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# Daftar Isi

# INTRODUCTION OF SYSTEM OF RICE INTENSIFICATION (SRI) IN KELARA KARALLOE IN SOUTH SULAWESI, INDONESIA

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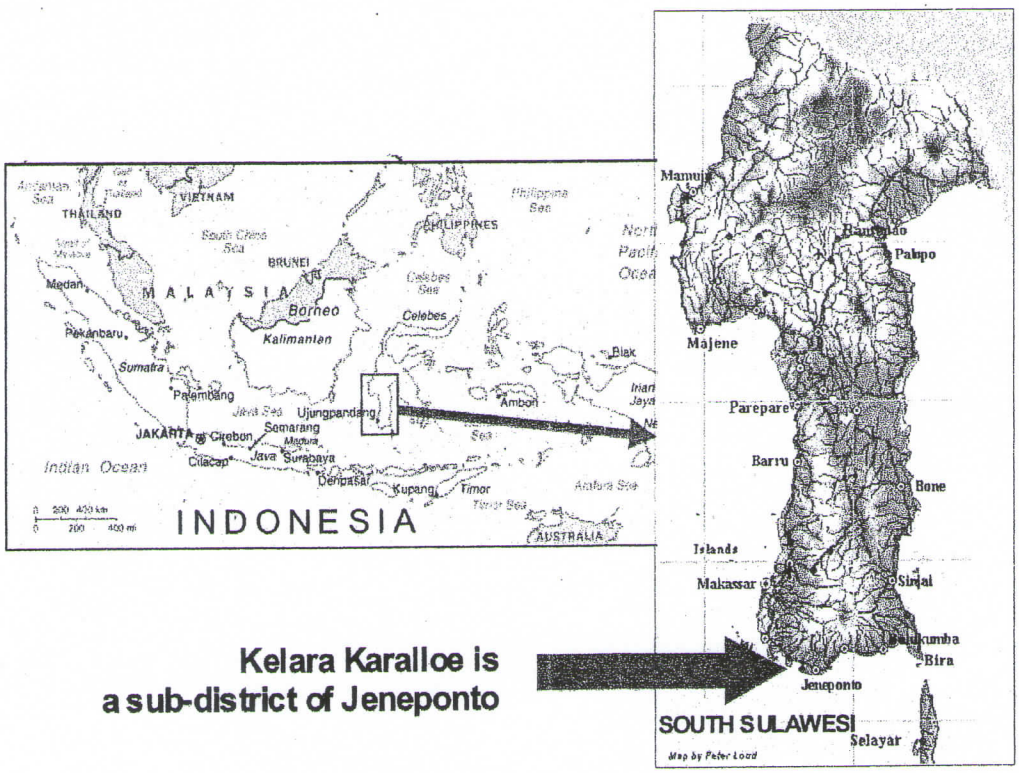
## I. Introduction

This project looks at the sub district of Kelara Karalloe with particular reference to the agricultural practice of rice production and System of Rice Intensification (SRI) implementation.

### 1.1. Kerala Karalloe




**Picture1**. Map of Indonesia, showing South Sulawesi, where Kelara Karalloe is situated

Kelara Karalloe is a sub district of Jeneponto which in turn is a district in South Sulawesi, a province in Indonesia. This sub district of Kelara Karalloe consists of three farmer groups, with one group having successfully implemented the SRI method (see below).

### 1.2. SRI Method

System of Rice Intensification (SRI) is a "new" method of rice production that increases yield with use of less water and seed. Originally SRI was "developed" in 1983 in Madagascar by Fr. Henri de Laulanie, SJ. It was introduced as an alternative to slash-and-burn agriculture. In 1999 it was introduced in West Java, Indonesia. It increased yields from 4.1 t/ha to 6.2 t/ha in the first season and 8.2 t/ha in the following season.

SRI method helps to alter how farmers manage their plant, soil, water and nutrients. This procedure is done to promote root growth and increase the abundance and diversity of soil organisms that enhance plant productivity. SRI methodology increases productivity of irrigated rice by altering conventional method and techniques for managing plants, soil, water and nutrients. SRI does not require the purchase of new seed or the use of new high yielding varieties, although the better the variety the better the yield. SRI methods have also been reported to increase rice plant resistance to pest and disease damage. This method again reduces the need for agro-chemicals. Incorporation of compost also gives better result for SRI than compared with fertilizer. However the major advantage of SRI method is its water saving capacity of around **30-50%**.

