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STAPLES VALUE CHAIN NAFKA ACTIVITY

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

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The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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List of Acronyms

GAP-----	Good Agriculture Practice
ICRISAT-----	International Crop Research Institute for the Semi-Arid Tropics
IITA-----	International Institute of Tropical Agriculture
IRRI-----	International Rice Research Institute
KATI-----	Kizimbani Agriculture Training Institute
SRI-----	System of Rice Intensification
TNA-----	Technical Needs Assessment
UDP-----	Urea Deep Placement
YARA-----	YARA International
ZARI-----	Zanzibar Agriculture Training Institute

Executive Summary

The Zanzibar Rice Productivity program started in January of 2013 after a meeting between USAID, NAFKA, and the Government of Tanzania. The parties decided that NAFKA Feed the Future would work in cooperation with the Government of Zanzibar primarily with the Ministry of Agriculture and Natural Resources (MOA). The program was designed and executed by NAFKA with the assistance of the Zanzibar Agricultural Research Institute (ZARI).

The program includes eight (8) groups of fifty (50) farmers, four (4) groups from the irrigate perimeters and four (4) groups from the rain-fed sector. The program also installed four (4) demonstration plots, two (2) in the irrigated perimeter of Bumbwisudi and one (1) plot each in the rain-fed areas of Kapanga and Kilombero. The training was completed with many farmers using the adapted SRI technology in the irrigated perimeters; the adoption rate in the rain areas was lower because many farmers had completed their land preparation before the training.

The results of the irrigated demonstration plots show the yield could be increased from the national average of four (4) ton per hectare to five (5) tons by farmers adapting the modified System of Rice Intensification (SRI) technology. The modified SRI system could also reduce the usage of seed and fertilizer while increasing yields. The results of the rain-fed plots were more dramatic. The national production average for rain-fed rice is a debated 0.6 tons to 1.0 tons; the demonstration plots using the modified SRI technology showed that yield in rain-fed rice could increase up to three (3) ton per hectare. The best rain-fed yielding demonstration plots yielded over five (5) tons per hectare. It is thought that the biggest improvement of yield was because of the water conservation of the level land with bunds; the Good Agriculture Practice (GAP) use of fertilizer and use of quality improved seed also contributed.

The results of the Zanzibar Rice Productivity program has shown that the research institutes and the training institutes with limited funding, using existing technologies with intense focus and dedication has the opportunity to make an impact on the lives of thousands of farmers.

The role of this consultant was to provide support for program activities focusing on productivity, with a central focus on Zanzibar. This included development of demonstration plots and training farmers at the Kapanga, Bumbwisudi and Kilombero sites identified by the Zanzibar Ministry of Agriculture on the following: seed preparation; seeding and land preparation; planning and transplanting; proper fertilizer application; water management; fertilizer side dressing; weed control; insect and disease control; later-season disease and insect control; bird scaring; pre-harvest preparation; planning for post-harvest crops; harvest; post-harvest management; and planting alternative crops. In addition to serving as liaison with the MOA technical specialists and officials attached to program activity, this consultant was also involved in defining the participation of the Kizimibani Agricultural Training Institute (KATI), building its capacity to provide training and technical assistance services.

This report summarizes the primary activities conducted by this consultant over the course of four weeks between November and December 2013.

II. Strategy of KATI and ZARI Grants

The goal of the grants with KATI and ZARI is to increase the productivity of rice production in both the irrigated and rain-fed rice production in Zanzibar to being self-sufficient in rice supply in the future. The present yields of rain-fed rice are 0.6 to 1.0 tons per hectares planted on 18,000 ha by more than 45,000 farm families. If these farmers would use parts of the adapted SRI technology they could easily double yields, if 100% of the adapted SRI technology were used by the farmers the yields could exceed 2.5 tons per hectare. The adapted SRI is adapted to be compatible with the environmental conditions in Unguja and Pemba. The basis of the adapted SRI is as follows:

- Land leveling and bunds for water conservation
- Incorporation of organic matter when possible
- Use of improved seed
- Reducing the amount of seed sowing or transplants planting
- Spaced planting of seed/seedlings
- Use of fertilizer in a way that prevents runoff reducing environmental concerns.
- Managing moisture to limit water use to maximize yields.
- Pest and disease program using an IPM program.
- Harvest, processing and storage with minimum loss and maximum quality of the crop.

The first phase of the Rice productivity program started in January of 2013, with the planned training of over 400 farmers in 4 different groups in Kapanga, Kilombero in the rain-fed area and Bumbwisudi an irrigated area with 4 additional groups. These groups received from ZARI personal 5 trainings each covering the adapted SRI technology. ZARI also installed 4 demo plots 2 in the irrigated area and 2 in the rain-fed area of Kapanga and Kilombero. The results of the demo plots were better than expected, the irrigated plots showed that yields up to 6 tons per hectare could be obtained if the adapted SRI technology was applied, the average yield of the 700 hectares of irrigated rice in Zanzibar is 4 tons/ha. The results from the rain-fed demo plots were more dramatic, the 18,000 hectares of rain-fed rice in Zanzibar is between 0.6 tons and 1 ton. The demo average yields were over 2.5 tons per Hectare with the best yielding plot yielding equivalent of 5 tons per hectare. The water conservation, seeds, fertilizer all contributed to the yield increase.

