



**ENTERPRISE DEVELOPMENT SERVICES LTD**

15 Mudge Farm, Off Sir Samuel Lewis Road

P. M. B. 108, Freetown ~ Sierra Leone

[www.eds-sl.com](http://www.eds-sl.com)

# FARMERS ASSESSMENT OF RICE VARIETIES IN NORTHERN SIERRA LEONE

**Report of a survey for CARE**

Dunstan Spencer

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Sanusi S. Deen

*Senior Partner*

Tel: +23276608663

Email: [ssdeen@yahoo.com](mailto:ssdeen@yahoo.com)

Dunstan S. C. Spencer

*Senior Partner*

Tel: +23276610441

Email: [dscspencer@gmail.com](mailto:dscspencer@gmail.com)

Chrispin E. Wilson

*Senior Partner*

Tel: +23276787890

Email: [chrispinwilson@hotmail.com](mailto:chrispinwilson@hotmail.com)

## **BACKGROUND**

### **Rice Production in Sierra Leone**

Rice is the staple food for Sierra Leoneans but production does not satisfy demand and the country is obliged to import rice especially to feed the Freetown population. Annual rice production is currently estimated to be around 900,000 metric tons of paddy.

The main problems identified with rice production by CARE are: 1) the poor quality of seeds leading to poor yields, 2) lack of post harvesting quality control, 3) lack of post harvest services such as rice mills, collection and, 4) lack of organized distribution.

The local varieties are well-known and have been used by farmers over a long period of time. Despite their reputation of low yielding capacities, they have their own advantages including their adaptability to local conditions. Improved varieties are available through the Seed Multiplication Project (SMP) and include the ROK and the new NERICA varieties disseminated by the Sierra Leone Agricultural Research Institute (SLARI). They have advantages (high yielding potential, short-cycle, palatability, high protein content) but present some constraints (short straws, harvest during rainy season, etc.) that are not well documented in the local context, making it difficult for the extension services to convey well-founded messages to the farmers, and to have a clear understanding of farmers' constraints when these new varieties are introduced in the farming system.

### **The Value Chain Development Project**

The European Union funded 22 month CARE Rice Value Chain Development (RCVD) Project, started on December 16, 2009 with the aim of improving food and nutrition security and increasing incomes through more efficient production and marketing practices supported through value chain promotion. In collaboration with the Sierra Leone Agricultural Research Institute (SLARI) and the private sector, the RCVD project is expected to address the main bottlenecks in the rice value chain in three northern district of Sierra Leone (*Bombali, Koinadugu and Tonkolili*).

The RCVD project will build on the progress made by the other projects in setting up Farmer Associations, in supporting their organizational development and helping them to improve their techniques, by taking them the next step to facilitating improvement in quality of product and adding value through to engaging in product value chain activities and marketing of their products.

## **THE SURVEY**

### **Objectives of the Survey**

The objective of this survey was to ascertain the point of view of farmers regarding the pros and cons of rice varieties (local and imported) they are using in different agro-ecological contexts (upland, inland valley swamps, boli land) in the three Districts of the AVCD project (Bombali, Koinadugu and Tonkolili), in order to improve the technical support provided in the rice production sector

## Methodology

A random sample of 700 farmers (95% CI, 3.37% ME) was selected from the list of project farmers compiled by the CARE AVCD project which consisted of 44,100 farmers belonging to 98 Farmers Associations.

Enumerators interviewed farmers using coded questionnaire (see Annex 1) in which farmers were asked to rate different characteristics of the local and improved varieties they were growing on a 4 point scale - very poor = 1, poor = 2, good = 3, and very good = 4. Mean scores were then calculated for each characteristic.

Information was obtained from farmers for the different varieties in the three ecosystems as shown in Table 1. In the analysis all local varieties were grouped together and the improved varieties grouped as the ROK series, Pa Kiamp, the NERICAs and other improved varieties<sup>1</sup>.

