別添14-1

Handbook on Upland Rice Cultivation

Capacity Building Project
for the Implementation of the Executive Programme
for the Agricultural Revival

Akio GOTO
JICA Expert

Introduction

Currently, rice production has high demand as a new crop due to its high productivity in comparison with traditional crops in order to improve farmers' income and to cope with national food security in Sudan as well. Here comes upland rice as a new high yield crop. Rice consumption per head has been increasing in recent years. Sudan is importing about 50,000t (worth about 25 million USD per year) to meet people's consumption. As above mentioned, upland rice can be considered as a new promising crop. Therefore, it is imperative to provide proper technical knowhow to not only extensionists but also to farmers who want to grow upland rice. Sudan has vast area of agricultural land and has different characteristics of environmental conditions on soil, climate (temperature, rainfall, etc.). In order to comply with the current situation of insufficiency for technical knowhow on upland rice cultivation, the Project formulated this handbook through field activities. This handbook provides the fundamental knowledge and techniques on upland rice cultivation in Sudan. The Project believes that farmers could realize high yield and obtain good profit with support of skilled extensionists by utilizing this guideline book. Finally, the Project expects that this book could be good assistance for them, and hopes to utilize this book fully in the early stage of upland rice cultivation in Sudan.

Understanding without practice produces nothing at all !

January, 2016

Remarks

The result on demonstration farm activity in farmers' fields in Gezira State for season 2015 from the viewpoint of achieved yield by utilizing knowledge and techniques which are explained in this handbook is as follows,

Variety: NERICA 4
Total number of site (demo and seed production/demo site): 10 sites
Average area of 10 sites: 3.0feddans
Maximum yield: 7.9t/ha (3.3t/fed)
Average yield of demonstration site: 3.2t/ha (1.3t/fed)
Average yield of seed production/demo site: 3.5t/ha (1.5t/fed)

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⑤ Effective Weed Control
⑥ Appropriate Water Management
⑦ Harvesting at Proper Time

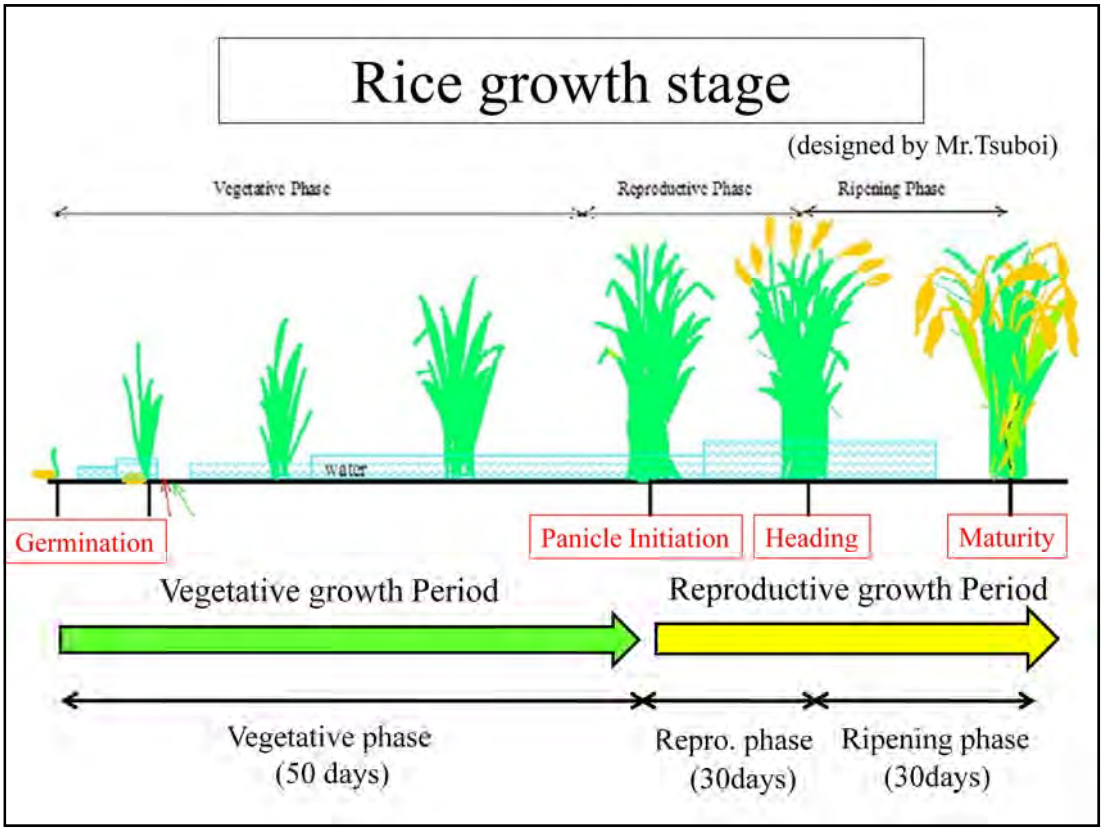
Japan International Cooperation Agency

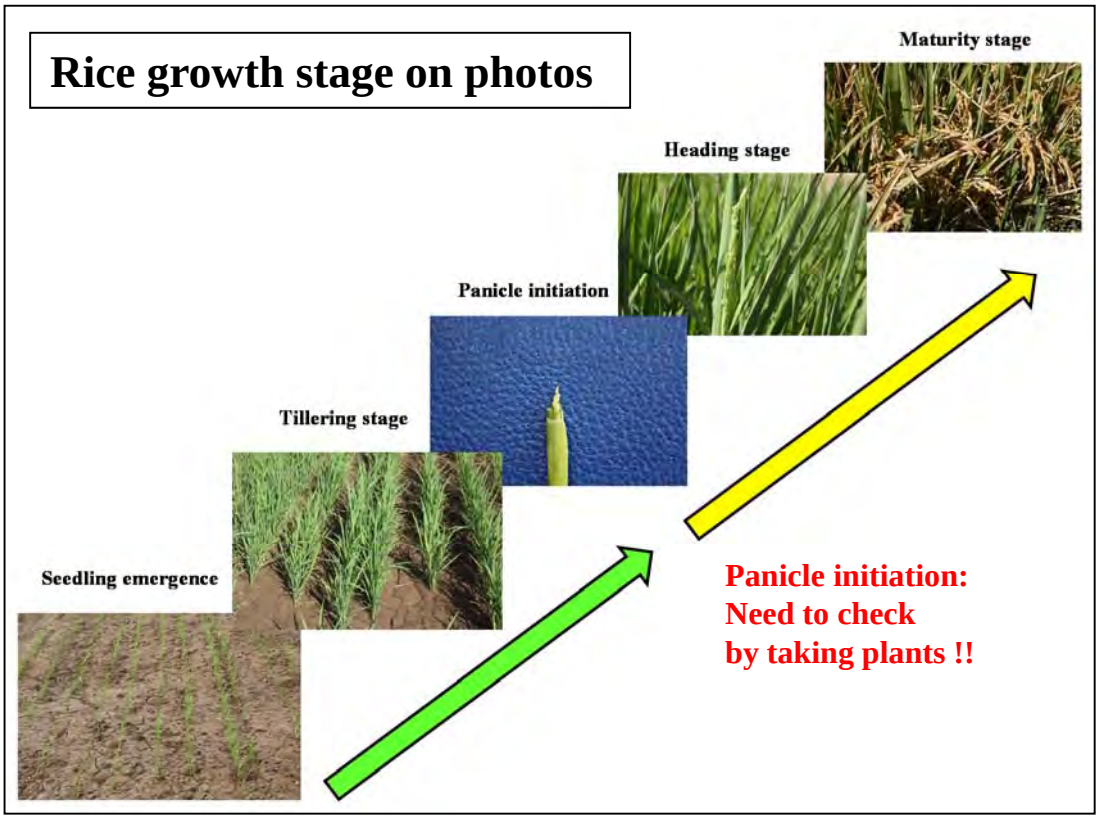
Seed

Leveling

Weed control

Water management


Rice growth stage
(designed by Mr.Tsuboi)
Vegetative Phase
Reproductive Phase
Ripening Phase
water
Germination
Panicle Initiation
Heading
Maturity
Vegetative growth Period
Reproductive growth Period
Vegetative phase
(50 days)
Repro. phase
(30days)
Ripening phase
(30days)


Rice growth stage on photos
Maturity stage
Heading stage
Panicle initiation
Tillering stage
Seedling emergence
Panicle initiation:
Need to check
by taking plants !!

Basic Operations for Upland Rice Cultivation

- **Seed preparation** (Purity, Germination Test)
- 1st Land preparation : Plowing, Organic fertilizer, Harrowing
- 2nd Land preparation : Ridging, **Pre-watering**
- Fertilizer application (Basal Dressing : NPK, TSP, SSP, etc.)
- 3rd Land Preparation : Harrowing, **Land leveling**
- **Sowing seeds**
- **Weed control** (Pre-emergence : Pendimethalin, etc.)*
- Irrigation
- **Weed control** (Manual weeding)
- Fertilizer application (Topdressing: Urea, etc.)
- **Weed control** (Post-emergence : 2,4-D, etc.)*
- **Irrigation (Panicle Initiation ~ Heading ~ Maturity)**
- **Harvesting**

***If herbicide is not used, timely hand weeding is indispensable.**

Cultivation Points for yield more than 1t/fed Implement below operations appropriately !

1. **Seed rate : 20-30kg/fed, Sowing space : 30cm or more**
2. **Even/flat land leveling** should be secured.
   → if good land leveling is not done, seed can not germinate and grow at lower place in the field. Land should be leveled evenly without bump and dent.
3. **Weed control** should be implemented at early stage.
   → if herbicide is not applied, hand weeding should be done at least 2 times during 1 month after sowing.
4. **Irrigation interval** :
   Germination ~ Panicle initiation : **1time/5 - 6days**
   Panicle initiation(50days after sowing) ~ heading~ maturity : **1time/2 - 3days**
   → it varies according to soil and field condition, but before soil dries, irrigation should be implemented.

General Cropping Calendar for Upland Rice

Operations	Month											
	Jan.	Feb.	Mar	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Site Check & Selection	1 - 31											
Seed preparation (Cleaning, Germination test, etc.)	1 - 31											
Formulate year action plan based on technical handbook			1 - 31									
Plowing, Organic fertilzer & Harrowing			1 - 30									
Ridging & Pre-watering			1 - 30									
Applying TSP (SSP) & Harrowing					1 - 31							
Leveling					15/05	15/06						
Sowing						15/06	Before 15/07					
Ridging & Plotting						15/06	15/07					
Pre-emergence herbicide						15/06	15/07					
First irrigation						15/06	15/07					
Manual weeding ①							05/07	05/08				
Fertilization ① (3-4 Weeks after Sowing)							10/07	10/08				
Manual weeding ② or Chemical weeding (Post-emergence)							20/07	20/08				
Fertilization ② (6-7 Weeks After Sowing)							25/07	25/08				
Manual weeding ③								10/08	10/09			
Fertilization ③ (9-10 Weeks After Sowing)								15/08	15/09			
Roguing (Removing off-type)								01/08		15/10		
Irrigation (Second～Final)							15/07			30/10		
Harvesting										15/10	15/11	
Start Panicle initiation								05/08	05/09	Increase water amount !		
Start Heading									05/09	05/10		

① Using Pure Seed

Using purified seeds is first step for high yield

Purity is the most important factor as seed

Mixed seed

Pure NERICA 4

Mixed seed causes difficult cultivation and produce low quality

Using mixed seed causes problems on
① Cultivation Management (= Yield) ② Quality

① Cultivation management (= Yield) ;
Because implementing uniform management on irrigation, fertilization, harvest, etc. is very difficult.

→ **Low yield !**

② Quality ;
1) Because implementing milling operation properly is very difficult.

→ **A lot of broken rice !**

2) Because there are various color, tastes, shape and size of rice

→ **Low quality !**

Removing off-type is indispensable for maintaining purity of seed.

Using mixed seed with off-type varieties causes several serious problems on cultivation management and quality. In terms of competitiveness of plant growth, off-type plants are stronger than NERICA 4. Without removing off-type from seed and field, field will be covered by off-type plants eventually. Therefore, removing off-type (roguing) operation is imperative for maintaining purity of seed.