SRI requires skill for management of production especially during the initial phases and there is also additional labor input of approximately 25-50%. This extra labor input is important mainly during the beginning of the rice production process.

Yield increases have been known to average **50-100%** and may even reach three times the present level. Returns to labor are very high as purchased inputs are not required to a greater extent in comparison with the conventional method.

***Basic concept of SRI:***

**1. Unique transplanting method**

Seedling are transplanted at a younger age (before 14 days), this preserves the original seed's nutritional potential by around 40-50% there by maximizing the potential for tillering and root growth. A single seedling is transplanted per hole with a wider than the normal spacing. This is done to provide room for profuse root and tiller growth by allowing the plant to monopolize both soil fertility and sunshine energy.

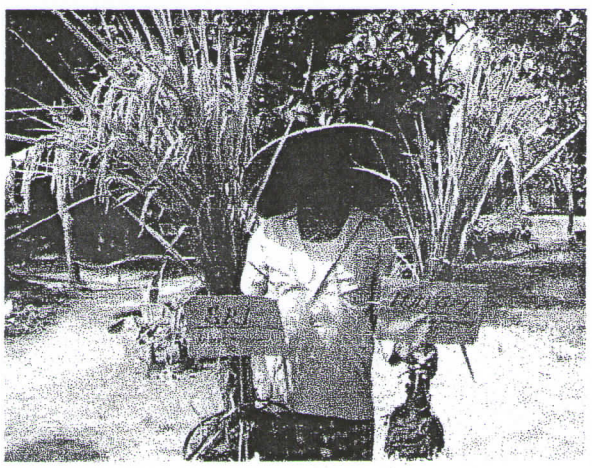
**2. Unique water management**

Intermittent irrigation is applied periodically to keep the soil both moist and aerated mainly during vegetation growth period. This irrigation practice reduces water demand by 30-50%.

### 1.3 Current rice production in Kelara Karalloe

The current method of rice production requires a lot of water for irrigation as the ground is kept continuously moist. More water is therefore required for the continuous flooding practice, in comparison to SRI which uses intermittent irrigation practices. There is also a heavy reliance on agrochemicals for both additional nutrients and pest control. However the conventional practice itself is not too labor intensive in comparison with SRI, as many seedlings are placed in one hole as compared to SRI which has only one seedling per hole. The seedlings are transplanted after a longer period (30 days) than compared to SRI (10 days). The conventional method on the other hand does not maximize yield.

Picture 2 below shows the difference in plant structure for rice grown under SRI as opposed to rice grown through the conventional method.



**Picture2.** Rice plants grown under the SRI method (left) and the conventional method (right)

Photo: http://ciifad.cornell.edu/sri/images/indosato3.jpg

### 1.4. Problem statement

Rice yields, in general, are low in Kerala Karalloe (approximately 3-4 t/ha.). The SRI method has proven its merit with regards to rice yield and out performs the traditional rice production techniques. This however has not seen any increase in the number of farmers opting to use the SRI method, which can increase yields to approximately 7-9 t/ha.

## II. Socio-technical Analysis

## 2.1 Problem Situation: Problem Tree

In general there is a problem of low yield in Kerala Karalloe. SRI implementation was devised through the Ministry of Public Works to solve this problem. The reduced yields are due to various problems. Below are some of the major problems involved.

### 1. Water shortage

Due to the climatic conditions of the area water shortages occur frequently, and in some extreme cases drought can also occur.

### 2. Water rights

The local leader (Karaeng) traditionally holds the water rights in the area. This often results in an inequitable and haphazard distribution of the water.

### 3. Local leader influence

The tradition of the local people is that they are dominantly influenced by the same Karaeng, who are seen as the Kings descendents therefore in a way directly rule over them.

### 4. Labor supply

Normal rice production practices for Kerala Karalloe depend on the use of family labor. This results in frequent shortages especially during peak labor time like planting and harvesting.