Table 1: Groups of varieties covered in the CARE Farmer Rice Variety Assessment Survey

Variety	Upland		IVS		Boli	
	No	%	No	%	No	%
Local	252	32.5	410	58.5	46	16.7
ROK	102	13.2	137	19.5	58	21.0
NERICA	18	2.3	20	2.9	2	0.7
Pa Kiamp	389	50.2	63	9.0	170	61.6
Other Improved	14	1.8	71	10.1	0	0.0
Total	775	100	701	100	276	100

## Education and wealth indicators

As is expected among the rural population 75.6% of the sampled farmers are illiterate, with only 17.6% having received formal education and 7% some Koranic education. The level of illiteracy is higher than the national average of 60.2%,<sup>2</sup> indicating that the population is in general more disadvantaged education wise, than those in the rest of the country.

Farmers' dwellings are made mainly of mud walls and zinc roofs with thatched roof dwellings running a distant second (Figures 1 & 2). Half of the farmers own poultry, with about a third owning sheep and goats (Figure 3). Although 103 (15%) of sampled households were in Koinadugu District, the cattle owning District of Sierra Leone only 12 (1.7%) of sampled farmers reported owning any cattle indicating that farmers in the RVCD project are not among the richest in the District.

<sup>1</sup> See Ngaujah and Spencer, Characteristics of rice varieties in Northern Sierra Leone, for a description of the characteristics of the improved varieties

<sup>2</sup> Thomas, Armand, 2007, Population Profile of Sierra Leone.

Figure 1 Make of walls of dwellings of farmers

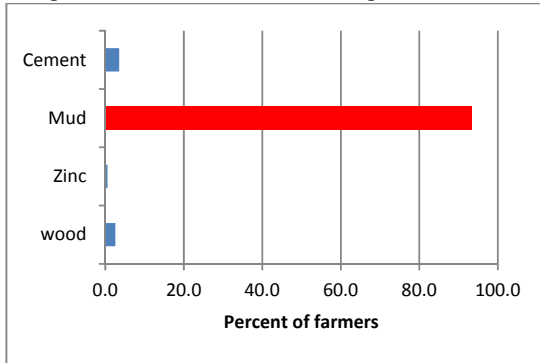
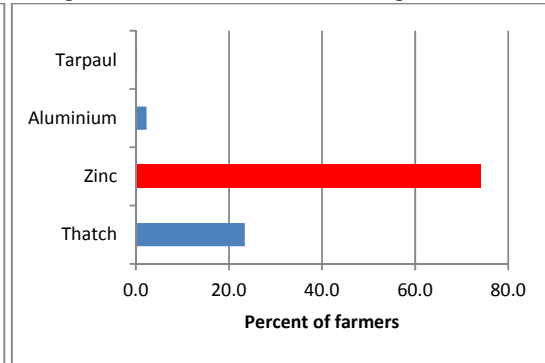
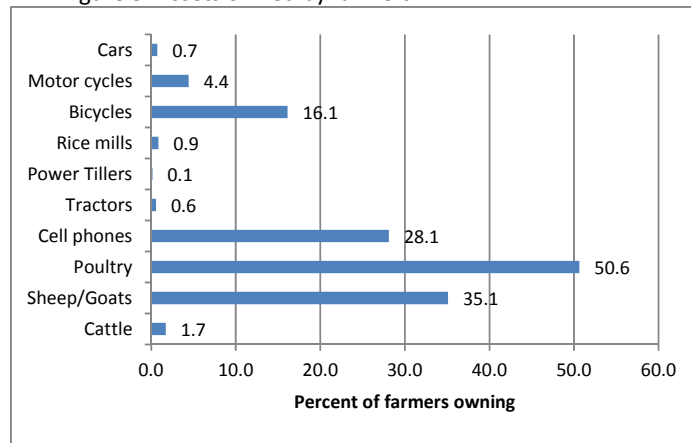


Figure 2: Make of Roofs of dwelling of farmers



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Figure 3: Assets owned by farmers