● **Increasing and expanding off-types :**

1 grain of seed of off-type plants at sowing time

If off-type plant produces,
100 grains per panicle and
10 panicles per plant
→ 100 × 10 = 1,000 grains

1,000 grains at harvest time

Off-type plants increase dramatically in the field !

● **Keeping seed purity:**

If amount of seed is 30kg/fed, there is about 1 million seeds/fed.
(For example: 1,000 grains weight is 30g)
It indicates that

99% Purity → 10,000 off-type grains in the filed of 1fed.
99.9% Purity → 1,000 off-type grains in the field of 1fed.
99.99% Purity → 100 off-type grains in the field of 1 fed.
99.999% Purity → 10 off-type grains in the field of 1 fed.
99.9999% Purity → 1 off-type grain in the field of 1 fed.

Keeping purity at high level is very,very important !

Several points for identifying off-type plants.

Grain size, shape and color

NERICA 4

Off-type (example)

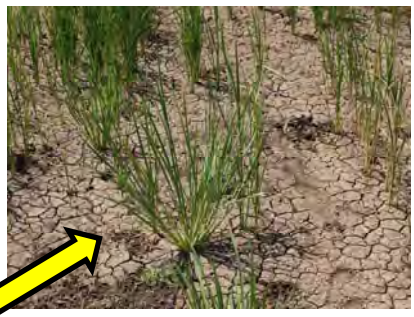
Various varieties of off-type plants

Maturity period

NERICA 4

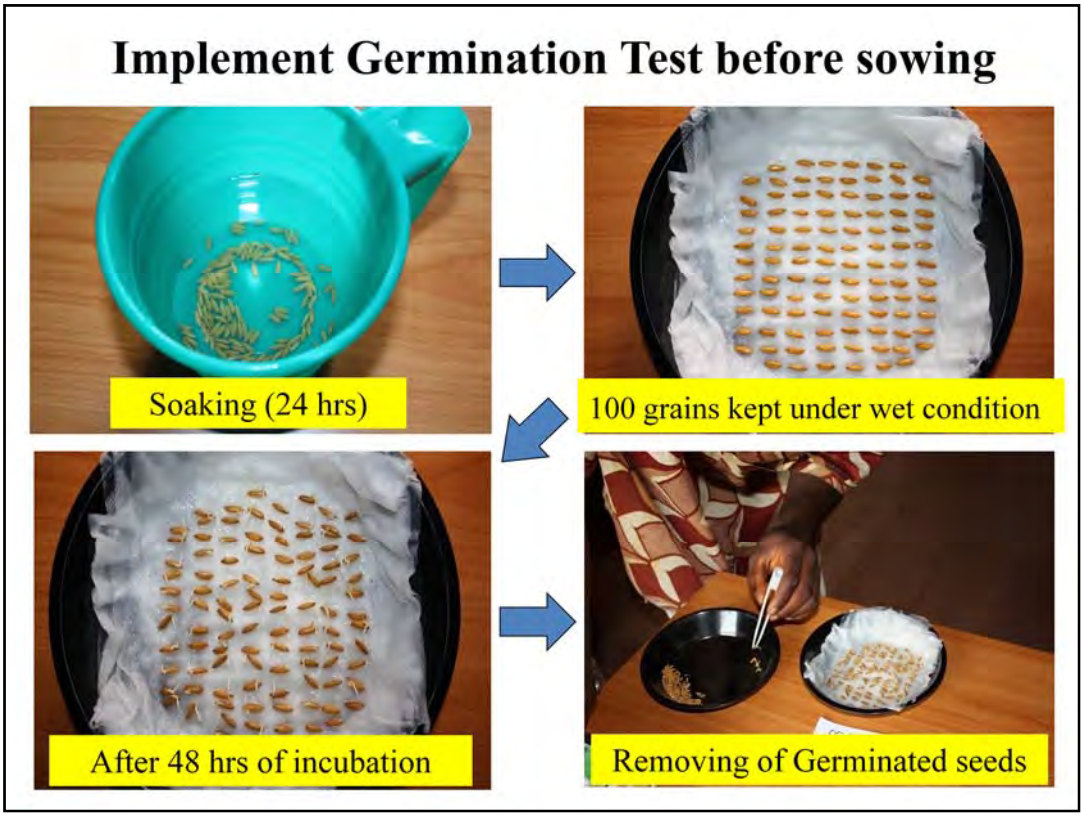
Off-type

Plant shape



Off-type

Plant height



Why conducting germination test before sowing is important ?

Because germination rate needs to be grasped before sowing.

If germination rate is less than 80%, the amount of seed must be increased !

Germination Rate (100 - 7 = 93%)

More than 80% is OK

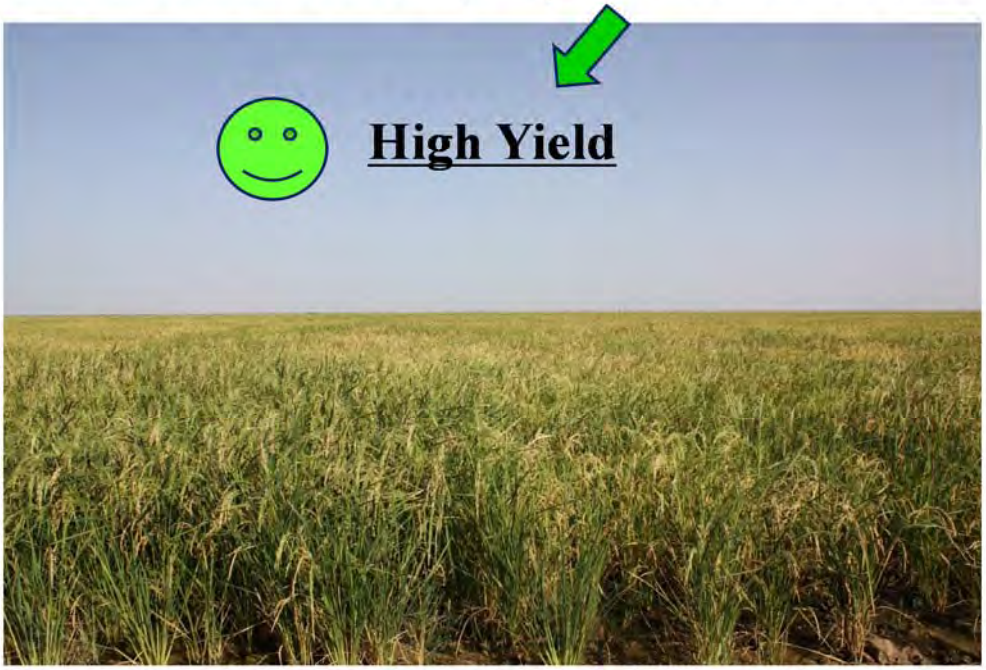
How about 93% ?

93% is more than 80%
and very high rate,
no need to increase the seed !

② Good Land Preparation (Leveling)

Good leveling is indispensable for irrigating water uniformly in the field.

Good Land Leveling ➡ Uniform Growth



Land Preparation (Leveling)

Improper leveling ! **Proper leveling !**

Keep in your mind the vital importance of land leveling;

Improper leveling creates high and low places in the field and causes the irreversible problems such as

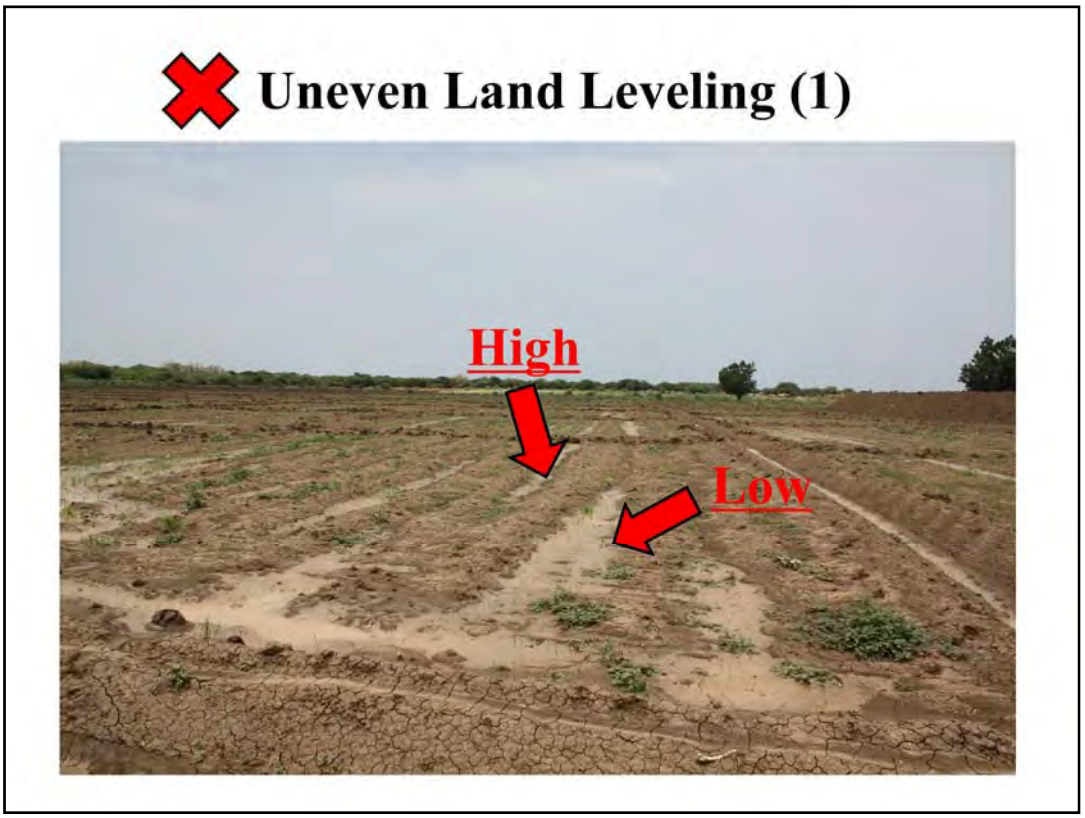
1) Rice is not able to grow well at the higher places because of insufficient water.

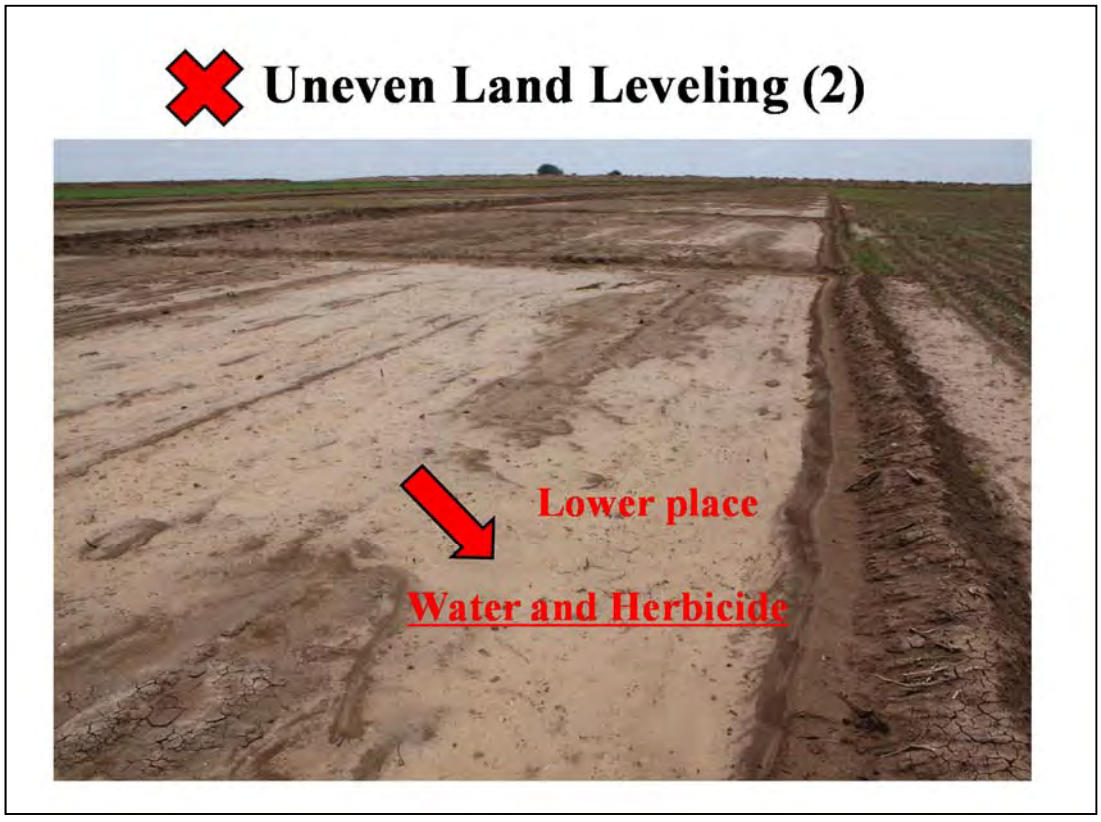
2) The submerged water and high concentration of herbicide impede seedling emergence at lower places.