To accomplish a real rice yield increase in Zanzibar an intensive training program must be undertaken to train and demonstrate to the extension staff and the farmers yield increases brought about by the use of adapted SRI. To accomplish this KATI and ZARI do the following per funding by the NAFKA grants:

- KATI and ZARI will focus all the training on 40 groups that were jointly selected by ZARI and KATI;
- From the selected groups KATI will train 40 extension staff and 80 lead farmers in a two week residential training course;
- The trained lead farmers will return to their villages and install a 5x5 meters squared adapted SRI demo plot with supplied seed and fertilizer;

- ZARI will do intense class room training and demo plots in the same villages;
- The irrigation department trainers will be trained by ZARI per the adapted SRI technology;
- The seed production Unit will also be trained by ZARI in the use of adapted SRI in the production of seed;
- NAFKA will also train the seed producers per the technology and technics per rice seed production; and
- ZARI will also do outreach as last year with reaching out to farmers and the extension staff.

It is expected that this training and outreach program will reach an additional 2000 farmers for a total of 4000 farmers.



III. Activities First 30 Days of the Grants to ZARI and KATI

The focus of the first 30 days after the ceremonial signing was to meet the conditions to reach milestone one and start to meet the conditions of milestone two. The necessity of meeting the milestones is to start the process to obtain funding to move ahead with milestone two.

KATI has accomplished the following:

- Financed and completed the TNA survey on both Unguja and Pemba, the results survey is attached;
- The first milestone has been completed and payment has been made;
- KATI has hired new tutors and a person to monitor and mentor; and
- Completed the process of harmonizing the KATI training syllabus with the ZARI adapted SRI production technology.

ZARI, working in coordination with KATI, was able to select the 40 villages to be targeted for the residential training, monitoring and mentoring, formal training, and demo plots. ZARI has been able to accomplish within the first 30 days:

- Submitted the first milestone;
- Working in cooperation with KATI and the extension service selected the communities that will receive the training;
- Assisted KATI with the TNA survey;
- Prepared a draft agreement with the seed production unit for the production of Supa BC rice seed;
- Prepared a draft agreement with the irrigation department to level the planned one acre each on Kapanga and Kilombero;
- Developed the criteria of the selection of the land for leveling and bund construction;
- Leading the collaboration with KATI in developing the unified training syllabus for the adapted SRI technology;
- In the process of hiring five (5) new employees to do the field training and demo plots;
- Meeting with YARA Fertilizer resulted in the supply of YARA Milla fertilizer and technical cooperation in developing environmental friendly use of fertilizer;
- Contacting the manufacturers of urea super granules to continue the environmentally friendly Urea Deep Placement (UDP) program; and
- Developing the protocols for the scientific trials and the alternative crop observation plots.

There have been minor glitches that have made ZARI request two changes:

- ✓ Move the alternative crops from milestone one to milestone 4 the reason being, because of climatic conditions.
- ✓ Move the scientific trials from milestone four to milestone three.

The two grant programs are moving forward; however, to maintain the momentum special efforts need to be made to get the milestones completed and funded in a timely way.

IV. Plan next 60 days

The next 60 days will be a very critical time for the grants of both ZARI and KATI. In coordination with the climate ZARI needs to accomplish important residential training, formal training and all of the field activities.

The next 30 days some of the important things KATI will accomplish are:

- Co-operate with NAFKA in the M&E base line study;
- Publish the results of the analysis of the completed TNA;
- Start the residential training of rain feed farmers;
- Start the mentoring and monitoring of the activities;
- Complete the conditions of milestone two;
- Commence complying with milestone three;
- Summit the training syllabus for the residential training; and
- Develop the format for the presentation of milestone for residential.

ZARI will have a more complicated program in the next 60 days as the institute must coordinate all activities with the climatic conditions. ZARI will be doing the following:

- Cooperate with NAFKA in the M&E base line study with five (5) staff members being enumerators;
- Purchase four (4) motorcycles with NAFKA mentoring;
- Lead and complete the training syllabus with KATI;
- Start the first training of the groups;
- Sign agreements with the Seed Production Unit and Irrigation Department;
- Complete the training of trainers of the staff of the Seed Unit and Irrigation Department;
- Complete the conditions of milestone two;
- Commence complying with milestone three;
- Select and start the land leveling and bund building at Kapanga and Kilombero;
- Approve the seed production program of the seed production;
- Select rice seed varieties;
- Develop the report format for farmer training;
- Select demo plot locations and the protocols of the demo plots;
- Organize the delivery of the YARA fertilizer; and
- Purchase and organize the delivery of the Urea Super Granules.

NAFAKA will continue to monitor and mentor both ZARI and KATI to complete all of the above activities. This consultant is scheduled to return to assist and mentor the grant programs once every 2 months for a period of 10 to 14 days. Mr. _____ will be assisting in my absence.

Annex I: Alternative Crops

TRANSFER OF ALTERNATIVE CROPS TO THE SHORT RAINS SEASON IN RAINFED RICE FIELDS, STARTING IN JUNE 2014

ZARI has received a Grant from the NAFKA Feed the Future project to trial different alternative crops to observe the adaptability of different cultivars and varieties of legume and non-legumes. The project implementation was delayed and the short rains for 2013 will be ending in 30 days as Zanzibar enters into the mid-summer drought. It is planned to delay the alternative crop until June 2014. ZARI requests to move the alternative crop production from Milestone 1 to Milestone 4. The budget of 1,783,200 TZS for the alternative crops will be discounted from Milestone 1 and moved to Milestone 4. The net value of Milestone 1 will be reduced to 16,181,000 TZS, Milestone 4 will increase to 42,265,400 TZS.