**Farmer experience with improved technologies:**

Figures 4 and 5 show that most RVCD project farmers have had access to and use improved rice varieties but few use fertilizers. This implies that despite the fact that improved varieties perform best with fertilisers farmers have selected such varieties and grow them without fertilisers. In the following sections of this report their assessments of the performance of the improved varieties as compared to local varieties grown under the similar conditions are presented. Farmers have also adopted other improved crop varieties with over 50% of the sample growing improved cassava and oil palm varieties

Figure 4: Access & Use of Improved Varieties

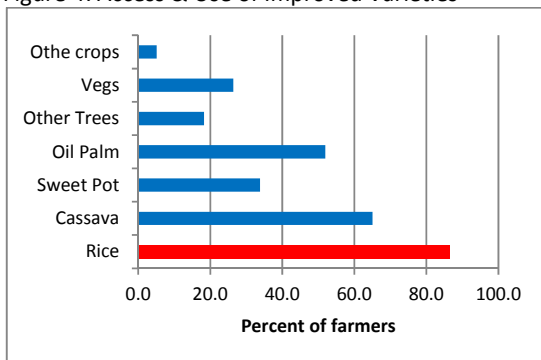
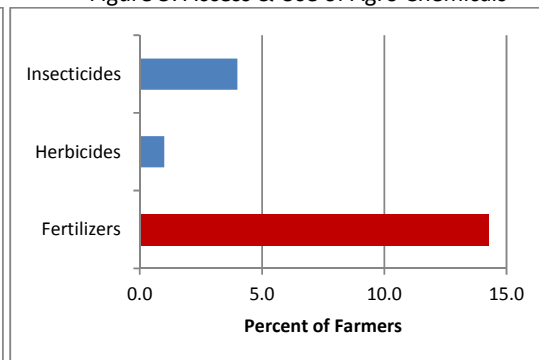


Figure 5: Access & Use of Agro Chemicals



Figures 6 & 7 show that very few of the farmers have water control facilities with about 10 – 15 percent having dams or pumps, less than 5% having PVC pipes. Use of rice mills is slightly more common (Figure 8) but access to improved storage facilities is much less common (Figure 9). In general farmers have received technical advise from extension agents (Ministry of Agriculture and NGOs) in the past with Figure 10 showing that 40-80% reported having received advise on various improved cropping techniques.