### 5. Pest and diseases

This is also reduces yields. Pest and diseases are a major threat to the local rice producers; due mainly to their agricultural practices which are heavily dependent on synthetic agro-chemicals and fertilizers. In most cases the locals are too poor to afford these products.

### 6. Extension worker influence

The area has two sets of extension staff who work there, from the respective Ministries of Agriculture and Public Works. Extension staffs yield a lot of power and authority within Kerala Karalloe. Success and failure of agricultural programmes have lain indirectly in their hands, and if they are not certain about the innovations, these innovations will not be implemented effectively.

### 7. Farmers resistance to change

Farmers, in general, in Kerala Karalloe are very resistant to change, with only one group out of three having adopted the SRI method.

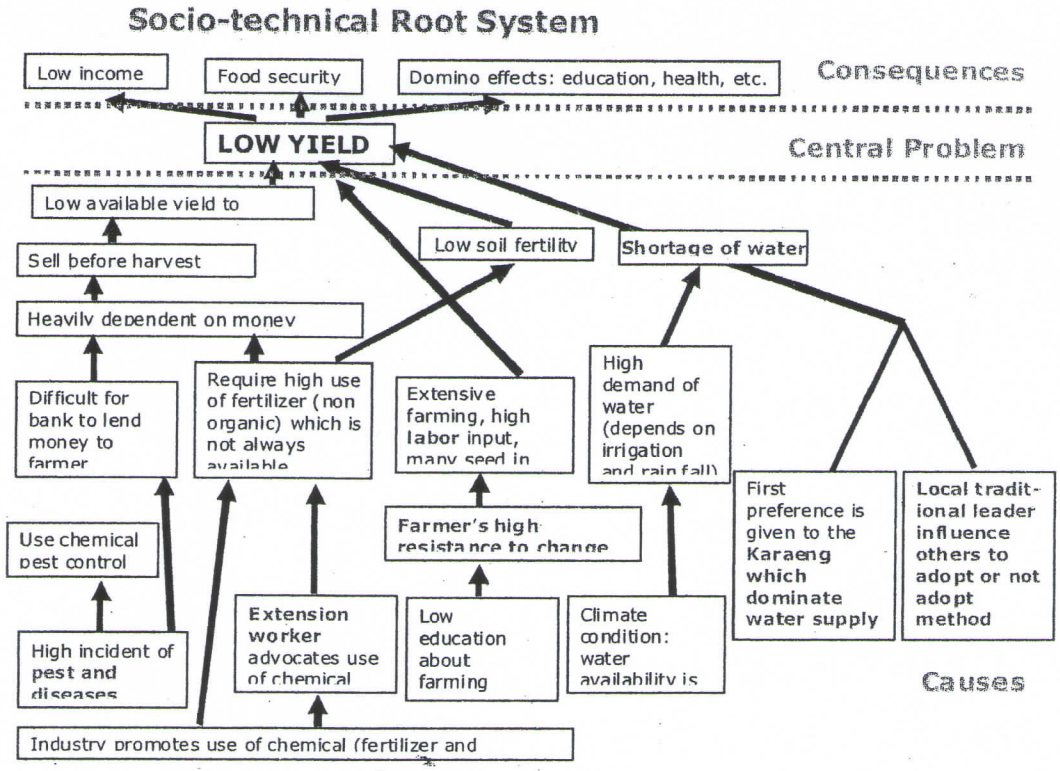



**Diagram 1.** Problem tree for Kerala Karalloe

### 2.2 Problem Situation: Stakeholder Hierarchy (power relation)

Diagram 2 gives an overview of the power relations which have a direct impact on the Kerala Karalloe community. Funding for the SRI project is from an international organization, Japan Bank for International Cooperation. This funding was given to the Ministry of Public Works through the Indonesian Government, on the condition that the Nippon Koei (a Japanese Consultant) was hired. The agricultural extension workers on the ground are from another ministry, Ministry of Agriculture.