Cost of Growing (Demonstrating) Alternative Crops				
Extension staff	Per diems for day trip	45	10,000	450,000
Technical Coordinator	Per diems for day trip	15	15,000	225,000
Fuel	Liters	460	2,170	998,200
Labor				
Seeding	Trial plot (5mX4m)	10	3,000	30,000
Weeding	Trial plot (5mX4m)	10	2,000	20,000
Disease control (spraying)	Lump sum			10,000
Harvesting	Trial plot (5mX4m)	10	5,000	50,000
				1,783,200

Justification: Zanzibar has a total land area of 26,600 ha for rice cultivation, of which 8,521 has potential for irrigation development which could be used for rice cultivation in two seasons per year during long rains (Mar-June) and short rains (Oct-Dec). Over 18,000 ha are rain-fed where rice is only grown during the long rains after which the land stays without any farming. Rice using the traditional varieties cannot be grown during short rains due to unreliability of rainfall and also other varieties are photosensitive and therefore they cannot flower. However, the amount of rainfall received during the short rainy season using water saving systems should be enough moisture for short term and drought tolerant crops. Once established, farmers of rain-fed fields could have an alternative crop during short rains and could therefore raise their food security while increasing farm income per year. If this alternative crop was a legume the benefit would be greater because of the captured nitrogen in the soil and crop residue.

Possible Alternative Crops

Some of the possible alternative crops could be obtained in Zanzibar and some could be introduced from regional or international research institutes dealing with such crops. We are planning to contact these institutions for acquisition of these crops for testing. The alternative crops could be cowpeas, pigeon peas, green gram, groundnuts, sesame, sunflower, maize, upland NERICA varieties, sorghum, millets and etc.

Implementation Plan Delayed

The short rains begin in October and end in December. We cannot proceed to implement the alternative crop program as planned in the milestones as we are now in late November, with the expected mid-summer dry season to start in 40 day. The way forward for ZARI at this time is to develop the plot plan and protocols for the alternative crop trials that will start as soon as the rice harvest starts. It could be delayed to the end of the long rains while currently making an effort to get the crops from various institutions.

The normal season for alternative crops would be September and October planting and seedling emergence, and November and December vegetation and crop set with harvest in January.

In order to comply with the milestones ZARI will do the following:

- Develop the plot plan for the alternative crops;
- Develop the protocols for the different alternative crops to be observed;
- Establish the criteria for the selection of the alternative crop varieties;
- Selection of the best varieties that meet the criteria on Zanzibar and the mainland; and
- Request trial packets of new drought resistant and short maturity varieties, for observation and evaluation from international research institutes such as International Crop Research Institute for the Semi-Arid Tropics (ICRISAT), International Rice Research Institute (IRRI), International Institute of Tropical Agriculture (IITA) and others.

The criteria for the selection of varieties for observation are as follows:

- Locally consumed as a food and/or possible to be exported;
- Beneficial to the soil;
- Deep root system;
- Short vegetative period;
- Limited processing needed to be consumed as food;
- Storability and PHH; and
- Value on the market.

Annex 2: Group Selection

SELECTED COMMUNITIES/LOCATIONS FOR NAFKA TRAINING IN MASIKA SEASON 2014-ZANZIBAR

UNGUJA ISLAND

RAINFED					
No	Location	Group name	No. of participants	Registered members	In process
1	Mtende	Mtende farmers	50	-	50
2	Muyuni B	Muyuni B farmers	50	-	50
3	Chuini	Chuini farmers	50	-	50
4	Kwarara	Kwarara farmers	50	-	50
5	Mchangani	Mchangani farmers association	50	50	-
6	Koani	Koani farmers association	50	50	-
7	Cheju	Cheju farmers association	50	50	-
8	Uzini	Kisimamchanga farmers association	50	50	-
9	Mkokotoni	Mvivu akae	50	40	10
10	Kisongoni	Kisongoni tusizembee	50	30	20
11	Kinyasini	Ukweli bora	50	30	20
12	Muwanda	Tushikamane	50	20	30
13	Mto mzigua	Mkorofi hafai	50	20	30
14	Pangeni		50	20	30
IRRIGATION					
15	Kibokwa 1	Kibokwa irrigation farmers 1	50	-	50
16	Kibokwa 2	Kibokwa irrigation farmers 2	50	-	50
17	Kianga	Kianga irrigation farmers	50	-	50
18	Mtwango 2	Mtwango irrigation farmers	50	-	50
19	Mtwango 4	Mtwango irrigation farmers	50	-	50
20	Mtwango 5	Mtwango irrigation farmers	50	-	50
21	Cheju FAO 1	Tuwe pamoja 1	50	50	-
22	Cheju FAO 2	Tuwe pamoja 2	50	50	-
23	Cheju Padep		50		
24	Cheju Tasaf		50		
25	Mwera	Mwera irrigation farmers	50	-	50
26	Uzini	Uzini irrigation farmers	50	-	50