Figure 6: Use of irrigation equipment

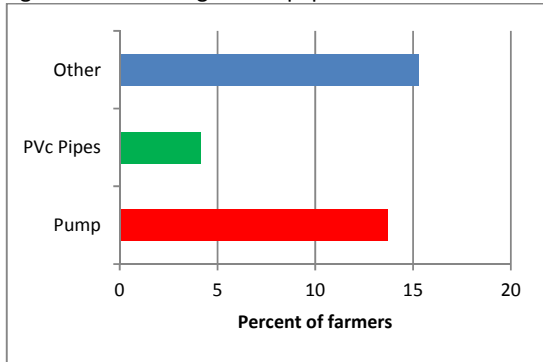


Figure 7: Use of irrigation facilities

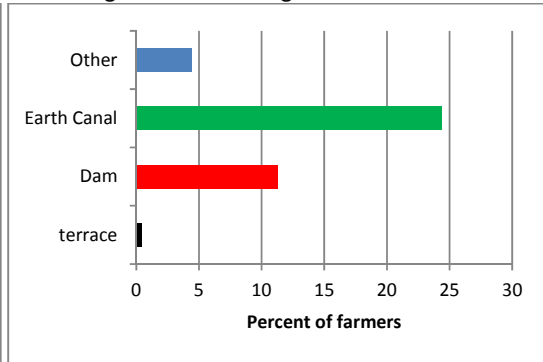


Figure 8: Use of processing equipment

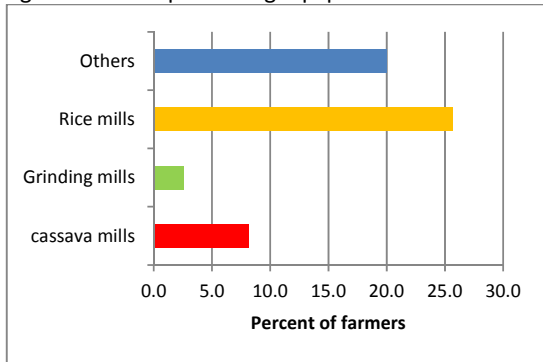


Figure 9: Use of storage equipment

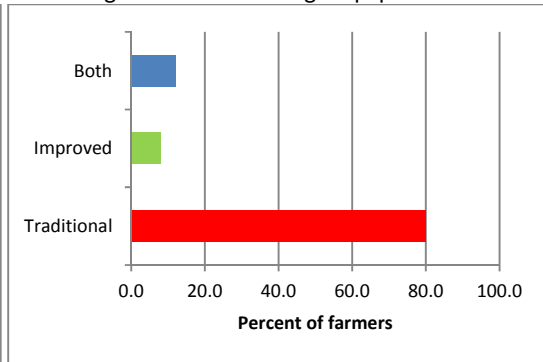
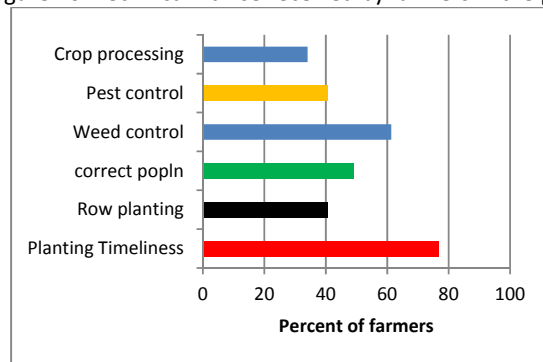


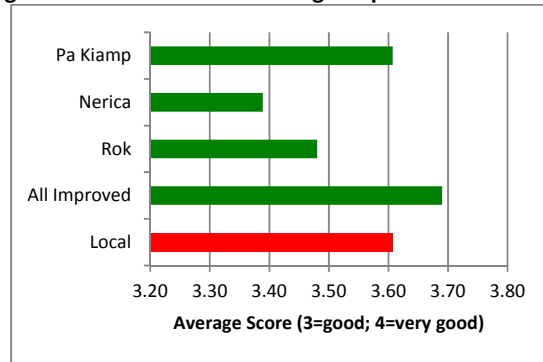
Figure 10: Technical Advise received by farmers in the past



**Farmer assessment of upland rice varieties**

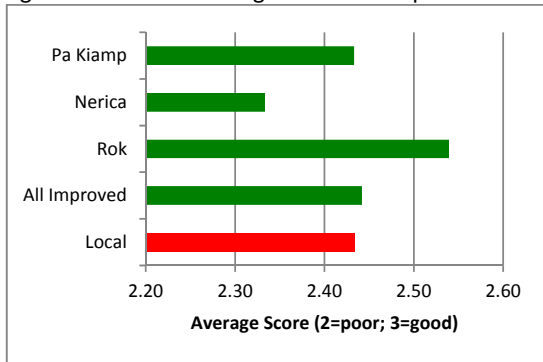
Overall farmers rated the varieties they were growing as good to very good (Figure 11). Improved varieties were rated as well as local varieties with Pa Kiamp being rated about the same as locals and the NERICA and ROK varieties slightly lower.

**Figure 11: Farmers overall rating of upland rice varieties**

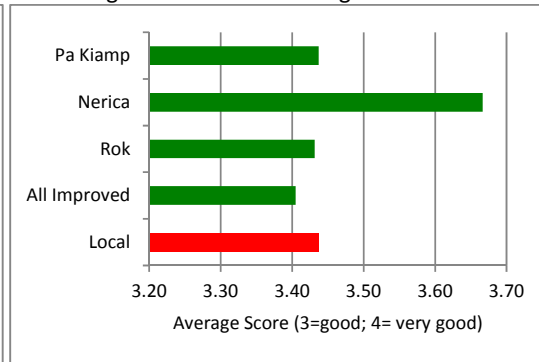


All the varieties, including the improved varieties were rated as poor on the average (Figure 12) with the ROKs rated slightly above the locals in this respect. However, all are rated as good to very good with regards to their duration (Figure 13) with the NERICAs being rated better the best for earliness.

