STAPLES VALUE CHAIN NAFAKA ACTIVITY

TASK ORDER NO. AID-623-I-10-00001

Consultant Report – To assess the profitability of NAFAKA RICE production technologies in irrigated and rainfed systems

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List of Acronyms

IFDC	International Fertilizer Development Center
NPK	Nitrogen: Phosphorous: Potassium
QDS	Quality declared seeds
SRI	System rice intensification
Tsh	Tanzanian Shillings
UDP	Urea deep placement

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1. Executive Summary

The purpose of the trip is to conduct a rapid economic assessment through field level interviews with various primary (farm households) and secondary stakeholders (traders, processors etc.,) involved in the rice and maize value chain activities. The output of this work will be a report to guide future Nafaka investments based economic analysis that would compare different scenarios of both adoption and non-adoption of best practices that will provide clarity in terms of future investments in such interventions. However due to time constraints, during this trip it was possible to visit only two rice production districts (Mvomero and Kilombero districts). The maize production areas were not visited. For this report all analyses pertain to field-level assessments of rice production technologies in both irrigated and rainfed systems.

- Overall, the introduction of key technologies reduced labor. Line sowing, seed sowing using dibbling or a seed dibbler and using seed beds for seeding and transplanting initially required additional labor (especially in the case of transplanting and line sowing from the existing traditional method of broadcasting), but this labor was offset by reduced requirements for weeding.
- The technology adoption under Nafaka project has resulted in lower costs of production and higher yields, evident from the views expressed by both adopters and non-adopters in the intervention areas. Total costs of production reduced by nearly 70,000 Tsh/acre in terms of labor, and yield increased by a minimum of 5 bags/acre, This resulted in an additional revenue of nearly 300,000 Tsh./acre vs. traditional practices in both irrigated and rainfed rice production system due to line sowing and seed beds and transplanting using the seed dibbling method.

A detailed and a final report with a complete economic analysis will be provided *after this trip report* at both at the farmer level (adoption vs non-adoption of NAFAKA rice production technologies) and at the farm demonstration trials of model farms on various technologies.

II. Body of Report

2.1 OBJECTIVE

- To work out economics (costs vs. returns) related to various rice technologies demonstrated by NAFAKA ,which includes use of improved seeds, direct rice seeding, commercial seed production activities among seed farmers, and other input-saving rice technologies such as use of UDP and irrigation management practices among rice farming households in both irrigated and rainfed systems.

2.2 SCOPE OF WORK

- Meet with various IFDC-NAFAKA staff and carry out a rapid field level assessment on various technologies introduced through the project at farm household level, and the utility of technologies implemented through farm demonstration trials in Dakawa irrigation systems.

2.3 DELIVERABLES ASSOCIATED WITH TRIP

- Revised scopes of work (SoW) – Due to time constraints, it was possible to visit only the two districts involved in the rice production (Mvomero and Kilombero districts) and make a detailed field level assessment of rice production technologies in both irrigated and rainfed systems.
- Profitability of various NAFAKA interventions implemented through farm demonstrations in Dakawa irrigation systems for both seed producers and seed users.
- A detailed and a final report with economics worked out both at the farmer level (adoption vs. non-adoption of NAFAKA rice production technologies) and at the farm demonstration trials of model farm on various technologies will be provided *after this trip report by September 4th, 2013.*

2.4 SPECIFIC ACTIVITIES UNDER TAKEN DURING THE TRIP

In 2012 IFDC focused on the identification and production of quality seed of superior rice varieties, and the demonstration of urea deep placement (UDP). Both technologies were undertaken in areas with good irrigation management, with technical advice from the irrigation specialist. Results with both interventions were very promising, and there is now interest from both commercial seed companies to engage in certified rice seed production, and from fertilizer suppliers to produce and market urea super granules.

The major objective of this trip is to carry out a detailed cost/benefit analysis for technologies demonstrated (conservation agriculture, irrigation, varieties, and fertilizers) with the seed program development specialist and the irrigated rice specialist. Hence specific activities that were undertaken

to complete this task – a rapid assessment through field level interviews conducted among farm households in two districts (Mvomero and Kilombero) on the adoption of NAFAKA rice production technologies – among seed producers and seed users, and discussion with NAFAKA subject matter specialists regarding various farm demonstration trial details and practices carried out through Dakawa model farm to work out the cost: benefit analysis.

To accomplish the above tasks, field trips were undertaken to assess the adoption of new agricultural practices introduced through NAFAKA rice project in Kilombero and Mvomero districts. The key interventions implemented through the project are

1. improving the availability of quality seed of superior varieties of rice through seed production and multiplication activities among farmers,
2. demonstrating technologies such as urea deep placement (UDP), planting methods, use of improved ag-inputs (improved seeds and herbicides), and good irrigation management practices among rice growers in the NAFAKA project area.