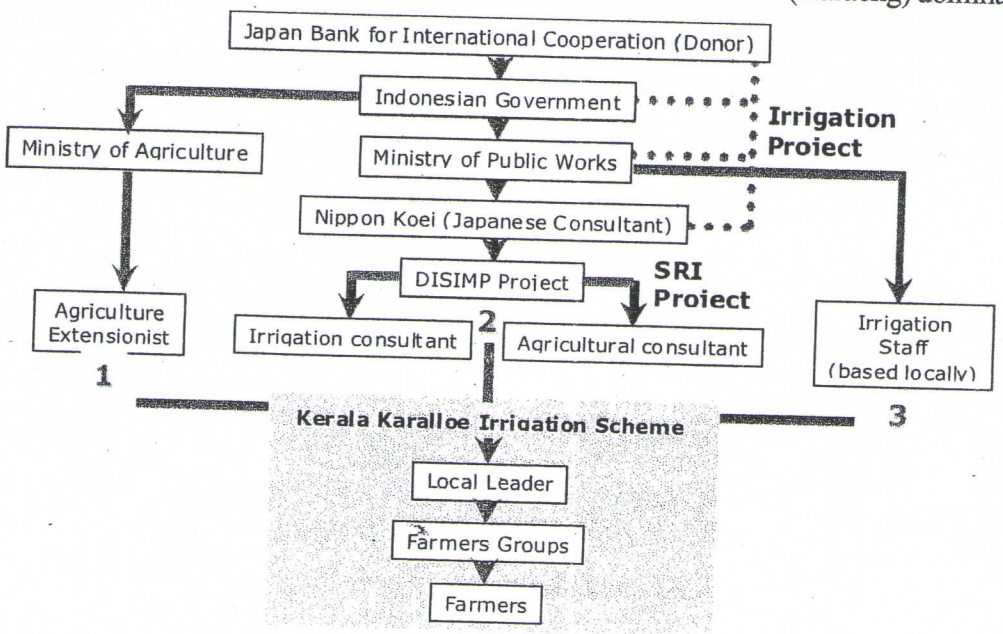
Due to this setup the following major situations arose:

1. There is tension among agricultural extension; irrigation extension (government) and DISIMP project (irrigation and agriculture consultants). The issue of ownership of the project is a problem as the agricultural extensionists feel that it should belong to their ministry. There is also some tension with the consultants and government workers as feelings of profession jealously are rife; consultants holding the more lucrative posts and the government employees working locally to ensuring success

of the project.

2. Due to having gained the trust of the Kerala Karalloe community, the local agriculture and irrigation extension staffs have the power to influence farmers on adoption of new technology. They can negatively influence the Kerala Karalloe for any reason from sabotage to shear ignorance themselves about SRI.

Within the Kerala Karalloe community, the local traditional leader (Karaeng) dominates.




Note: Power struggle among 1, 2 and 3

**Diagram2.** Problem Situation: Stakeholder Hierarchy

### 2.2 Problem Situation: Stakeholder Analysis

The table below (Table1) shows the stakeholder analysis. This stakeholder analysis prioritizes the stakeholder and their potential impact on the project (positive or negative). It also highlights the problems and constraints, as well as the power and influences of the stakeholders.

## III. Design Criteria

The design criteria were formulated from the problem tree and the stakeholder analysis. This design is important as is allows for a framework to solve the low acceptance and utilization rate of the SRI method that would go a long way in solving the major problem of low yields that the Kerala Karalloe community face. The design considered the technical

(hardware), social organization (orgware) and the changing of mindsets (software). The project team also looked into why the innovation had not been accepted much in that specific region. The two major reasons were the previous designs had concentrated mainly on the technical aspect and had generally ignored the social aspect. Also the project was largely top down with limited participation of the locals in its implementation.

The three aspects of the design (Hardware, Software and Orgware), although looked at separately are not rigid designs are they tend to overlap and feed into each other. The purpose of the design is to encourage network building, social learning and conflict management.

### 3.1. Design Criteria: Hardware/ Technical Aspect

The irrigation system of Kerala Karalloe consists of main, secondary and tertiary channels that carry water from the river to the farmers' fields. Changing this system is not necessary, with only the irrigation systems at individual farmer level requiring change. This is due to the fact that SRI can work efficiently enough with the current method of irrigation. Also disrupting the main irrigation would be costly and taxing on a social level as farm boundaries are renegotiated.