**Figure 12: Farmers' ratings of weed competitiveness**



**Figure 13: Farmers' rating of earliness**



Rather surprisingly, improved upland rice varieties are rated better than the locals for their height (Figure 14) and as expected also better for their yield (Figure 15). With regards to post harvest characteristics of taste and marketability (varieties for which farmers expect to get a higher price), the improved varieties especially NERICAs were assessed the best by the farmers (Figures 16&17).

Figure 14: Farmers' ratings of the height of varieties

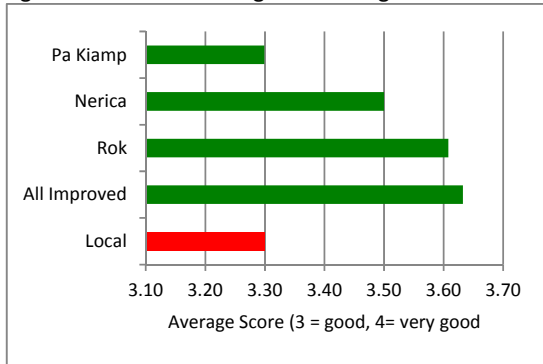


Figure 15: Farmers' ratings of the yield

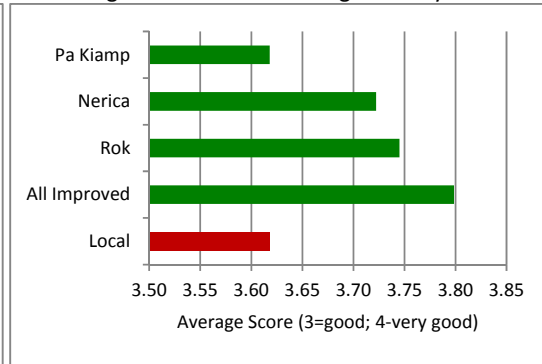


Figure 16: Farmers' ratings of the taste

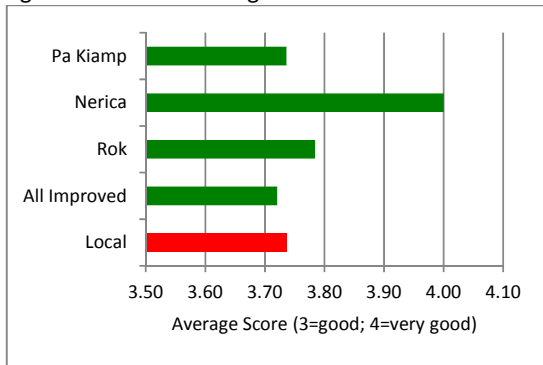
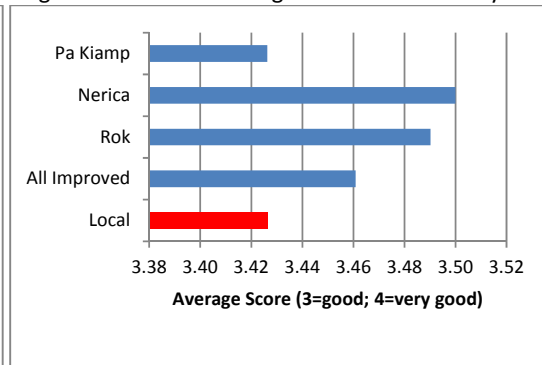