PEMBA ISLAND

RAINFED					
No	Location	Group name	No. of participants	Registered members	In process
1	Mavuika	Mavuika farmers	50	-	50
2	Chwale	Chwale farmers	50	-	50
3	Msaani	Msaani farmers	50	-	50
4	Wapape	Wapape farmers	50	-	50
5	Ngwiya	Ngwiya farmers	50	-	50
6	Mfubaha	Mfubaha farmers	50	-	50
7	Ngurumo	Ngurumo farmers	50	-	50
8	Kwapapa	Kwapapa farmers	50	-	50
9	Mkadini	Mkadini farmers	50	-	50
10	Kwajibwa	Kwajibwa farmers	50	-	50
IRRIGATION					
11	Tungamaa	Tungamaa irrigation farmers	50	-	50
12	Saninga	Saninga farmers association	50	50	-
13	Tibirinzi	Tibirinzi farmers association	50	50	-
14	Makombeni	Makombeni irrigation farmers	50	-	50

Annex 3: Community Selection

SELECTION OF COMMUNITIES FOR CONDUCTING DEMO-PLOT IN ZANZIBAR- 2014

Objective of the Selection

The objective is to select the farmer group engaged in rice cultivation which will be trained by NAFKA project through demo-plots in Masika season 2014.

The committee had a total of 80 locations from Unguja and Pemba Islands out of which 40 locations were selected from both rain-fed and irrigated areas based on the criteria.

List of selected locations

Rainfed Unguja		Irrigation Unguja	
Location	District	Location	District
Mtende	South	Kibokwa 1	North A
Muyuni B	South	Kibokwa 2	North A
Chuini	West	Mtwango 2	West
Kwarara	West	Mtwango 4	West
Mchangani	Central	Mtwango 5	West
Koani	Central	Kianga	West
Cheju	Central	Mwera	Central
Uzini	Central	Uzini	Central
Mkokotoni	North A	Cheju FAO 1	Central
Kisongoni	North A	Cheju FAO 2	Central
Kinyasini	North A	Cheju Padep	Central
Muwanda	North B	Cheju Tasaf	Central
Mto mzigua	North B		
Pangeni	North B		
Total	14	Total	12
Rainfed Pemba		Irrigation Pemba	
Mavuika	Wete	Tungamaa	Wete
Kwapapa	Mkoani	Saninga	Micheweni
Chwale	Wete	Tibirinzi	Chake
Mkadini	Mkoani	Makombeni	Mkoani
Msaani	Wete		
Wapape	Micheweni		
Ngwiya	Micheweni		
Mfubaha	Chake		
Ngurumo	Chake		
Kwajibwa	Mkoani		

Total	10	Total	4
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Selection criteria

The committee used the following key criteria to select 40 farmers' groups for project activities during 2014.

1. Potentiality of the agricultural area in rice production rain-fed/irrigated.
2. Existence of farmers organized in groups.
3. Accessibility of the location in-terms of transport.
4. Availability of Extension officer.

Annex 4: Land Leveling Draft Agreement

AGREEMENT BETWEEN ZARI AND THE IRRIGATION DEPARTMENT OF THE MOA TO LEVEL TWO ACRES OF RAIN-FED RICE LAND

The objective of this agreement is the following:

- To start the capacitation of the Irrigation Department to do leveling of rain-fed rice land for the purpose of water conservation and the use of adapted SRI technology;
- To demonstrate to the local farmers the advantage of water conservation and adapted SRI technology;
- Leveling one acre each on Kapanga and Kilombero as selected by ZARI staff;
- Monitor and record the results of the demonstration;
- Develop a report that shows the negative or positive results of water conservation and adapted SRI rain-fed rice technology on Zanzibar; and
- The economic cost of leveling and bunding will be reported to ZARI.

The norms of the seed production will be:

- An area of 4000 square meters will be leveled on the area known as Kapanga.
 - ✓ The area will be selected by the ZARI technical specialists working with the extension service.
 - ✓ There will be at least two (2) farmers on each area but no more than four (4).
 - ✓ The area leveled will be able to be drained.
 - ✓ The area will have a slight slope to the drain.
 - ✓ The farmers will build the bunds as dictated by the slope of the land.
 - ✓ Rain gage will be installed at the area and a farmer will have the responsibility to record the rain.
- The farmers will be monitored and trained by ZARI technical specialists to:
 - ✓ Use the proper seed and fertilizer to comply with SRI technology;
 - ✓ Use GAP such as spacing to comply SRI; and
 - ✓ Record and deliver to ZARI all production cost and yield and market information.

ZARI will make the following payments per deliverables from the Irrigation Department unit.

- | | |
|------------|---|
| Payment 1. | At contract signing and selection of the producing locations:
200,000 TZS |
| Payment 2. | At farmer selection and the completion of the survey map for leveling:
500,000 TZS |
| Payment 3. | At the signing of the contract (copy of contract) with the commercial company to level the two 4000 square meter areas: 1,100,000 TZS |
| Payment 4. | At the completion of the leveling and bund building drain completion:
1,000,000 TZS |