The field assessment for this task included detailed discussions with its stakeholder; i.e., farm households who adopted such technologies (seed producers and seed users) and the traders who are involved in both input and output markets. The field trips were organized by NAFAKA staff and were undertaken from 13th – 16th August, 2013 in the districts on Mvomero and Kilombero. The details and purpose of the field trip are given below;

Table 1: Details of the trip

Date	Location	Purpose of the visit
12th August, 2013	Morogoro discussion with Mr. Richard Kaiza about project details and implementation; planning of field trip schedule for the week.	
13th August, 2013	Dakawa, Mvomero district	Discussions with i. rice certified seed producers and rice producers in irrigated and upland systems; visit the model farm established under NAFAKA activity for different treatments
14th August, 2013	Mhelule village, Mang'ula, Kilombero district	i. discussions with rice seed producers – quality declared seeds (QDS); ii. discussions with rice growers on the adoption of key rice technologies introduced by the NAFAKA activity and associated costs.
15th August, 2013	Ifakara, Lumemo, Kisegese, Kilombero district	i. meetings with agro-dealers ; ii. discussions with farmers group at Lumemo on the adoption of rice production technologies; iii. discussions with seed producers at Kisegese
16th August, 2013	Ifakara, Kilombero district	Visit and discussion with rice trader and miller at Ifakara town.
19th August, 2013	Morogoro – Wrap up discussion with Mr. Richard Kaiza, Irrigation Specialist and Mr. Filbert Mzee regarding the overall performance of the NAFAKA technologies; seed production and users adoption in the districts and details regarding the model farm demonstrations from Dakawa irrigation project.	

2.5 PRELIMINARY FINDINGS FROM THE FIELD [1]

During this trip 25 farmers were interviewed at various locations (specified above in the table) to understand their views on the adoption and non-adoption of NAFKAKA rice production technologies.

Farmers interviewed in Mvomero are served by Dakawa the irrigation scheme. Rice is grown mostly under irrigation, though most of these farmers have also practiced upland rice cultivation in fields that are not close to canals or covered by the irrigation system. The rice varieties are grown during the major rice cropping season, starting from December and January through the months of July and August. Usually the canal supplies irrigation from May onwards.

The rice seed producers in the irrigated Dakawa scheme are contracted by Tan Seed International to produce certified seeds by multiplying TXD 306(SARO), a semi-aromatic rice variety. Farmers covering 93 acres in Dakawa were given seeds for further multiplication of certified seeds of TXD variety last season. Seeds produced from this acreage will be procured by Tan Seed International at a fixed price of 900 Tsh/kg of seeds. Farmers in the region expect an average yield of 30-35 bags/ acre (90 kg/bag).

In Kilombero district, 11 farmers were given basic seeds to produce quality declared seeds (QDS) to cater to the demand for quality seeds in their own farm communities. In addition, 35 rice farmers also are producing certified seeds in the district. The rice production system in Kilombero is mostly under rainfed conditions, and very few farmers have supplemented their rice cultivation with irrigation from nearby river systems. The farmers in Kilombero district are also aware of herbicide use since 2007 onwards. The most common herbicides used are 2-4-D and Proponil, and Round-up to lesser extent. Farmers in the rainfed system obtain average yields of 10-12 bags per acre.

The overall acceptance rate of key interventions introduced through NAFAKA was positive among both seed users (rice growers) and seed producers in the project intervention areas.

- Among the technologies and good agricultural practices introduced in the last couple of years under NAFAKA, the adoption of *direct seeding using seed dibbling/transplanting using seed beds* and *proper spacing (line sowing method)* between seedlings was adopted extensively among the farmers in the project areas.
- Farmers realized a savings of nearly 35 kg of seeds/ acre (from 50 kgs / acre used under traditional broadcasting method) due to improved seeding methods introduced through NAFAKA, or nearly 70,000 Tsh (2000 Tsh/kg of rice seed).

[1] Detailed profitability of different interventions adopted by farmers' vs non-adopters in both rainfed and irrigated system will be given in the final report due by September 4th 2013.

- The improved method of sowing and plant spacing also resulted in other advantages such as ease of weeding operations; reduction in weeding cost due to fewer weeds, and easier fertilizer application.
- The adoption of line sowing using seed bed-transplanting or seed dibbling resulted in increased average yields – 3 to 5 bags/acre in the rainfed rice systems and of 10 to15 bags in the irrigated systems.
- A few farmers also have also planted *second crops,* mostly vegetables such as onion and chillies (piri-piri) after rice using excess moisture in the field and using hose pipes to lift irrigation from the nearby rivers in Kilombero district.
- Farmers in the project area also have adopted *bunding around fields,* especially in Kilombero district, to retain water, especially in rainfed rice systems.
- Farmers have also adopted certain fertilizer saving technologies demonstrated and supplied through NAFAKA project, particularly urea deep placement (*UDP)* methods. They also have adopted good fertilizer application practices such as split application of urea.
- Farmers use less fertilizer with UDP, as UDP, as requires only 15 kg of urea/acre.
- Farmers, who have adopted *rice seed production* for the first time due to NAFAKA intervention, found seed production more profitable, though involves intensive production technologies, and guard against *output price uncertainites*.