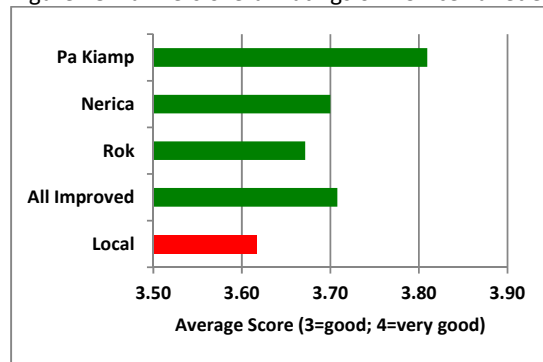
Figure 17: Farmers' ratings of the marketability



**Farmer assessment of inland valley swamp (ivs) rice varieties**

Overall, farmers rated the varieties they were growing in their IVS as good to very good. The improved varieties were rated above the local varieties with Pa Kiamp being rated the best, slightly above the NERICAs and ROKs (Figure 18).

Figure 18: Farmers overall ratings of IVS rice varieties



As is the case for upland varieties IVS varieties were also rated between poor and good for weed competition. However, the improved varieties, especially the NERICAs were rated worse than the locals (figure 19). Also with regards to the height of the varieties, the improved were rated generally less than the locals, with NERICAs being again rated worst, although varieties were rated as good to very good (Figure 20). But as expected the improved varieties were rated best for yield, with the Pa Kiamp rated the best followed by the NERICAs (Figure 21). For post harvest characteristics again the improved varieties are rated better than the local, with the NERICAs being rated the best for taste and Pa Kiamp best for marketability (Figures 22 & 23)