3) Termites appear in the dry soil at the higher places, and eat root of rice and kill it.

4) After sowing, re-leveling is impossible. Proper leveling must be conducted before sowing !

(1) Problem caused by improper leveling





Submerged water and high concentration of herbicide impede seedling emergence

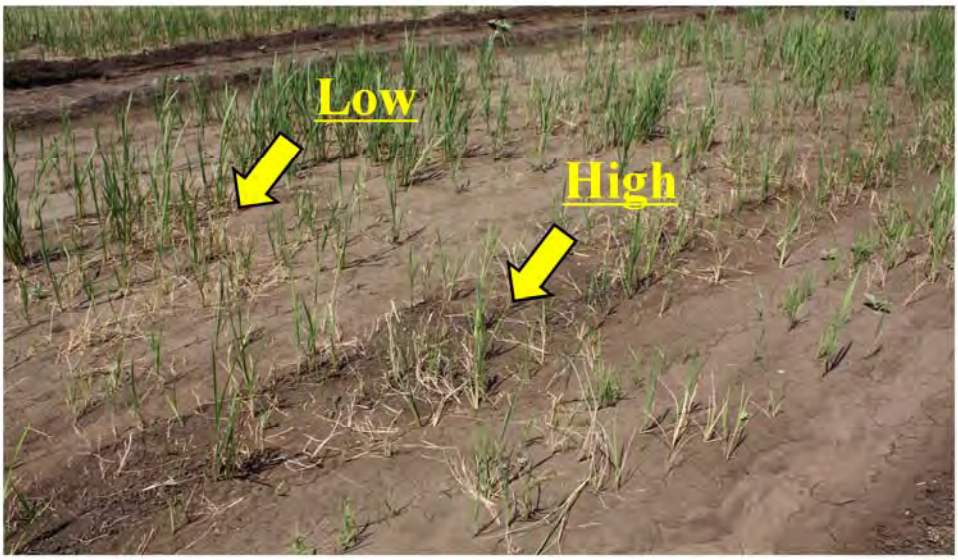
Uneven Land Leveling

Low Yield

(2) Problem caused by improper leveling

Damage by termites (1)

Damage by termites (2)



Damage by termites can be minimized by keeping water.
Good land leveling is indispensable from this viewpoint.

Implements of Tractor for Land preparation

Chisel Plow

For drying soil, easier and avoiding the field with bump and dent, but less effective compared with Disk Plow in reversing soil ability

Disk Plow

For reversing soil, easier under any condition, but less effective compared with Bottom Plow in plowing deep and reversing soil ability

Fertilization:
Basal Dressing (ex.TSP, NPK) must be applied before harrowing to mix with soil

Disk Harrow

For crushing soil mass at deep level by rotating disks and implementing leveling at the same time

Scraper (Leveler)

For executing soil leveling manually by technique of operator under correct understanding on field condition

Laser Leveler

For conducting soil leveling automatically by utilizing emission and receiving device of laser beam

Example of Perfect Land Leveling

Please implement leveling like this field !

Fertilizer Application

Example : Major chemical fertilizers and the content of elements

Name	Chemical formula	Content of elements (%)
Nitrogen fertilizer (N)		
Ammonium sulfate	$(NH_4)_2SO_4$	21(N) - 24(S)
Urea	$CO(NH_2)_2$	46(N)
Ammonium chloride	NH_4Cl	26(N)
Phosphorus fertilizer (P)		
Single superphosphate		18～20(P_2O_5) - 18(Ca) - 12(S)
Triple superphosphate		45(P_2O_5) - 14(Ca) - 10(S)
Potassium fertilizer (K)		
Potassium chloride	KCl	60(K_2O)
Potassium sulfate	K_2SO_4	53(K_2O) - 18(S)
Compound fertilizer (NPK)		
14-14-14		14(N) - 14(P_2O_5) - 14(K_2O)
12-12-12		12(N) - 12(P_2O5) - 12(K_2O)

Fertilizer application in farmers' fields

- **Fertilization on demonstration farms by the Project**
  172.5-53.6-0 kg NPK kg/ha (69.0-22.5-0 kg NPK kg/fed)

DAS (Days After Sowing)

Fertilizer	Before sowing	3-4 Weeks DAS (21-28 DAS)	6-7 Weeks DAS (42-49 DAS)	9-10 Weeks DAS (63-70DAS)
T.S.P (0-45-0)	125kg/ha (50kg/fed)	0	0	0
Urea (46-0-0)	0	125kg/ha (50kg/fed)	125kg/ha (50kg/fed)	125kg/ha (50kg/fed)

Remarkable points ;

1. Before starting cultivation, soil analysis need to be conducted for understanding soil characteristics on the nutrient and physical aspects.

2. Each amount and timing, especially applying of 3rd dosage need to be decided based on actual rice growth condition.

3. Applying organic fertilizer is one effective way to improve soil fertility and soil characteristics such as sandy soil, alkaline soil, etc.

4. Rice plants grow well under mildly acidic condition (pH5.0-6.5), but generally, Sudan has alkaline soil (pH8.0 ~). According to the field trial, utilizing Ammonium sulfate (acid fertilizer) instead of Urea (neutral fertilizer) is considered as one effective method to improve soil pH value temporarily to realize suitable pH condition for rice to obtain high yield.

5. Alkaline soil inhibits rice plants from absorbing several micronutrients.

Various types of fertilizer (examples)

Organic fertilizer 1-(1)

Organic fertilizer 1-(2)

Single superphosphate

Triple superphosphate

Urea

Ammonium sulfate

NB: It is not true that applying more fertilizer produce more yield . It must be applied at proper amount, time and way.

What is pH ? What is EC ?

- **pH : A measure of acidity or alkalinity of a substance, which ranges from 0 (maximum acidity) – 7 (neutral) – 14 (maximum alkalinity).**

- **EC (Electric(al) Conductivity) : A measure of soil salinity and indicate the ability of an aqueous solution to carry an electric current. This value enables us to grasp degree of salinity of soil.**

How to measure pH value and EC value

- **Direct type : insert electrode into soil to be tested**
- **Indirect type : submerge the tester in the solution to be tested**

NB : Before utilizing direct type, soil must be wet by purified or distilled water. Calibration must be conducted timely at proper way.

pH tester (Direct type)

Measuring pH value in the field

pH tester (Indirect type)

EC tester (Direct type)

③ Proper Sowing Operation

1. **Adjustment of tractor and seed drill machine to land condition is indispensable operation.**
2. **It is very important for operator to check soil condition before sowing to conduct proper operation based on soil condition for realizing uniform sowing without missing hills.**

Manual sowing with 'Karack' (a forked-rake for rice drill-planting)

Sowing Operation

Sowing depth was deep ! Optimum sowing depth !

Poor seedling emergence Good seedling emergence

(1) Sowing depth (optimum: 2-3cm)

Too deep (more than 4cm)

↓

Poor seedling emergence !

Too shallow

↓

Damage by birds, seed loss by irrigation water or rainfall and poor seedling emergence affected by herbicide !

NB: Deep sowing is main reason for missing hills. Therefore, sowing depth must be checked during the operation even it is done by machine or manual.

Sowing Operation

Seed rate is extremely high.
It causes poor growth and very low yield !

(2) Seed rate (optimum: 20-30kg/fed)

Too high

Due to competition for water, nutrient and light, plants can not grow and produce little !

Too low

Due to unused nutrient, water and light, plants produce very low yield !

NB: It is not true that more seeds produce more yield from the result of trial and demonstration activities.

Sowing Operation

If sowing space is narrow, it is not suitable for weeding.
When weeding is difficult, it caused very low yield !

(3) Sowing space (optimum: 30cm～)

Too narrow

↓

Due to close planting, poor growth and difficulty of weeding cause low yield !

Too wide

↓

Due to inadequate plant numbers for the capacity of field area, yield becomes low !

NB: From the viewpoint of proper hand weeding and mechanical weeding, sowing space should be at least 30cm (or more).

Implement sowing operation properly !

After sowing,
it was rain or irrigation was started ;

Submerged water impede seedling emergence

After sowing, adequate plotting operation must be conducted for realizing uniform water management.

The field was not divided by irrigation canal and ridges properly. The plot size is too large to implement uniform water management !

The field was divided into proper size by making canal and ridges. Under this condition, it is easy to conduct uniform water management for each plot appropriately.

1. **Plotting operation must be done based on understanding to avoid high and low place.**
2. **After 1st irrigation, re-plotting must be conducted as needed.**

④ Sowing at Optimum Time

Sowing at optimum time allows rice to grow at proper level which can avoid damages caused by rain, lack of water at heading stage, high and low temperature, etc.

Optimum Sowing Time

If water is available, optimum sowing time is

Summer season : Before starting rain

➡ June

*** In northern part of Sudan, they have little rainfall and high temperature. Therefore, sowing from the end of July to August is suggested to try while considering the sowing time of winter crops.**

Winter season : Before starting low temperature

➡ October

Damage by heavy rain !

Please keep in your mind on sowing time;

1) Influence caused by rainfall
2) Influence caused by temperature (high or low)
3) Damage by birds, especially, no crops around rice

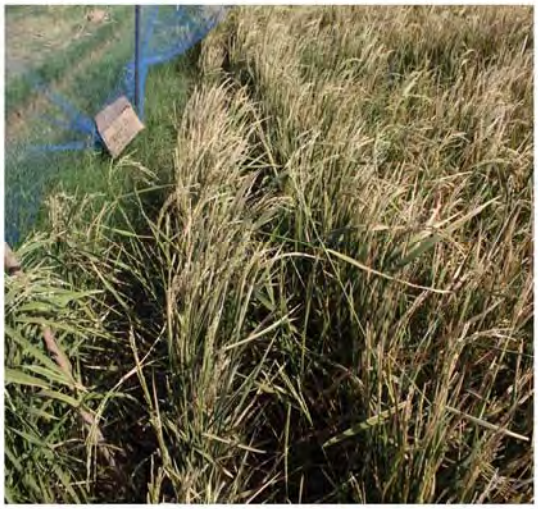
- Sowing time needs to be determined from several viewpoints such as rainfall, temperature, water availability, birds attack, etc.
- In general, it is recommended that sowing should be finished 3 weeks before rainy season so that rice grows to enough height to avoid damage by rain.
- There is a tendency that the yield of rice sown in the middle of September might be significantly lower than the month before such as August, July, June, etc.

(1) Influence on rice growth by rainfall

It affected growth of rice plants.