Annex 5: Seed Profiles

PROFILES OF SEEDS SELECTED FOR SEED PRODUCTION UNDER ACDI/VOCA - ZARI GRANT

Variety	Characteristics
BKN-SUPA	<ul style="list-style-type: none"> • moderate yield (up to 5t/ha)
	<ul style="list-style-type: none"> • medium in plant height
	<ul style="list-style-type: none"> • low tilling ability
	<ul style="list-style-type: none"> • high seed rate (needs closer spacing or more seedling per hill)
	<ul style="list-style-type: none"> • semi aromatic
	<ul style="list-style-type: none"> • medium size and translucent
	<ul style="list-style-type: none"> • early-duration (110 days)
	<ul style="list-style-type: none"> • preferred by consumers
SUBANG	<ul style="list-style-type: none"> • succumbs to rice blast when grown under upland conditions.
	<ul style="list-style-type: none"> • moderate yield (up to 7t/ha)
	<ul style="list-style-type: none"> • medium in plant height
	<ul style="list-style-type: none"> • early-duration (110 days)
	<ul style="list-style-type: none"> • high tilling ability
	<ul style="list-style-type: none"> • low seed rate (wider spacing with one seedling per hill)
	<ul style="list-style-type: none"> • high responsive to increased N application
	<ul style="list-style-type: none"> • semi aromatic
SUPA BC	<ul style="list-style-type: none"> • medium size and translucent
	<ul style="list-style-type: none"> • preferred by consumers
	<ul style="list-style-type: none"> • high yielding potentials (more than 7t/ha)
	<ul style="list-style-type: none"> • medium plant height
	<ul style="list-style-type: none"> • high tilling ability
	<ul style="list-style-type: none"> • low seed rate (wider spacing with one seedling per hill)
	<ul style="list-style-type: none"> • high responsive to increased N application
	<ul style="list-style-type: none"> • semi aromatic
	<ul style="list-style-type: none"> • medium-duration (135 days)
	<ul style="list-style-type: none"> • preferred by consumers
	<ul style="list-style-type: none"> • suitable under lowland and irrigated ecologies

Annex 6: Seed Production Draft Agreement

DRAFT AGREEMENT BETWEEN ZARI AND THE SEED UNIT OF DEPARTMENT OF AGRICULTURE, MANR TO PRODUCE EIGHT (8) TONNES OF CERTIFIED SEED PRODUCED BY CONTRACT FARMERS

The objective of this agreement is the following:

- To train and capacitate the Seed Production Unit to train the seed production trainers and contracted seed producing farmers to use adapted SRI technology.
- To locally produce the rice varieties that has been selected for the local Zanzibar conditions.
- Ensure these seeds are to be disseminated to local farmers as certified seed.
- To lead Zanzibar in becoming self-sufficient in seed production in the future.

The norms of the seed production will be:

- The farmers contracted to produce seed will be from a “to be determined” irrigated parameter;
- The seed producing farmers and trainers will be trained in SRI technology;
- The seed varieties will be selected per-agreement between the seed producer and buyer;
- The seed will be produced per international seed production norms;
- The seed will be harvested and dried to international standards;
- The seed will be germination tested and certified farmer per farmer 30 days after harvest; and
- The seed will be packaged per the requirements of ZARI and delivered to storage as requested by ZARI.

ZARI will make the following payments per deliverables from the seed production unit:

- Payment 1. At contract signing and the purchase of basic seed and selection of seed producing locations and farmers: 600,000 TZS
- Payment 2. At the contracting of farmers and the completion of training: 800,000 TZS (ZARI will support the training cost)
- Payment 3. At harvest time with field inspection and estimated yields: 1,000,000 TZS
- Payment 4. At delivery of purity test and independent germination test: 808,000 TZS (The “to be determined” kg of seed delivered to a location as directed by ZARI)

This agreement is entered into in good faith by both parties.

Annex 7: TNA Analysis

TECHNICAL NEEDS SURVEY ZANZIBAR: KATI DECEMBER 2013

UNGUJA					
Sample size 20 farmers each					
all yields and rates in hectare and kilogram					
1	Yields	Rain-Fed	%	Irrigated	%
	< 3000 kg	9	45%	5	25%
	>3000 kg	5	25%	4	20%
	>5000 kg	6	30%	11	55%
2	Seed Source				
	Commercial	18	90%	20	100%
	Neighbor	1	5%		
	Self	1	5%		
3	Seed Type				
	Local	4	20%		
	Improved Short	14	70%	20	100%
	Improved Long	2	10%		
4	Seeding Rate				
	< 20	4	20%	2	10%
	< 50	14	70%	2	10%
	> 50	2	10%	16	80%
5	Seed soaking				
		20	100%	20	100%
6	Land Preparation				
	Hand Hoe	2	10%	10	50%
	Mechanical	18	90%	10	50%
7	Puddling Before Plant				
	1 day	N/A		15.0	75%
	2 days			0	
	7 days			5	25%
8	Leveling				
	No Leveling	20		1	5%
	Hand Leveling			19	95%
9	Size of Seed Bed				
	Recommended	N/A		1	5%
	Not Recommended	N/A		19	95%
10	Weeding				
	Small Hand Hoe	13	65%	5	25%
	Hand Pulling	7	35%	15	75%
	100% of the rain feed farmers use a contact hormone herbicide				