Figure 19: Ratings of IVS varieties weed competitiveness

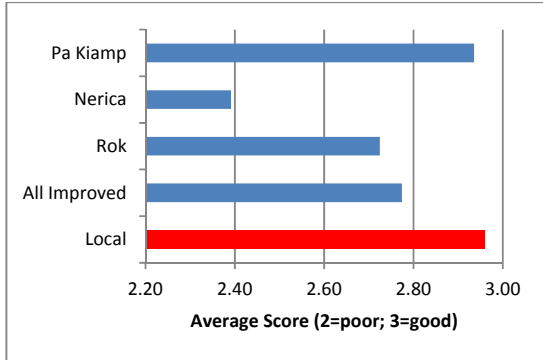


Figure 20: Ratings of the height of IVS Varieties

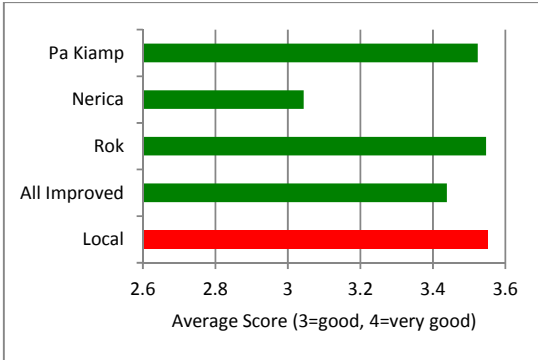


Figure 21: Farmers ratings of yield of IVS varieties

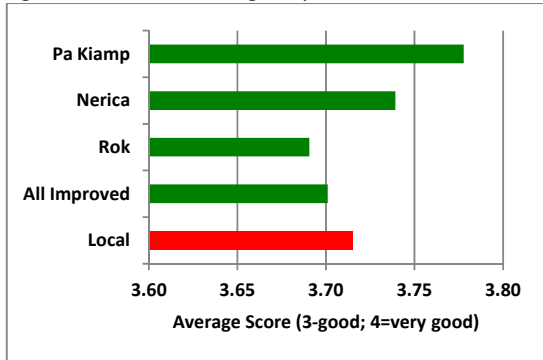


Figure 22: Farmers ratings of the taste of IVS varieties

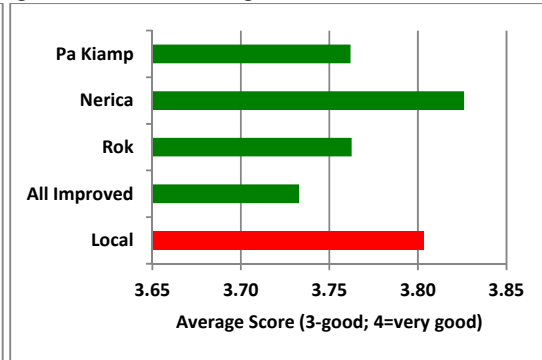
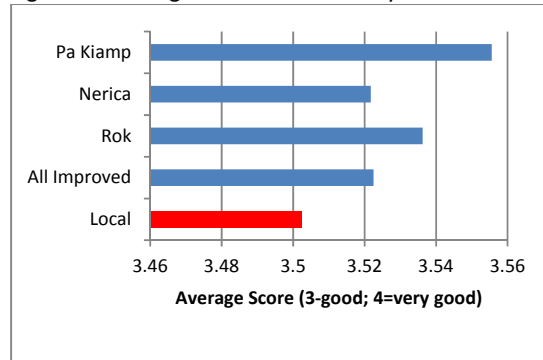


Figure 23: Ratings of the marketability of IVS varieties

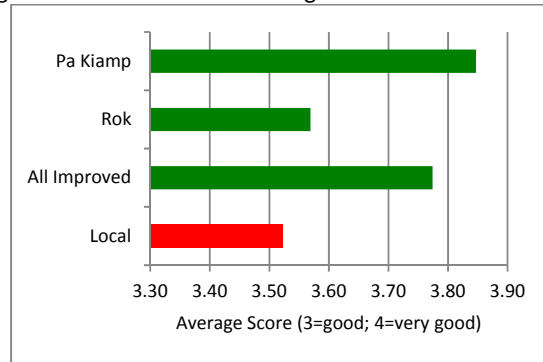




### Farmer assessment of boliland rice varieties

Since only two cases of NERICAs being grown in the bolilands were encountered, they were excluded from the discussion below because of the small sample size. Overall, farmers rated the varieties they were growing in bolilands as good to very good, with the improved varieties being rated above the locals and Pa Kiamp rated as best (Figure 24).

Figure 24: Farmers' overall ratings for boliland rice varieties



Again all the varieties were rated as poor for weed competition with the improved faring worse than the locals (Figure 25). But for height all the varieties were rated as good to very good, with Pa Kiamp rated as the best (Figure 26). For all the other characteristics all the varieties are rated as good to very good, with Pa Kiamp are rated as best (Figures 27 – 29)