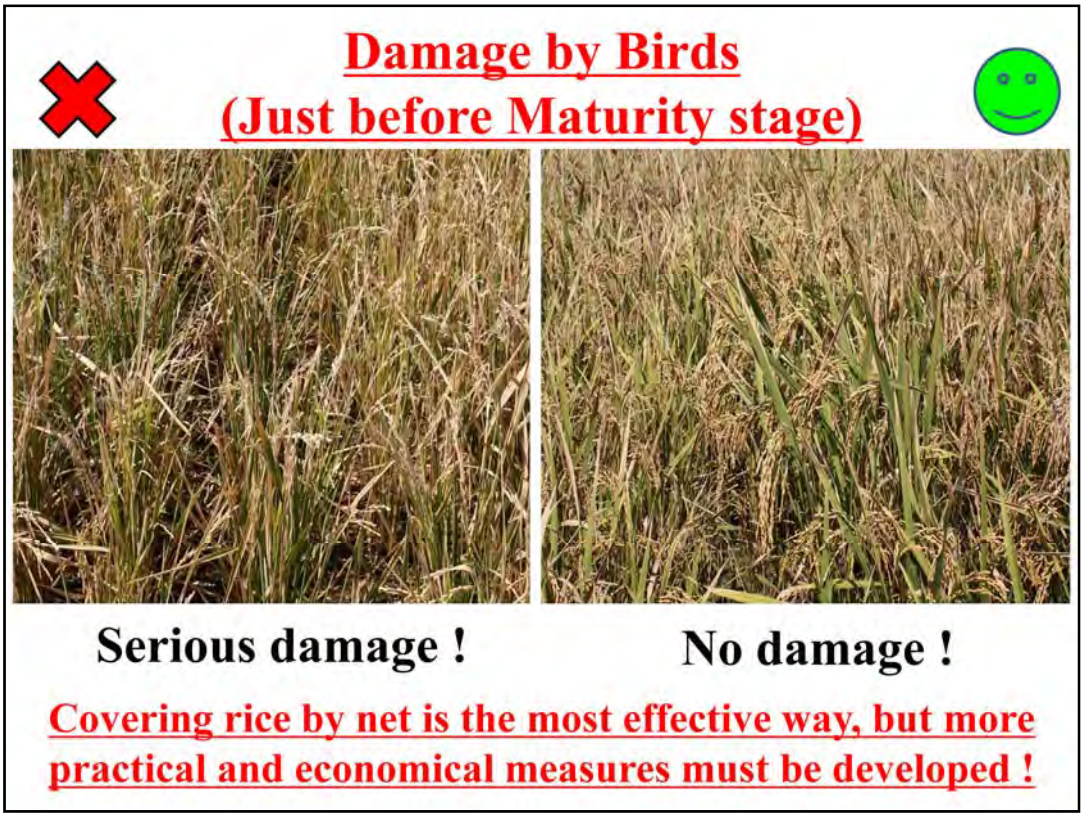
Re-sown seeds were not be able to germinate.

(2) Influence on rice growth by temperature



To avoid/minimize 'heat damage' under high temperature, frequent irrigation and/or keeping water is important. Shifting time of sowing also needs to be considered.

(3) Influence on rice growth by birds



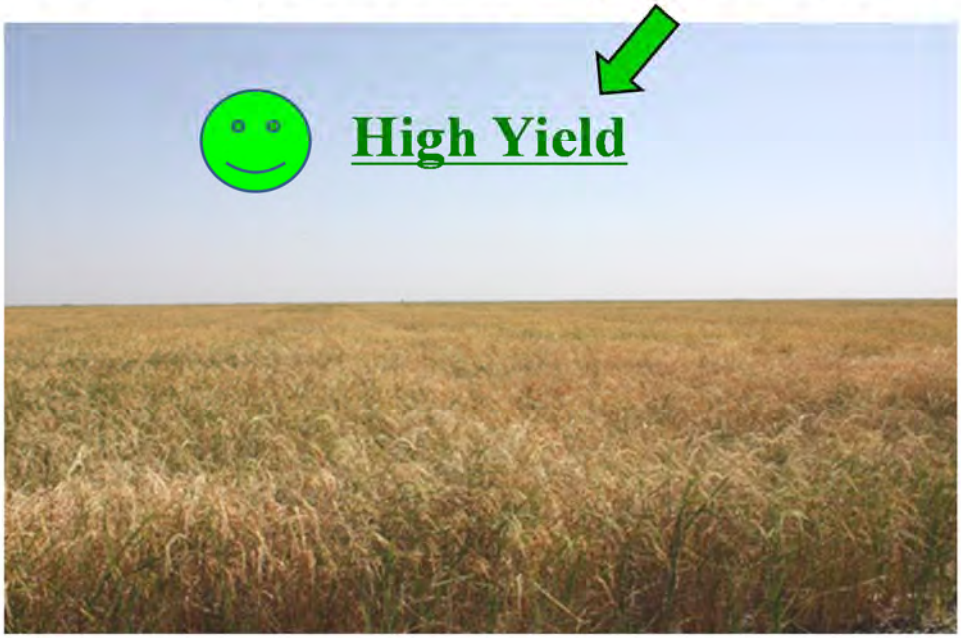
Re-sowing (or additional sowing)

Re-sowing is an important operation for reducing missing hills to obtain good yield, but it must be started and finished at proper time.

⑤ Effective Weed Control

Because of weakness of rice compared with weed on absorbing nutrient and water from soil, rice growth could be very much retarded by the growth of weeds.

Effective Weed Control → Without Weeds



Weed Control (1 month after sowing)

Weeds cover up the field !

Appropriate weed control !

Weed Control (Heading stage)

A lot of weeds !

No weeds !

Field must be cleaned before this stage to avoid competition for water and nutrients !

Weed control is the main decisive factor of yield !

Please keep in your mind on weed control ;

- **Weeds are stronger than rice in terms of absorbing nutrient and water from soil. In case weeds and rice grow altogether in the same field, only weeds can grow but rice cannot grow at all eventually. It means that weeds can become bigger and bigger, but rice cannot grow properly and the fields will be covered by weeds.**
- **Implementing appropriate weed treatment such as plowing, pre-watering, ridging as well as cleaning field before sowing is vital importance.**
- **Proper application of pre-emergence type herbicide and sufficient weeding at necessary time in one month after sowing are also indispensable.**
- **If clean condition is maintained up to heading stage, rice can avoid competition on water and nutrient and it realize high yield.**
- **Removing weeds before flowering is important to lessen weeds next season.**

Weed Control Methods

- Preventive, Cultural control
  - Land preparation, Pre-watering before sowing,
  - Crop rotation, Plant spacing, etc
- Mechanical control
  - Hand weeding (hand, hand hoe, etc)
- Chemical (herbicide) control
  - Selective herbicide
  - Non selective herbicide
  - Pre-emergence (ex, Pendimethalin)
  - Post-emergence (ex, 2,4-D)

↳ **Type, Amount, Concentration, Time should be considered**

Weed control method (1)

Weed control method (2)

Mechanical control
Hand weeding (hand, hand hoe, etc)

Weed control method (3)

Chemical (herbicide) control
Application of herbicide

STOMP AQUA
(Pendimethalin)
(Pre-emergence type)
(dosage: 1.5L/fed)

Please select effective product based on the result of previous season and follow exactly the instruction of product (herbicide) !

If you do not follow …

No rice plants due to improper application of herbicide !

Herbicide Damage (Phytotoxicity)

Symptom of herbicide injury (Phytotoxicity)

Pre-emergence type

Post-emergence type

Please start weeding at early stage !

Weed control at early stage is essential

If you do not start weeding…

Weed control is difficult at this stage

If you do not start weeding yet …

✖ **Weed control is more difficult at this stage**

And, eventually…

✖ **Weeds cover up the field**

No Yield

Weed Control Trial at the field of MoA, Gezira
(T-1[Treatment -1] = No Weed Control)

We identified effective weed control method, but more practical, effective and economical weed control method must be developed.
At present, number of weeding operation is not key point.
The most important point is whether there are weeds or not.

This photo indicates that without weed control, rice can not be obtained at all !

The number of weeding operation is not key point.

The most important point is whether there are weeds or not !

Intensive weeding is indispensable on weed control !

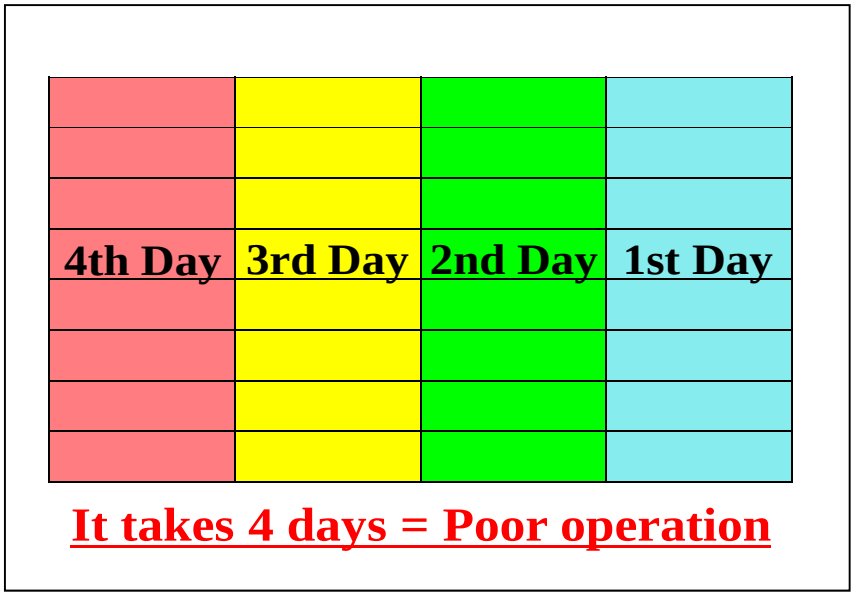
Intensive weeding operation is :
for example,

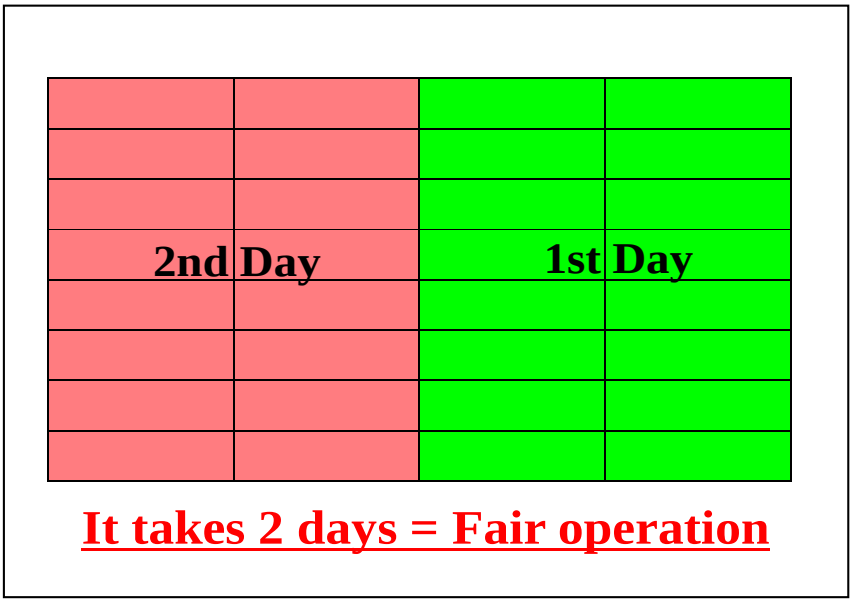
✖ **3 persons × 10 days**

↓

☺ **30 persons × 1 day**

Intensive weeding enables removing weeds completely in a short time and conducting next operation timely !


4th Day
3rd Day
2nd Day
1st Day
It takes 4 days = Poor operation


2nd Day
1st Day
It takes 2 days = Fair operation


1st Day
It takes 1 day = Good operation !