Therefore with this in mind the major design for the technology aspect relied mainly on the technical training of the actual SRI method. This was achieved through the following:

- Training of trainer (TOT)- extension staff and farmers
- Farmers visitations and field days to where the innovation has been successful
- Farmer to farmer education
- Demonstration plots to teach and show how innovation can be correctly implemented
- Pilot projects which test the innovation and show how SRI can be properly implemented, this can be accompanied with subsidized inputs (motivation and not bribes) for the farmers involved.

### 3.2 Design Criteria: Software

To allow effective changing of mindsets a participatory approach was used for the software design. This concentrated on focus group discussions of the following groups:

- Farmers
- Extension workers – especially MOA to introduce sense of ownership of the project
- Local leaders

This participatory approach- bottom up approach- would verify what the farmers need; allow the groups to actively participate in solving the problems of the Kerala Karalloe; and correct the perception of SRI being insurmountably more labor intensive. Although SRI method is highly labor intensive, this is only at the beginning but gets better with time. The use of demonstration plots and field trails can be used to practically show this to be true.

The local leaders can be approached to be a role model for SRI, due to their great influence on the Kerala Karalloe communities.
Public consultation meeting of all stakeholders would also be part of the design as it allows the building of networks with the different participants.


**Picture 3.** Different stakeholders participating in group discussions

### 3.4 Design Criteria: Orgware/ Organizational Aspect

Labor is family based, but the design can encourage alternative sources such as reciprocal labor practices (whereby neighboring farmers work together, mutually assisting each other), hired labor, or share cropping.

A forum with trusted and respected facilitators should be created to enable the stakeholders to communicate equally. Discrepancies in power relations through negotiations can be solved. The local leader can be convinced that the introduction, which uses less water, will benefit his constituency, allow for a near win-win situation.

The tension between the two ministry employees and the Nippon Koei (Japanese consultants) can be resolved through conflict management, firstly develop common ground among them, and involve them in the activity. Honorariums for the local agricultural extension staff can be introduced in the initial phases of SRI implementation. This is motivational, as the extensionists are encouraged to work harder on top of their normal activities.

## III. Strengths and Weaknesses of the proposed approach

The major advantage of the design is that it is flexible and can be modified according to

needs, within the SRI framework. The design allows for network building, conflict management and social learning to take place.

However, the major disadvantage on the other hand is that SRI in itself is typically top down with the innovation having been formulated at ministerial level along with Nippon Koei and now being implemented at local level. The design does not again look at other alternatives to increasing yield apart from those that have something to do with the SRI method, as SRI is a ministerial decision.

The follow are other contributing strengths and weaknesses for the design.

**Strengths**

The design:

1. is highly visual and participatory in nature resulting in skills build up.
2. encourages social learning, and horizontal knowledge transfer.
3. enables farmers to express their needs and expectations in a free and enabling environment.
4. promotes exploration of the reality on the ground for each stakeholder in their own context.
5. allows for a sense of ownership for the SRI innovation for the extension staff and the local leaders.
6. makes room for negotiation, creating conflict resolutions and common ground for stakeholders.
7. increases the socialization through reciprocal labor practices, training, visitations, focus group meeting, etc.

**Weaknesses**

The design:

1. may prove costly to bring many farmers to different areas for visitations.
2. relies heavily on knowledge transfer of trained participants, as knowledge transfer does not always happen.
3. supports the farmers with inputs, and SRI might again fail once the project team (Nippon Koei) withdraws from the area.
4. is time consuming.
5. fruitful negotiations, network building and social learning are reliant on the facilitator's rapport with the stakeholders; she/he must be trusted, respected, approachable and able to listen without dominating the process.

## IV. Conclusion

The design wanted to solve the problem of poor rice production yields in Kerala Karalloe through the improved implementation of the System of Rice Intensification (SRI). The problem tree and the stakeholder analysis were used to obtain a clearer picture of the situation in which to act on the above problem.
Although the facilitators and the project implementers are very important, the final success of the project will depend on the Kerala Karalloe community and all the other stakeholders involved. In the end, the Kerala Keralloe's own convictions about the usefulness of the tool will result in its use.

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