11	Age of Seedlings				
	< 15 days	N/A		3	15%
	<21 days			5	25%
	21 days			9	45%
	>21 Days			3	15%
12	Number of Seedlings				
	Only 1	N/A		0	
	2--4			17	85%
	<4			3	15%
13	Planting Depth in cm				
	<1	N/A		1	5%
	1 cm			8	40%
	>1			11	55%
14	Seeding / Spacing				
	20 X 20 cm	all		14	70%
	25 cm X 25 CM	broad		6	30%
	No Spacing	cast		0	
15	Fertilizer Use				
	Used	17	85%	20	100%
	Do Not Use	3	15%	0	
16	Type of Fertilizer				
	ORGANIC	0		0	
	CHEMICAL	18	90%	17	85%
	COMBO	0		3	15%
	NO USE	2	10%	0	
17	Source of fertilizer				
	Government	18	90%	20	100%
	Private	0		0	
	No use	2	10%	0	
18	Rate of Use / ha				
	< 100 kg	10	50%	4	20%
	100 kg	3	15%	4	20%
	100-300 kg	3	15%	12	60%
	> 400 kg	0	0	0	0
	No use	4	20%	0	0
19	Timing Fertilizer App				
	Pre-Plant	4	20%	1	5%
	Tilling & Boot	1	5%		
	Tilling	3	15%	10	50%
	Booting Planting	3	15%		
	Booting	4	20%	1	5%
	Tilling & Booting	1	5%	8	40%
	Pre-Plant & Boot	1	5%		

20	Weeding	13	65%		Constant
	Once	0			
	Twice	0			
	> Twice				
21	Had Insects				
	Yes	19	95%	13	72%
	No	1	5%	5	28%
22	Insect Control				
	Culture				
	Chemical			35%	7
	Biological	1	5%		
	No Control	19	95%	65%	13
23	Have had Plant Disease				
	Yes	19	95%	85%	17
	No	1	5%	15%	3
24	Chemical Disease				
	Yes	5	25%	60%	12
	No	15	75%	40%	8
25	Harvest				
	All rice harvested by hand				
26	Harvest a % Maturity				
	80%	6	30%	8	40%
	More than 80%	13	65%	9	45%
	Less than 80%	1	5%	3	15%
27	Drying Method				
	Sunshine	20	100%	20	100%
	Drier				
	No Dry				
28	Threshing Method				
	Manual	20	100%	20	100%
	Mechanical				
29	Willowing				
	Other				
	Wind	20	100%	20	100%
30	Packing Material				
	New bag				
	Old bag	20	100%	20	100%
	Other				
31	Storage of rice				
	Ventilated	10	50%	16	80%
	Non Ventilated	10	50%	4	20%
	Covered	0			

32	Market/Sales				
	No Sales	15	75%	10	50%
	Part Sales	5	25%	10	50%
	No Sales				
33	Received Training				
	Formal	14	70%	14.00	70%
	Informal		30%		
	No	6	30%	6.00	6
34	Challenges				
	Inputs	12	60%	14	70%
	Insect/Disease	6	30%	6	30%
	Post Harvest	2	10%	0	
35	Intervention Needed				
	Government	10	50%	18	90%
	Private	0			
	Other (NGO)	10	50%	2	10%

Annex 8: Protocol of Plots and Trials

PROPOSED PROTOCOL FOR CONDUCTING DEMO-PLOTS AND SCIENTIFIC FERTILIZER TRIALS DURING MASIKA 2014 IN ZANZIBAR

S/N	Proposed agricultural practices for 2014 demo-plots
	With bunds and levelling
1	SUPA BC + 57.5kgP ² O ⁵ + UDP at T and PI
2	SARO 5 + 57.5kgP ² O ⁵ + UDP at T and PI
3	BKN SUPA + 57.5kgP ² O ⁵ + UDP at T and PI
4	SUBANG + 57.5kgP ² O ⁵ + UDP at T and PI
5	NERICA I + 57.5kgP ² O ⁵ + UDP at T and PI
6	LOCAL AREA VARIETY + 57.5kgP ² O ⁵ + UDP at T and PI
7	SUPA BC + YARAMILA 100 + UDP at T
8	SARO 5 + YARAMILA 100 + UDP at T
9	BKN SUPA + YARAMILA 100 + UDP at T
10	SUBANG + YARAMILA 100 + UDP at T
11	NERICA I + YARAMILA 100 + UDP at T
12	LOCAL AREA VARIETY + YARAMILA 100 + UDP at T
13	SUPA BC + DOUBLE ROW SPACING + 57.5kgP ² O ⁵ + UDP at T and PI
14	SUPA BC + 57.5kgP ² O ⁵ + UDP at T and PI + pre-emergence herbicide
15	SUPA BC+ 57.5kgP ² O ⁵ + 57.5kgN/ha
16	SUPA BC no fertilizer application
	No bunds No levelling
17	SUPA BC + 57.5kgP ² O ⁵ + UDP at T and PI
18	SUPA BC + YARAMILA 100 + UDP at T
19	LOCAL AREA VARIETY + 57.5kgP ² O ⁵ + UDP at T and PI
20	SUPA BC no fertilizer application

Requirement of fertilizer

UDP

- For demo-plots: 250 granules/plot x number of plots with UDP (2500 + 875)*1.8*40 = 243kg

Protocol for Scientific trial on fertilizer management

Factors and levels for research

1. Varieties at 3 levels
2. UDP – size of granules (small and large granules), number of application (none, once and twice), stage of application (at transplanting, tilling and PI stages)
3. YaraMilla – amount of application, stage of application

Experiment 1:

Number of factors

1. Varieties (SUPA BC, SARO 5 and SUBANG)
2. UDP – size of granule (small and large)
3. Stage of application (at establishment, tilling and PI)
4. Number of treatment combinations = 3varieties × 2sizes of granules × 3 stages of application × 3 replications = 54 treatments/plots per trial site

UDP requirement for trial:

Small granules: 1.2kg

Large granules:

Experimental design: Factorial experiment in Randomized Complete Block design with 3 replications.