Yield result of weed control trial

The Yield Result of Weed Control Trial

		R			Unit: kg/ha	Weeding Control
		1	2	3	Ave.	
T	1	98	1037	1991	1042	Control
	2	3208	9564	9691	7488	Herbicide (Pre-emergence) +Herbicide (Post-e)
	3	2195	8304	8465	6321	Herbicide (Pre-e) +Hand weeding (42DAS)
	4	6775	8623	6201	7180	Herbicide (Pre-e) +Hand weed. (42DAS+56DAS)
	5	2907	3771	10105	5594	Hand weeding (21DAS)
	6	2585	6624	7977	5729	Hand weed. (21DAS+30DAS)
	7	6569	10966	10978	9504	Hand weeding (21DAS+30DAS+56DAS)
	8	2059	7580	10838	6826	Hand weed. (21DAS+30DAS) +Herbicide (Post-e)

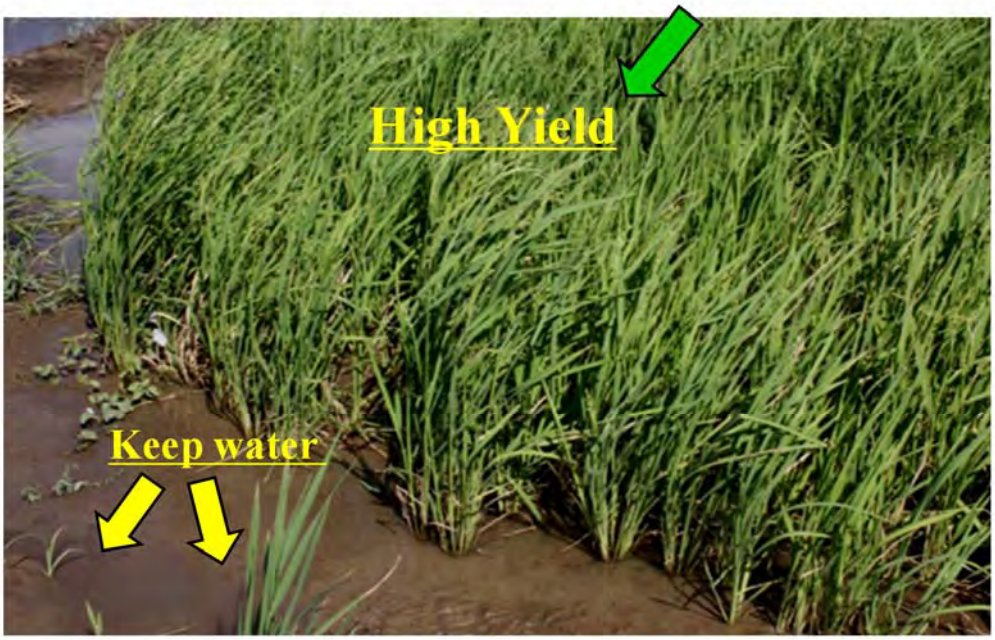
Recommendation

- **Utilizing herbicide (pre-emergence, post-emergence) is indispensable under large scale field condition in Sudan. Application of herbicide is effective from the viewpoint of yield by statistical analysis.**
- **Hand weeding of 3times is also effective way from the viewpoint of yield by statistical analysis.**
- **As a result, application of pre-emergence herbicide is imperative and even if herbicide is not utilized, by 2times hand weeding during one month after sowing, weeds can be removed and allows later weeding easier.**
- **The important point is that application of herbicide must be done at optimum time, in proper amount and at one time (one day). This information is imperative for farmers for good control. And, to implement weeding at early stage is important so that weeds can be eliminated easily. If clean condition is maintained up to heading stage, rice can avoid competition on water and nutrient and it realize high yield. Removing weeds before flowering is important to lessen weeds next season.**

⑥ Appropriate Water Management

From panicle initiation stage (50 days after sowing) to heading (flowering) stage, rice requires much water compared with other stage. Irrigate enough water and keep it in the field !

Appropriate Irrigation ➡ Enough water



Water management (Heading stage)

No water !

Enough water !

Field must be irrigated uniformly, especially at this stage !

Please keep in your mind on water management;

- Insufficient water causes poor growth of rice.
- Submerged water after sowing impedes germination and emergence of seedling of rice due to lack of oxygen.
- Excessive irrigation water at early stage before panicle initiation possibly retards root development of rice.

Remarkable points:

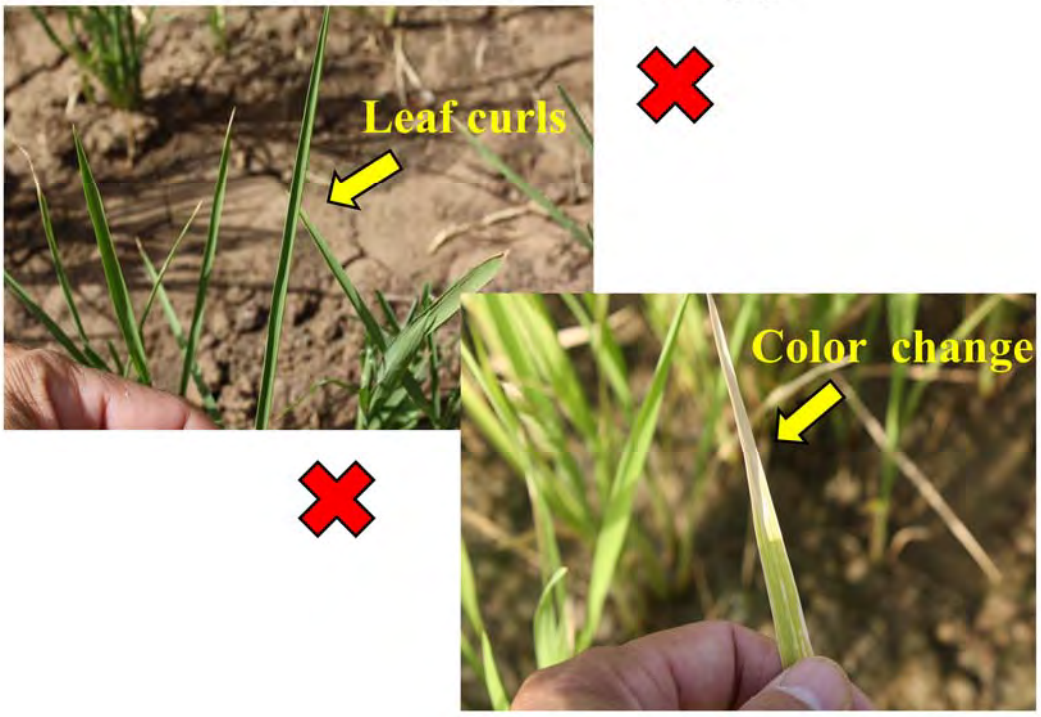
- After rice started to form panicle, it requires more water to have steady panicle growth compared with early stage. In particular, sufficient water is indispensable for rice at heading and flowering stage. In case irrigation water is not provided sufficiently at these stages, shortage of water causes empty or immature grains.
- In Sudan under high temperature, deficiency of water at/after panicle initiation stage, especially heading and flowering stage, causes empty grains at higher rate that results in very low yield.

Just after sowing

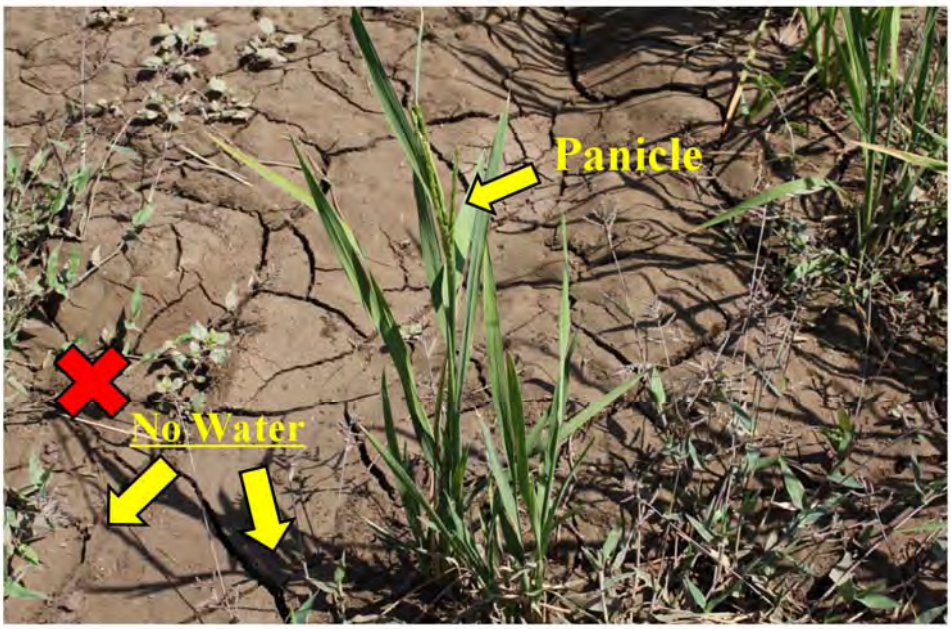
Please reduce the amount of water !
Just after sowing, no need to keep a lot of water.
Excess stagnant water impedes germination and seedling emergence due to lack of oxygen !

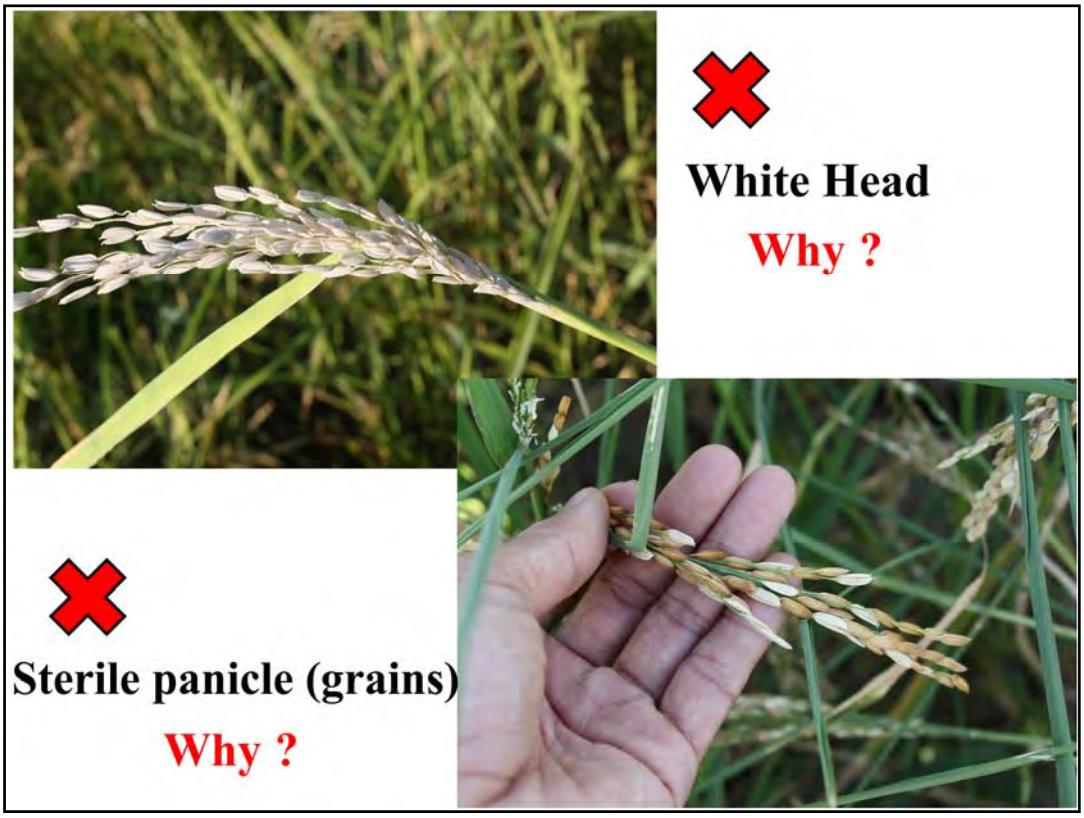
Good seedling emergence !

