the strands of the rope	See Section 3.3.6 in the <i>PCV SRI Handbook</i>
Marking rake	Use or build a rake out of wood or metal with a spacing of 25cm between tines	See Section 3.3.6 in the <i>PCV SRI Handbook</i>
Handouts	Print 1 material list per participant	Handout 1 (<i>this document</i>)
	Print 1 calculation/conversion sheet per participant	Handout 2
	<i>PCV SRI Handbook</i>	

SRI Training – Handout 2

SRI Calculations and Conversions
<i>Organic Matter Applications</i>
2-10 tons per hectare 20-100kg per 100m ²
<i>Nursery Calculations</i>
Nursery size = 1% field size 1ha field = 100m ² nursery Nursery seed use = 8.5kg per hectare 85g of seed per m ² nursery size If sorting farmer-grown seed, start with 10kg per hectare to account for seed that will be discarded in the process
<i>Direct Seeding Calculations</i>
Seed use = 17kg per hectare If sorting farmer-grown seed, start with 20kg per hectare to account for seed that will be discarded in the process
<i>Conversions</i>
1 hectare = 10,000m ² 1 metric ton = 1,000kg
<i>Yield Calculations</i>
Calculating the yield when harvesting the entire plot: $\frac{\text{Weight (kg)}}{\text{Surface area (m}^2\text{)}} \times 10 = t/ha$ Calculating the yield when harvesting the entire plot without a scale, use the average weight of the sacks (or other container if not a sack) used to store the harvest (commonly 100k or 50k sacks): $\frac{\text{Average sack weight (kg)} \times \text{Number of sacks}}{\text{Surface area (m}^2\text{)}} \times 10 = t/ha$

Overseas Programming and Training Support

The Peace Corps Office of Overseas Programming and Training Support (OPATS) develops technical resources to benefit Volunteers, their co-workers, and the larger development community.

This publication was produced by the Peace Corps with funding from the Feed the Future Program through the U.S. Agency for International Development (USAID) Bureau for Food Security. It is distributed through the Knowledge and Learning Unit within the Peace Corps Office of Overseas Programming and Training Support.

Volunteers are encouraged to submit original material to KLU@peacecorps.gov. Such material may be used in future training material, becoming part of the Peace Corps' larger contribution to development.

Peace Corps
Office of Overseas Programming and Training Support
Knowledge & Learning
1111 20th Street, NW, Sixth Floor
Washington, DC 20526

KLU@peacecorps.gov

Abridged Dewey Decimal Classification (DDC) Number: 631.5