Experimental variables:

- Soil analysis of experimental plots
- Plant height and number of tillers at tilling, PI and maturity (productive tillers)
- Scoring diseases and pests occurrence at vegetative and reproductive stages
- Yield and yield components (number of hills/m², panicle length, number of productive tillers/m², number of filled grains/panicle, 1000 seed weight and grain yield)

Experiment 2: three factorial experiments

Number of factors

1. Varieties (SUPA BC, SARO 5 and SUBANG)
2. YaraMilla – amount (50 kg and 100kg)
3. Stage of application (at establishment and tilling)
 $3 \times 2 \times 2 = 12$ treatment combinations × 3 replications = 36

Experimental design: Factorial experiment in Randomized Complete Block design with 3 replications

Experimental variables:

- Soil analysis of experimental plots
- Plant height and number of tillers at tilling, PI and maturity (productive tillers)
- Scoring diseases and pests occurrence at vegetative and reproductive stages
- Yield and yield components (number of hills/m², panicle length, number of productive tillers/m², number of filled grains/panicle, 1000 seed weight and grain yield)

Locations: 4 locations 2 under rain-fed and two under irrigated conditions

Calculation of fertilizer requirements

Plot size:

7 rows of 5m long spaced between 20 cm

UDP

For small granules:

1.4m wide x 5m length = 7m² = 53 granules/plot x 2 applications x 3 levels of applications x 2 trial sites = 636 granules x 1.8g x 27 plots = 30909.6 = 31kg

For large granules

636 granules x 2.5g = 1590gx27plots = 42930 = 43kg

Total UDP for Trials = 31 small granules + 43kg large granules = 74kg

YaraMilla requirement for trials

18 plots per trial site x 2 sites x 2 applications x 7m² in 10,000m²x 50kg of YaraMilla (5g/m²) = 2.520kg

18 plots per trial site x 2 sites x 2 applications x 7m² in 10,000m²x 100kg of YaraMilla (10g/m²) = 5.040kg

Total YaraMilla required for trials = 2.5 + 5 = 8kg

YaraMilla for demo-plots

- No. of plots for YaraMilla application = 7
- No. of application per plot = 2
- Size of the plot = 20m²
- Amount of YaraMilla/plot = 10g/m²x 2 applications x 20m²= 400g/plot
- No. of demo-plots = 40
- Total number of plots in all demo-plots = 40 x 7 = 140 plots

Total amount of YaraMilla for demo-plots = 140 x 400g = 56000g = 56kg of YaraMilla

GRAND TOTAL

UDP = 243kg for demo-plots + 74 kg for trial = 317kg

YaraMilla = 56kg for demo-plots + 8kg for trial = 64kg

Annex 9: Group Selection Process

19 NOVEMBER 2013 MEETING MINUTES OF THE SELECTION COMMITTEE ONSITE IN ZANZIBAR

AM.

2. SELECTION CRITERIA:

The Committee members decided that the following were the key criteria for selecting both the sites for project activities during 2014 and the area for conducting the Training Needs Assessment in Zanzibar and Pemba Islands.

- 2.1 Potentiality of the agricultural area in rice production rain-fed/irrigated.
- 2.2 Presence/existence/availability of farmers organized in groups.
- 2.3 Accessibility of the location in terms of transport.
- 2.4 Availability of Extension Officer.

Also the Committee developed a selection tool to be used to collect data/information which will form the basis of selecting the sites/groups (Evaluation of Communities Form)

3. The Committee had a total of 80 locations from Unguja and Pemba Islands out of which 40 locations were selected from both Rain-fed and Irrigated areas.

(See Attached Spread Sheets for Potential and Selected sites.)

4. List of selected locations/communities.

4.1 Selected Rain-Fed Areas - Unguja.

- Mtende
- Muyuni
- Chuini
- Kwarara
- Mchangani
- Koani
- Cheju
- Uzini
- Mkokotoni
- Kisongoni

- Kinyasini
- Muanda
- Mtomzigua
- Pangen

4.2 Selected Irrigation Areas in Unguja.

- Kibokwa 1
- Mtwango 2
- Kianga
- Mwera
- Cheju FAO 2
- Cheju TASAF
- Cheju FAO 1
- Cheju PADEP
- Uzini
- Mtwango 4
- Kibokwa 2

4.3 Selected Rain-Fed Areas in Pemba.

- Mavuika
- Chwale
- Msaani
- Wapape
- Ngwiya
- Mfubaha
- Ngurumo
- Kwajiba
- Dodani
- Kitambwa

4.4 Selected Irrigated Areas in Pemba.

- Tungamaa
- Saininga
- Tibirinzi
- Makombeni

4.5 Selected Sites for Training Assessment.

- Unguja Rain-fed
 1. Pangen
 2. Koani
- Unguja Irrigation
 3. Cheju
 4. Kianga
- Pemba Rain-fed
 5. Msaani
- Pemba Irrigated
 6. Tibirinzi

4.6 Selection of Lead Farmers for Training.

- It was recommended that Lead farmers who will attend the training at KATI

Shall be selected by group members based on the following criteria;

- Should know to read and write.
- Should have been growing rice for not less than 2 years.
- Located in the area/village and be a member of the group.
- Intermediate age.
- Willing to train other farmers.
- Respectable and accepted by fellow farmers.
- Gender balanced in selection.