Rice requires water (1)



Rice requires water (2)





1) <u>White head caused by</u>

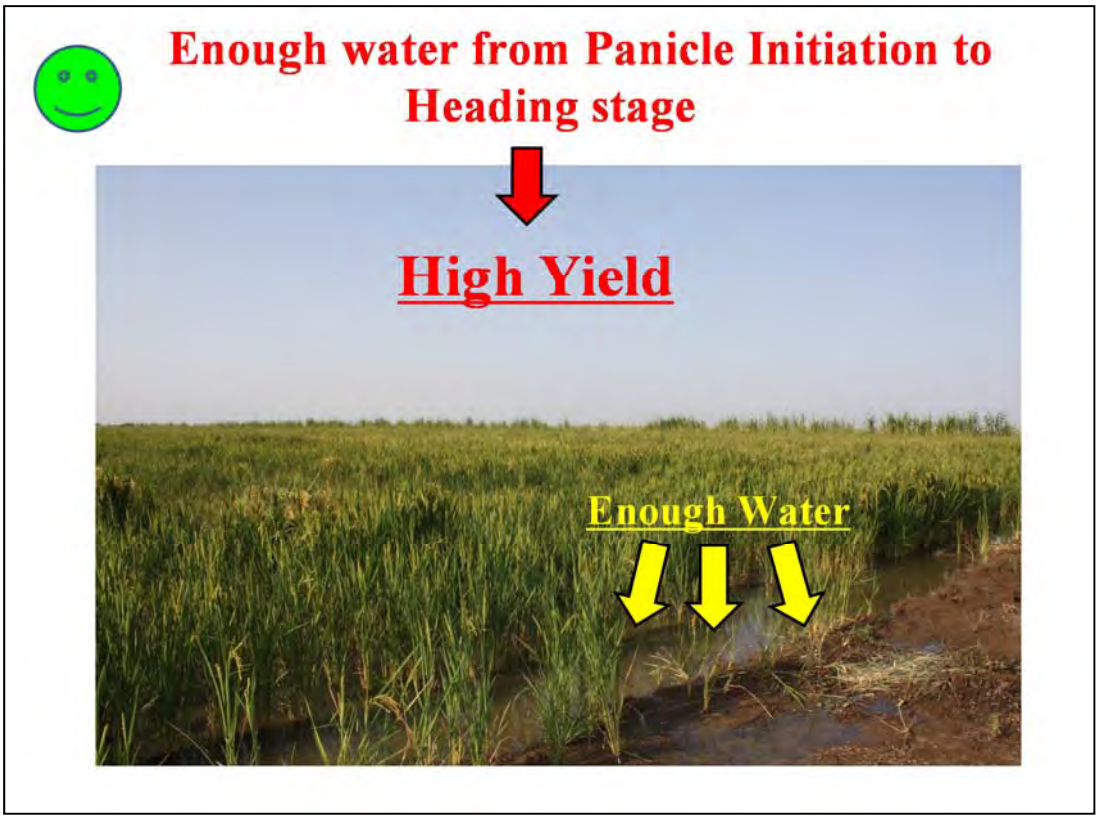
① Lack of water

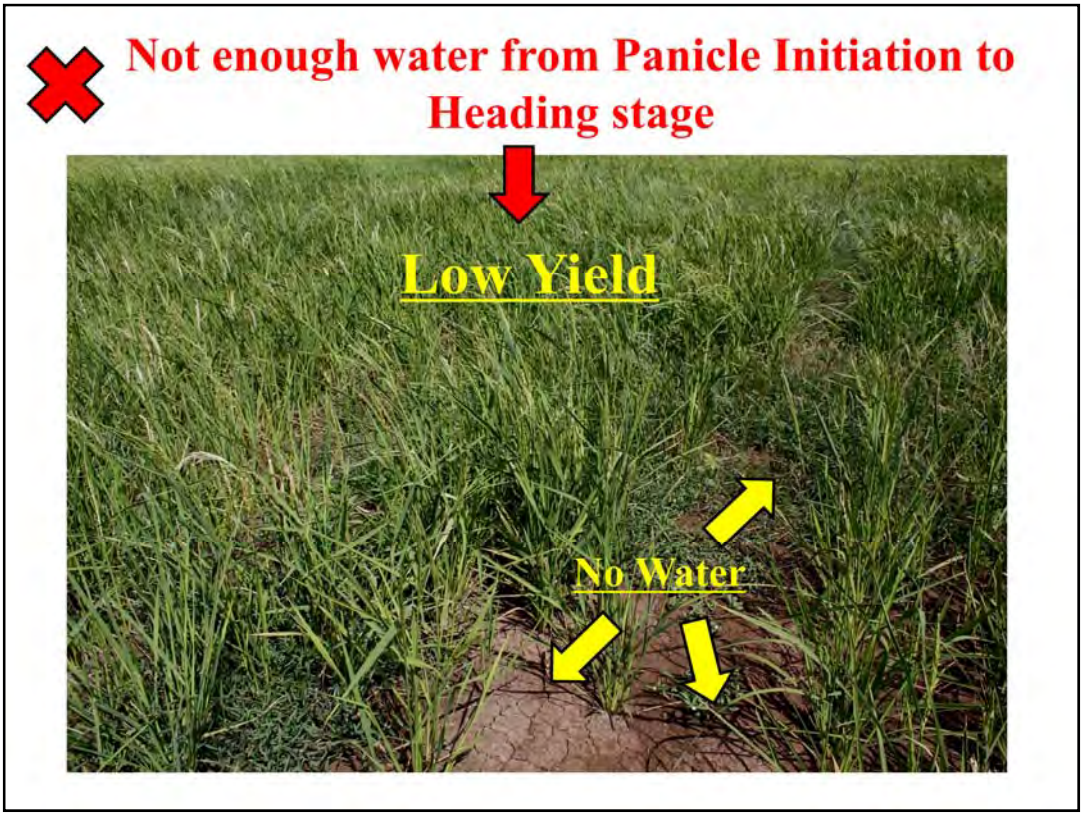
② Damage by insects such as stem borers

(by Mr.Tsuboi)

2) <u>Sterile panicle (grains) caused by</u>

Lack of water under high temperature condition from panicle initiation to heading (flowering)


Enough water from Panicle Initiation to Heading stage
High Yield
Enough Water


Not enough water from Panicle Initiation to Heading stage
Low Yield
No Water

The importance of Practical action based on Monitoring

Implementing daily observation & keeping records by utilizing Diary on rice, field condition, each operation and technical issues are indispensable for realizing expected yield and accumulating various data for the future.

Diary for Upland Rice Cultivation

Year _____

State _____

Name _____

Date:

1. Actual situation

Upland rice

Related matter

2. Action or operation

Extensionists

Farmers

3. Technical points to follow

4. Other elements in needs for upland rice production

Diseases, Insect pests and Nutrient disorder

Damage by insect pests such as stem borers was observed slightly. Micronutrient deficiency such as zinc, iron, etc. also was observed, but damage was not so severe and several types of fertilizer can be utilized for improving these deficiency temporarily.

Grain rot (*Burkholderia glumae*)

This disease developed under hot and humid weather condition at heading stage. This disease is seed transmitted disease. Therefore, removing infected panicles and grains completely is required for using harvested rice as seed next season.

Iron toxicity

Stagnant water at low places caused this disorder due to lack of oxygen. It sometimes affected rice growth seriously. To drain water and to dry soil for providing oxygen is required.

Only daily practical effort can produce good yield !

Re-sowing

Weeding

Weeding

Weeding

Weeding

Water management

Water management

Cleaning the field

You can realize high yield by implementing each operation properly.

① Using Pure Seed
② Good Land Leveling
③ Proper Sowing Operation
④ Sowing at Optimum Time
⑤ Effective Weed Control
⑥ Appropriate Water Management
⑦ Harvesting at Proper Time

Neglecting even one of ① ~ ⑦ never give you high yield !

Daily practical management

⑦ Harvesting at Proper Time

Harvesting at proper time is important to obtain head rice, not broken rice. Harvest must be started before moisture content of rice becomes less than 20% to prevent over drying.

Harvesting time

Too late ! **Optimum time !**

When 80-85% of total grain of panicle becomes yellowish, it is optimum time to start harvest.

Rice Milling Machine

After milling rice, how about rice ?

If you do not harvest at optimum time (moisture content of grains is too low)

A lot of broken rice due to late harvest (= over drying)

A lot of head rice because of good timing harvest

Storage of Rice

The storage place should have the following condition:

- Dry and cool area with ventilation
- Free from rain and direct sun heat
- Free from pests
- It is necessary to dry the grain below 15% of moisture content.
- Bags should be lifted from the ground to avoid transfer of moisture.
- The height of piles should be less than 3m to avoid falling down and breakage of sacks.
- For long term storage, please keep rice grain with husks. It is necessary to check the condition of stored grains periodically

Storage losses:

- Quantitative losses
- Qualitative losses

Factors affecting the storage of grains:

1. Moisture
2. Temperature
3. Insects
4. Rodents
5. Micro organisms
6. Mites
7. Birds
8. Grain properties
9. Storage structure

(by Mr. Tokumoto)

Additional information

Rice in the world and the classification (1)

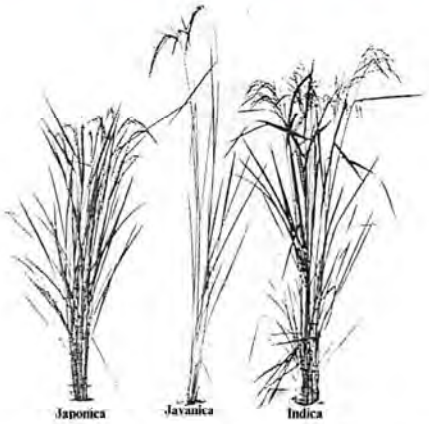
Rice planted area in the world: 157,500,000 ha (2012, Prof. ITO, Kyushu Univ.)
Rice production in the world: 720,000,000 t (2012, FAOSTAT)
Rice is eaten by half of the world population as staple food like Japan.

- *Oryza sativa L.* (Asia Rice)
  - Indica → IR-64, Tox, WITA, etc.
  - Japonica → Koshihikari, Nihonbare, etc.
  - Javanica → Moroberekan, Lac etc. (= tropical japonica)
- *Oryza glaberrima* Steud. (Africa Rice)
- *Oryza rufipogon* Griff.
- *Oryza nivara* Sharma et Shastry
- *Oryza longistaminata* A. Chev et Roehr.

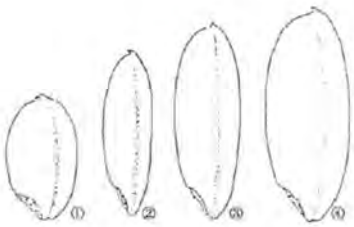
about 20 wild rice in the world.

Progenitor of *Oryza sativa L. is O. rufipogon*
Progenitor of *Oryza glaberrima Steud is O. barthii*

Rice in the world and the classification (2)



Japonica Javanica Indica



① : Japonica
②③: Indica
④ : Javanica

Classification of rice by amylose content
Non-glutinous rice: 10 to 25 % amylose + 90 to 75 % amylopectin
Glutinous rice: 100% amylopectin

What is NERICA ?

NERICA = New Rice for Africa

NERICA is the product of interspecific hybridization between the cultivated rice species of Africa and Asia. (*O. Sativa* L. × *O. glaberrima* Steud.)

developed by Dr. Monty P. Jones
at WARDA (West Africa Rice Development Association)
which is involved in AfricaRice (Africa Rice Center)

Development of NERICA

♀ Asian rice ♂ African rice

O.sativa L.
WAB 56-104

x

O.glaberrima Steud.
CG 14

→

NERICA


Ministry of Agriculture & Forestry
وزارة الزراعة والغابات


JICA

الدليل المرشد

زراعة الأرز غير المغمور

مشروع انعاش قدرات

ضمن المجلس التنفيذي للنهضة الزراعية

إعداد:

يو قتو

خبير بمنظمة جايكا

مقدمة

إزداد مؤخرا الطلب على الأرز كمحصول حبوب بسبب إرتفاع إنتاجيته مقارنة بالمحاصيل التقليدية، ولزيادة دخل المزارعين وتحقيق الأمن الغذائي في السودان . ونتيجة لذلك أصبح الأرز غير المغمور من المحاصيل الجديدة ذات الإنتاج العالي في السنوات الأخيرة زاد معدل إستهلاك الفرد الأرز. حيث يستورد السودان حوالي 50,000 طن (ماقيمته حوالي 25 مليون دولار أمريكي في السنة) لمقابلة الإستهلاك المحلي. مماسبق يمكن الإعتقاد بأن الأرز محصول جيد واعد. لذلك لابد من توفير الحزم التقنية ليستفيد منها المرشدين الزراعيين بل أيضا المزارعين الراغبين في زراعة الأرز غير المغمور. ينعم السودان بأراضي زراعية شاسعة متنوعة في خصائص البيئات والتربة والمناخ (درجة الحرارة، الأمطار، ..الخ). ونسبة لعدم توفر حزمة تقنية خاصة بزراعة الأرز في الوقت الراهن، قام البرنامج بإعداد هذا الكتيب من خلال الأنشطة الحقلية. هذا الكتيب يوفر المعلومات والتقنيات الأساسية الخاصة بزراعة الأرز غير المغمور في السودان. يؤمن البرنامج بأن المزارعين في إمكانهم تحقيق إنتاجية عالية وبالتالي ربحية مجزية من خلال دعم المرشدين الزراعيين ذوي المهارة والخبرة المكتسبة من خلال الإستفادة من هذا الكتيب. أخيرا، يتوقع البرنامج أن يقدم هذا الكتيب مساعدة جيدة لهم ، ويأمل البرنامج أن تتم الإستفادة القصوى من هذا الكتيب في المرحلة الأولى من زراعة الأرز غير المغمور في السودان.