In 2013 IFDC has established a model farm in the Dakawa irrigation scheme that was used to demonstrate best irrigation practices and the full range of technologies that are currently available to rice farmers either through commercial or public channels – see Table 2 below. This farm was used to showcase NAFAKA technologies and few key interventions, and was established by mid-February, 2013.

Table 2: DAKAWA IRRIGATED RICE DEMO PLOT LAYOUT SCHEMATIC DIAGRAM

VARIETY TRIALS					
SARO, YARA FERTILIZER	NERICA, YARA FERT.	LOCAL, YARA FERT.	FERTILISER TRIALS		
SARO, YARA FULL.	SARO, YARA 3/4	SARO, YARA 1/2	SARO, UREA	SARO, UDP x1.5	NO FERTILISER
SRI 20CM UREA FULL	SRI 20CM YARA	SRI 20CM CONTROL	SARO, UREA, 1.5	SARO, UDP x2	MANURE
SRI 25CM DAP FULL	SRI 25CM UDP	SRI 25CM CONTROL	UDP	NPK(0:40:40)	DAP
SRI 30CM YARA	SRI 30CM UDP	SRI 30CM GYPSUM	MINJINGU MAZAO	NPK(0:40:40)	NPK (120:0:0)
SRI 40 CM YARA	SRI 40CM UDP	SRI 40CM CONTROL	NPK (20:0:40)	MINJINGU MAZAO	DAP
SOURCE: Mr. Richard Kaiza, NAFAKA-IFDC					

The yields obtained from trials demonstrated in the model farm from different treatments were obtained, and a detailed economic analysis will be conducted using the information generated as a part of the final report. To ensure that both public and commercial technologies are demonstrated

effectively, and that cost: benefit analyses will be carried out that are meaningful to farmers, it is suggested that technologies are grouped into the five categories listed above; i.e. SRI, superior rice varieties, basal fertilizers, top-dressing fertilizers and herbicides. Although many of these technologies are already being promoted, there is a scarcity of research data that will hinder wider promotion of successful technologies by policy makers unless a convincing case can be presented with quantifiable data supporting further investment in up-scaling.

2.6 CONCLUSIONS

A. FARM LEVEL ADOPTION OF TECHNOLOGIES

- The introduction of key technologies reduced labor. Line sowing, seed sowing using dibbling or a seed dibbler and using seed beds for seeding and transplanting initially required additional labor (especially in the case of transplanting and line sowing from the existing traditional method of broadcasting), but this labor was offset by reduced requirements for weeding.
- Technology adoption under NAFAKA project has resulted in increased yields, reduced labor, and greater profits, which was evident from the views expressed by the adopters to non-adopters in the intervention areas. A cost saving of nearly 70,000 Tsh/acre in terms of labor in the total cost of cultivation and an increase in profits from the additional output of 5 bags (minimum) saving of nearly 300,000 Tsh (from traditional) was obtained by farmers in both irrigated and rainfed rice production system due to an adoption of a single technology – line sowing/ seed beds and transplanting using seed dibbling method.
- Farmers who adopted UDP during the last season are well aware of the advantages in terms of efficient use, cost savings in fertilizer use and increased yields. However the future adoption of such technologies cannot be guaranteed unless there is a constant supply and availability through proper sources – at the right time.
- Farmers in general, though aware of the benefits of fertilizer use, expressed that cost was the most important factor that prohibits them from using it. Most of the farmers in both rice production areas only use urea (25 to 50 kgs of urea/acre and in some case only10 kgs/acre). Few farmers in irrigated system have used Yara Mila Cereal mix (23:10:5 +micro) – 2 bags (50 kg each). The price of urea is around 60,000 Tsh/bag; Yara Mila is 55,000 Tsh/50 kg bag.
- Few farmers also complained about fake inputs in dealer shops – especially herbicides in Kilombero district.
- Farmers find bunding most useful in retaining water, but formation of bunds is labor intensive and expensive. Some farmers expressed that it reduces their cultivation area.
- Farmers in general are not happy about fluctuating output prices,– especially this year and last season. Government policy was to substitute domestic rice consumption with cheap imports, and domestic rice production/producers suffer as a result.
- Though currently seed inspection costs for seed producers are absorbed by the NAFAKA project, there is need to build a sustainable approach in addressing this in the long term.
- There is need for a model farm or extensive demonstrations of farm technologies introduced through NAFAKA in the rainfed rice production system such as the Dakawa irrigation scheme.

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