Annex 10:TNA Analysis Pemba

TIBIRITZI (IRRIGATED)

	< 3Tons/ha	>3Tons/ha	>5Tons/ha	
YIELD	7	3	0	
SOURCE OF SEED	Own -	Neighbor -	Purchased 10	
VARIETY	Local -	Improved Short 9	Improved Long 1	
SEED RATE	< 20Kgs/ha -	<50Kgs/ha 7	>50Kgs/ha 3	
SEED PREPARATION	No Clean -	Clean -	Commercial 10	
LAND PREPARATION	Hand Hoe 10	Power Tiller -	Tractor -	
TIME OF PUDDLING	No Puddling -	1 Day Prior to Puddling 6	>1Day Puddling 4	
LEVELLING	No Leveling -	Hand Leveling 8	Machine Leveling 2	
SOAKING	No Soaking -	Soaking 10		
SIZE OF SEEDBED	Recommended	Not Recommended 10		
WEEDING	0 Time -	1 Time 10	2 Times -	
FERTILIZER APPLICATION	0 Time -	1 Time 10	2 Times -	
AGE OF SEEDLINGS	<15 Days -	<21 Days 4	21 Days 3	>21 Days 2
NUMBER OF SEEDLINGS	1 Seedling -	2-4 Seedling 10	>Seedling -	
PLANTING	<1Cm -	1 Cm 3	>1Cm 7	
SPACING	20cm X20cm 7	25cm x25cm -	No spacing 3	
WEEDING METHOD	No Weeding 1	Hand Weeding 9		
FERTILIZER USE	Use Fertilizer 10			
TYPE OF FERTILIZER	Inorganic 10			
SOURCE OF	Government			

	< 3Tons/ha	>3Tons/ha	>5Tons/ha	
FERTILIZER	10			
RATE/AREA	<2Bags/ha 10			
TIME OF APPLICATION	Pre- Planting -	Tilling 9	Combination 1	
INSECTS	Always 9	Occasional -	Nil 1	
CONTROL MEAURES	Always 9	Occasional -	Biological -	No 1
DIESEASE	Always 9	Occasional -	Nil 1	
CONTROL MEASURES	Chemical 9	Biological -	Cultural -	No 1
HARVESTING TIME	<80% Maturity -	80%Maturity 10		
METHODS OF HARVESTING	Manual 10	Mechanical -		
DRYING	No Drying -	Sun Drying 10		
THRESHING	Manual 10	Mechanical -		
WINNOWING	Manual 10	Mechanical -		
PACKING MATERIAL	Bucket -	50Kgs Old Bags 10		
STORAGE FACILITY	Ventilated 10	Not Ventilated -	Outside House -	
SELLING	No 1	Part of Product 9	All Product -	
CHALLENGES	Insects and Diseases 10			
INTERVETION	Govt. Intervention 10	Others -		
RICE TRAINING ATTENDED	Formal -	Informal 9	None 1	

Annex II: TNA Analysis Pemba

MSAANI (RAIN-FED)

	< 3Tons/ha	>3Tons/ha	>5Tons/ha	
YIELD	9	1	0	
SOURCE OF SEED	Own -	Neighbor -	Purchased 10	
VARIETY	Local 9	Improved Short	Improved Long 1	
SEED RATE	< 20Kgs/ha 3	<50Kgs/ha 3	>50Kgs/ha 4	
SEED PREPARATION	No Clean -	Clean 6	Commercial 4	
LAND PREPARATION	Hand Hoe 2	Power Tiller -	Tractor 8	
METHOD OF PLANTING	Broadcasting 10	Dibling -	Transplanting -	
TIME OF WEEDING	On-time -	1 Time -	2 Times 10	
WEEDING METHODS	Hand Weeding 6	Hand Hoe -	Herbicides 4	
TYPE OF HERBICIDE	No 6	Contract 4	Residual -	
SOURCES	Government 6 -	Private -	Others -	
FERTILIZER USE	Use 10 -	No Use -		
TYPE OF FERTILIZER	Organic 1	Inorganic 6	Combination 3	
RATE OF APPL	<2 Bags/ha 8	2-4 Bags/ha 2		
TIME OF APPLICATION	Pre - planting 3	Tilling 6	Booting 1	
INSECTS	Always 9	Occasional 1	Nil -	

	< 3Tons/ha	>3Tons/ha	>5Tons/ha	
CONTROL MEASURES	Chemical 1	Biological 1	No 8	
HARVESTING TIME	<80% Maturity	80% 10	>80% -	
METHOD OF HARVESTING	Inorganic 10	Manual 10	Mechanical -	
DRYING	No Drying 1	Sun drying 9	Shade Drier -	
THRESHING	Manual 10	Mechanical -		
WINNOWER	Manual 10	Mechanical -		
PACKING MATERIALS	Bucket -	50 Kgs Old 10	50 Kgs New	>50 Kgs
DISEASES	Always 9	Occasional -	Biological -	No 1
STORAGE	Ventilated Room 10	Non –Ventilated Room -	Outside House -	
SELLING	No 10	Part of the Produce -	All -	
CHALLENGES	Access to Inputs 7	Insects, Pests and Diseases 3		
INTERVENTION	Government 10	Private -	Others -	
TRAINING	Formal -	Informal 4	No 6	

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