الفهم في غير ممارسة عملية لاينتج شيئ !

يناير، 2016

الملاحظات

تعتبر محصلة النشاطات الحقلية في حقول المزارعين الإيضاحية في ولاية الجزيرة في موسم 2015، وقياس الإنتاجية للمحصول عليها عن طريق الاستفادة من المعارف والتوصيات التي تم توضيحها في هذا الكتيب تتمثل تلك المحصلة في الآتي:

الصنف: ريك 4

العدد الكلي للمواقع (حقول إيضاحية وحقول إنتاج تقاوي)**:** 10 موقع

متوسط مساحة الحقل في الـ 10 مواقع: 3.0 فدان

أعلى إنتاجية: 7.9 طن/هكتار (3.3 طن/فدان)

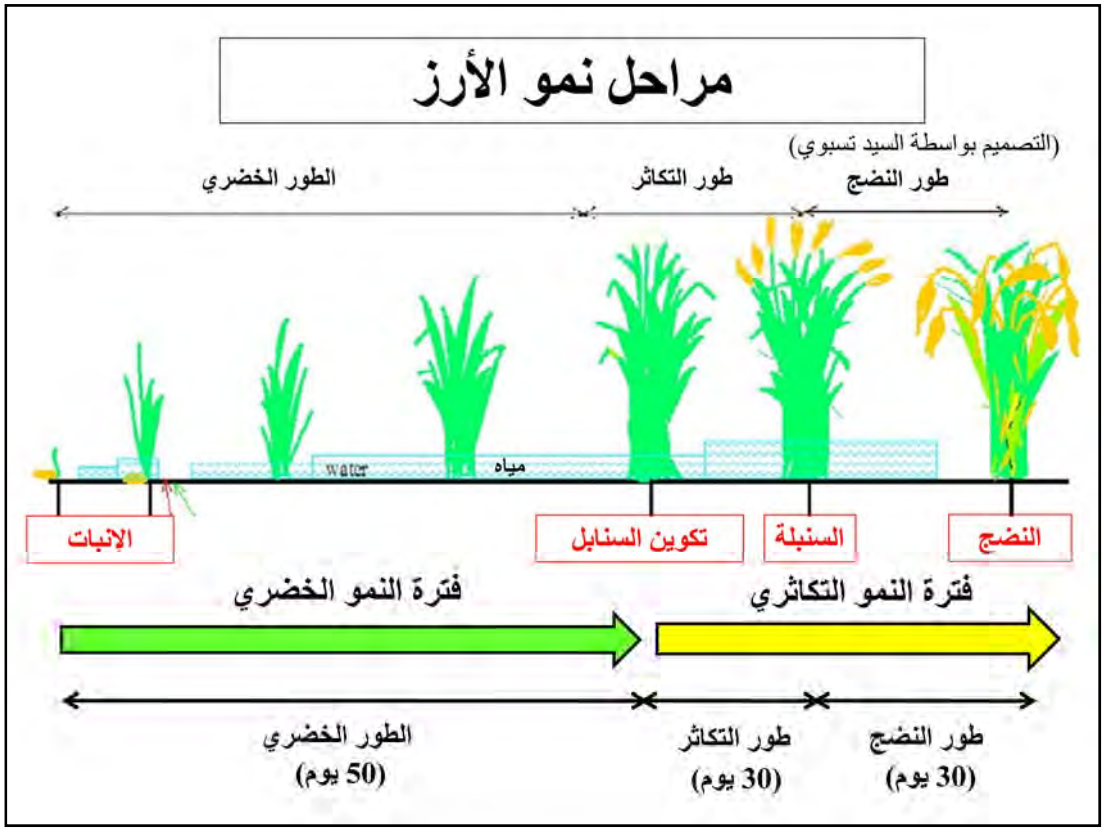
متوسط إنتاجية الحقول الإيضاحية: 3.2 طن/هكتار (1.3 طن/فدان)

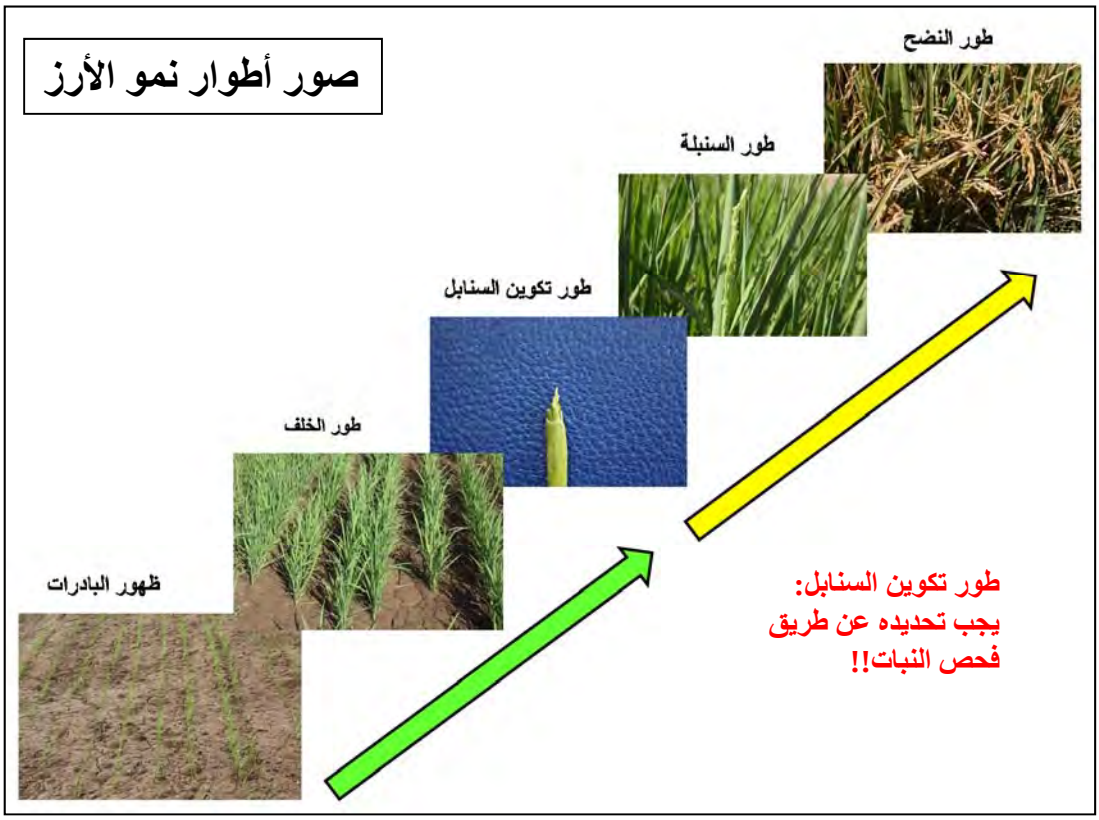
متوسط إنتاجية حقول إنتاج التقاوي : 3.5 طن/هكتار (1.5 طن/فدان)

المحتويات

أهم النقاط الفنية في زراعة الأرز غير المغمور

1) استخدام بذور نقية
2) التحضير الجيد للأرض (التسوية)
3) تجويد عملية الزراعة
4) الزراعة في الزمن الأمثل (تاريخ الزراعة)
5) مكافحة الحشائش بالطرق الفعالة
6) إدارة الري بالطريقة الأمثل
7) الحصاد في الزمن المناسب (تاريخ الحصاد)


مراحل نمو الأرز
(التصميم بواسطة السيد تسبوي)
الطور الخضري
طور التكاثر
طور النضج
water
مياه
الإنبات
تكوين السنابل
السنبلة
النضج
فترة النمو الخضري
فترة النمو التكاثري
الطور الخضري
(50 يوم)
طور التكاثر
(30 يوم)
طور النضج
(30 يوم)


صور أطوار نمو الأرز
طور النضج
طور السنبلة
طور تكوين السنابل
طور الخلف
ظهور البادرات
طور تكوين السنابل:
يجب تحديده عن طريق
فحص النبات!!

العمليات الأساسية لزراعة الأرز غير المغمور

- **تحضير التقاوي** (نظافة التقاوي، إجراء إختبار الإنبات)
- تحضير الأرض (1) : الحراثة، **إضافة السماد العضوي**، التنعيم
- تحضير الأرض (2) : السراب ، **التروية**
- تطبيق الأسمدة (الأساس Basal : NPK، TSP، SSP ...الخ)
- **تحضير الأرض (3)** : التنعيم، **تسوية الأرض**
- **زراعة التقاوي**
- **مكافحة الحشائش** (مبيدات قبل الإنبات: بنداماثالين، ...الخ)*
- الري
- **مكافحة الحشائش** (النظافة اليدوية)
- تطبيق الأسمدة (الأسمدة السطحية Topdressing : اليوريا، ...الخ)
- **مكافحة الحشائش** (مبيدات بعد الإنبات : 2,4-D ، ...الخ) *
- **الري (طور تكوين السنابل ~طور السنبلة ~طور النضج)**
- **الحصاد**

* إذا لم يتم استخدام مبيدات الحشائش، يجب وبالضرورة القيام بالنظافة اليدوية باستمرار.

للحصول على إنتاجية أعلى من 1 طن/للفدان
يجب تنفيذ العمليات الفلاحية التالية بصورة مثلى !

1. **معدل التقاوي : 20-30 كجم/للفدان ، مسافات الزراعة 30 سم أو أكثر**
2. **تسوية /تسطيح الأرض** يجب التأمين على التسوية الجيدة .

← إذا لم تكن التسوية جيدة ، لن يكون هنالك إنبات أو نمو للبذور في الأماكن المنخفضة في الحقل . يجب تسوية الأرض تماماً في كل أجزاء الحقل بدون وجود أخاديد أو حفر.

3. **مكافحة الحشائش . يجب القيام بها أولاً بأول (مبكراً)**

← إذا لم يتم تطبيق مبيدات الحشائش ، يجب القيام بالنظافة اليدوية مرتين على الأقل خلال فترة شهر واحد من تاريخ الزراعة.

4. **فترات الري** :

مرحلة الإنبات ~ مرحلة تكوين السنابل : **رية واحدة كل 5 - 6 أيام**

مرحلة تكوين السنابل (50 يوم بعد الزراعة) ~ مرحلة السنبلة ~ مرحلة النضج : **رية كل 2 – 3 أيام**

← تختلف فترات الري حسب حالة التربة ، لكن يجب القيام بالري قبل جفاف التربة .

التقويم المحصولي العام للأرز غير المغمور

Operations	Month											
	Jan.	Feb.	Mar	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Site Check & Selection	1 - 31											
Seed preparation (Cleaning, Germination test, etc.)	1 - 31											
Formulate year action plan based on technical handbook			1 - 31									
Plowing, Organic fertilzer & Harrowing			1 - 30									
Ridging & Pre-watering			1 - 30									
Applying TSP (SSP) & Harrowing					1 - 31							
Leveling					15/05	15/06						
Sowing						15/06	Before 15/07					
Ridging & Plotting						15/06	15/07					
Pre-emergence herbicide						15/06	15/07					
First irrigation						15/06	15/07					
Manual weeding ①							05/07	05/08				
Fertilization ① (3-4 Weeks after Sowing)							10/07	10/08				
Manual weeding ② or Chemical weeding (Post-emergence)							20/07	20/08				
Fertilization ② (6-7 Weeks After Sowing)							25/07	25/08				
Manual weeding ③								10/08	10/09			
Fertilization ③ (9-10 Weeks After Sowing)								15/08	15/09			
Roguing (Removing off-type)								01/08		15/10		
Irrigation (Second～Final)							15/07			30/10		
Harvesting										15/10	15/11	
Start Panicle initiation								05/08	05/09	Increase water amount !		
Start Heading									05/09	05/10		

① استخدام تقاوي نقية

يعتبر استخدام التقاوي النقية الخطوة الأولى للحصول على إنتاجية عالية

نقاء التقاوي عامل مهم جداً مثله مثل أهمية التقاوي

تقاوي غير نقية

نريكا 4 نقية

التقاوي غير النقية (المخلوطة) تتسبب في صعوبة العمليات الفلاحية وتقلل الجودة

استخدام التقاوي غير النقية يسبب العديد من المشاكل في

① الإدارة (= الإنتاجية) ② (الجودة)

① الإدارة (الإنتاجية) :

إذا كان التنفيذ المنظم لإدارة عمليات الري ، التسميد ، الحصاد ، ...الخ عملية صعبة جداً .