Figure 25: Ratings of weed competitiveness

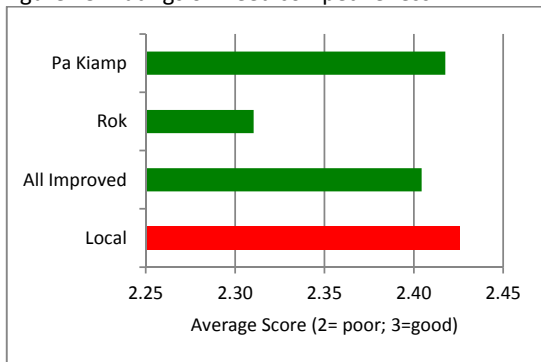


Figure 26: Farmers ratings of height

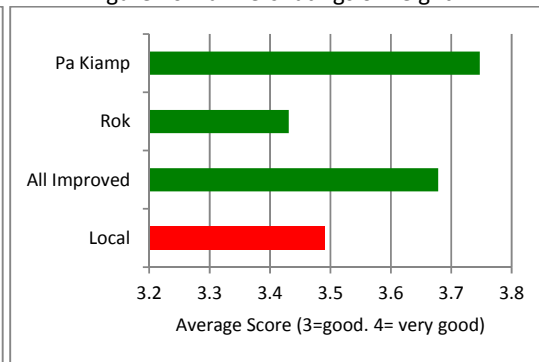


Figure 27: Ratings of earliness of boli varieties

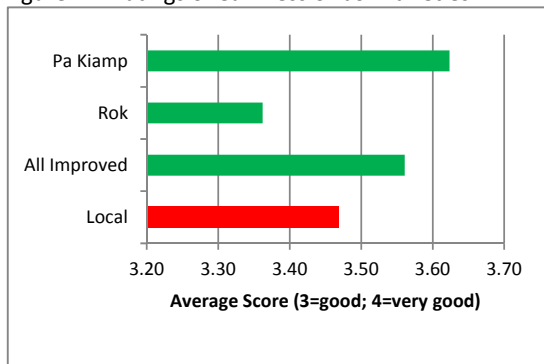


Figure 28: Ratings of yield of Boli varieties

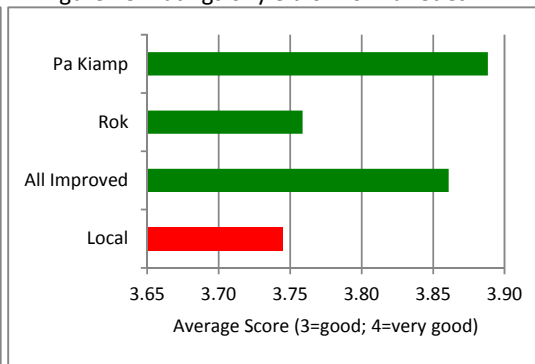


Figure 29: Ratings of the taste of boli varieties

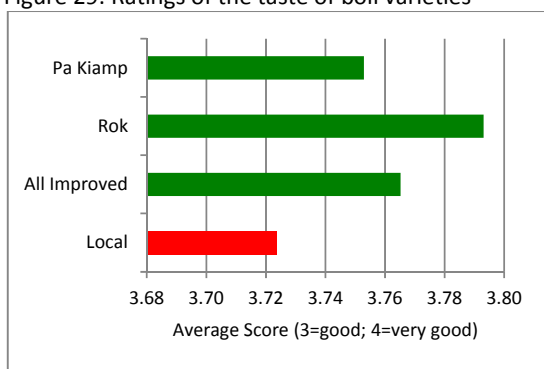
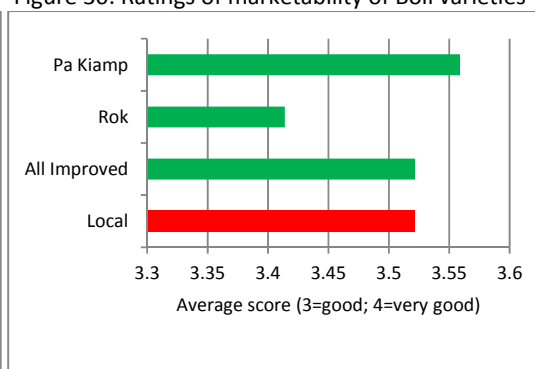


Figure 30: Ratings of marketability of Boli varieties



## Summary and conclusions

The main findings of the survey can be summarised as follows:

- Over 80% of farmers use improved varieties, but less than 20% use fertilisers, so farmers have found improved varieties to use without fertilisers
- The most highly rated improved variety in the three northern districts covered in the survey is Pa Kiamp, which is a very plastic variety as it is successfully grown in uplands, IVS and bolilands.
- Overall the improved varieties rated as well and usually better than the local varieties
- The improved varieties are rated better than locals for yield, earliness, taste and marketability in the sense that they usually command a slightly higher price in the market
- For height, the improved varieties are rated better in the uplands, and as good or better in the other ecologies
- All the varieties, including the NERICAs are rated only slightly above poor for weed competition

The main conclusion from the survey is that in spite of the lack of use of fertilisers and other minor deficiencies that they have, farmers assess the improved varieties as better than the local varieties and have adopted and are using them. Development agencies should therefore continue to offer the

existing improved varieties to farmers as the alleged disadvantages (poor height, earliness, etc) are not substantiated by farmers

However: above conclusions for varieties that farmers have already adopted. Similar assessments should be undertaken after all on-farm trials