إنتاجية متدنية !

② الجودة :

1) إذا كان تنفيذ عملية التقشير والتبييض بصورة سليمة عملية صعبة جداً.

الكثير من الأرز المكسور !

2) تباين في لون، وطعم، وشكل/حجم الأرز

جودة منخفضة !

إزالة الأصناف الغريبة عملية ضرورية للمحافظة على نقاوة البذور

استخدام التقاوي المخلوطة بالأصناف الغريبة يسبب العديد من المشاكل الخطيرة في إدارة العمليات الزراعية وفي معايير الجودة. في ما يتعلق بالتنافس في النمو، تعتبر الأصناف الغريبة أكثر قوة بالمقارنة مع الصنف نريكا4. في حالة عدم إزالة الأصناف الغريبة من التقاوي عند إعداد البذور وفي الحقل قبل الحصاد، سوف يتم تغطية الحقل كلياً بالأصناف الغريبة. لذلك تعتبر عملية إزالة الأصناف الغريبة (التنقية) ضرورية للمحافظة على نقاوة البذور.

● **إزدياد إنتشار الأصناف الغريبة:**

إذا كان هنالك حبة واحدة (1) من الأصناف الغريبة في وقت الزراعة

وإذا كان النبات الواحد من الصنف الغريب يحتوي على
100 حبة في السنبلة الواحدة وفي كل نبات
10 سنابل

فإن عدد حبوب الأصناف الغريبة ⟵ = 100 × 10 = 1000

1000 حبة عند الحصاد

سوف يزداد عدد النباتات من الأصناف الغريبة بصورة مطردة في الحقل !

● **المحافظة على نقاوة التقاوي:**

إذا كان لدينا 30 كجم تقاوي للفدان الواحد ، هذا يعني حوالي 1 مليون حبة للفدان.
(مثال: إذا كان وزن الألف حبة يساوي 30 جم)
هذا يشير إلى أنه إذا كان:

إذا كان هنالك 10,000 حبة صنف غريب فإن نسبة النقاوة ⟵ 99%
إذا كان هنالك 1,000 حبة صنف غريب فإن نسبة النقاوة ⟵ 99.9%
إذا كان هنالك 100 حبة صنف غريب فإن نسبة النقاوة ⟵ 99.99%
إذا كان هنالك 10 حبة صنف غريب فإن نسبة النقاوة ⟵ 99.999%
إذا كان هنالك 1 حبة صنف غريب فإن نسبة النقاوة ⟵ 99.9999%

المحافظة على نقاوة التقاوي لأعلى مستوى ضرورية جداً جداً !

معايير مختلفة تساعد في التعرف على الأصناف الغريبة

حجم وشكل ولون الحبة

عينات مختلفة من
الأصناف الغريبة

صنف غريب (مثال)

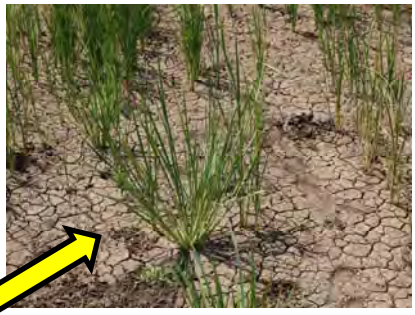
نريكا4

فترة النضج

صنف غريب

نريكا4

شكل النبات



صنف غريب

طول النبات

ما هي أهمية القيام بعملية إختبار الإنبات ؟

لأن نسبة الإنبات يجب أخذها في الإعتبار قبل الزراعة.

إذا كانت نسبة الإنبات أقل من 80% ، يجب زيادة كمية التقاوي !

نسبة الإنبات (100 - 7 = 93%)

أكبر من 80% نسبة مقبولة

ماذا عن النسبة 93% ؟

93% أكبر من 80%

وهي نسبة جيدة جداً،

لذلك ليست هنالك ضرورة لزيادة معدل التقاوي!

② التحضير الجيد للأرض (التسوية)

التسوية الجيدة ضرورية للتوزيع المنتظم لمياه الري داخل الحقل.

التسوية الجيدة للأرض ← نمو منتظم

التحضير الجيد للأرض (التسوية)

تسوية جيدة !　　تسوية غير جيدة !

ضع في اعتبارك أهمية تسوية الأرض:

التسوية غير الجيدة تخلق أماكن مرتفعة وأخري منخفضة في الحقل تتسبب في خلق مشاكل دائمة تتمثل في أن:

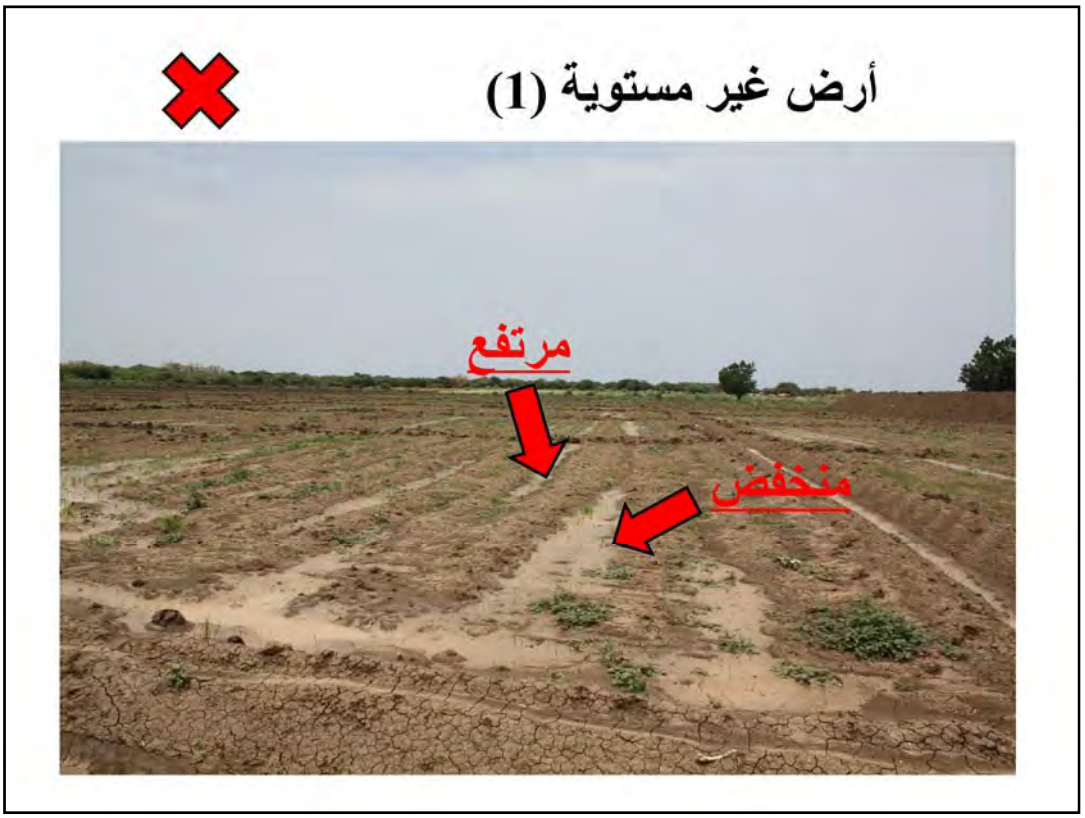
1) الأرز لن يكون قادر على النمو بصورة جيدة في الأماكن المرتفعة بسبب عدم كفاية مياه الري.

2) الأماكن المنخفضة سوف تغمر بالمياه ، ويزداد فيها تركيز مبيدات الحشائش ، مما يعوق إنبات البادرات.

3) تتكاثر الأرضة في التربة الجافة في الأماكن المرتفعة ، وتتغذى على جذور الأرز فتموت الجذور.

4) بعد الزراعة ، من الصعوبة إجراء عملية تسوية للأرض. يجب القيام بالتسوية الجيدة قبل الزراعة !

(1) المشاكل التي تحدثها التسوية غير الجيدة



مستنقع مياه وتركيز عالي لمبيدات الحشائش
أدى لإعاقة إنبات البادرات

تسوية غير منتظمة للأرض

إنتاجية منخفضة

(2) مشاكل ناتجة عن التسوية غير الجيدة

ضرر بواسطة الأرضة (1)

ضرر بواسطة الأرضة (2)

ضرر الأرضة يمكن تقليله بواسطة الإحتفاظ بالمياه، لذلك فإن التسوية الجيدة للأرض عملية في غاية الأهمية

ملحقات الجرار المطلوبة لتحضير الأرض

المحراث الحفار

يستخدم لسهولة تجفيفه للتربة ولا يكون أخاديد أو مجاري، ولكن يعتبر غير فعال مقارنة بالمحراث القرصي من حيث قدرته على قلب التربة

المحراث القرصي

يستخدم لسهولة قلبه للتربة تحت كل الظروف ، لكنه أقل فعالية مقارنة بمحراث تحت التربة من حيث عمق الحراثة والقدرة على قلب التربة

التسميد:

سماد الأساس Basal (مثل سيوبر الفوسفات الثلاثي TSP أو الـــ NPK) يجب إضافته للتربة قبل عملية التنعيم حتى يختلط بالتربة

قرص التنعيم

يستخدم لتكسير وتفتيت الكتل الترابية الموجودة في سطح أوعمق التربة ، كما يقوم بتسوية التربة في نفس الوقت

الزحافة (آلة التسوية)

تستخدم لتنفيذ تسوية التربة يدوياً بطريقة تعتمد على مهارة السائق (المشغل) وفهمه لطبيعة وحالة الحقل

التسوية بالليزر

تستخدم للقيام بعملية التسوية بطريقة آلية تعتمد على الأستفادة من أجهزة إرسال وإستقبال أشعة الليزر

مثال للتسوية المثالية للأرض

رجاءاً قم بتنفيذ تسوية مثل تسوية هذا الحقل !

تطبيق الأسمدة

مثال : الأسمدة الكيميائية الرئيسية ومحتواها من العناصر

الاسم	الرمز الكيميائي	محتوى العناصر (%)
الأسمدة النيتروجينية (N)		
سلفات الأمونيوم	$(NH_4)_2SO_4$	21(N) - 24(S)
اليوريا	$CO(NH_2)_2$	46(N)
كلوريد الأمونيوم	NH_4Cl	26(N)
الأسمدة الفوسفورية (P)		
سيوبرفوسفات أحادي		18~20(P_2O_5) - 18(Ca) - 12(S)
سيوبر فوسفات ثلاثي		45(P_2O_5) - 14(Ca) - 10(S)
الأسمدة البوتاسية (K)		
كلوريد البوتاسيوم	KCl	60(K_2O)
سلفات البوتاسيوم	K_2SO_4	53(K_2O) - 18(S)
الأسمدة المركبة (NPK)		
14-14-14		14(N) - 14(P_2O_5) - 14(K_2O)
12-12-12		12(N) - 12(P_2O5) - 12(K_2O)

التسميد في حقول المزارعين الإيضاحية

التسميد في الحقول الإيضاحية بواسطة البرنامج:

172.5-53.6-0 kg NPK kg/ha (69.0-22.5-0 kg NPK kg/fed)

DAS =(يوم بعد الزراعة)

السماد	قبل الزراعة	4-3 أسابيع بعد الزراعة (21-28 DAS)	7-6 أسابيع بعد الزراعة (42-49 DAS)	10-9أسابيع بعد الزراعة (63-70DAS)
T.S.P (0-45-0)	125kg/ha (50kg/fed)	0	0	0
Urea (46-0-0)	0	125kg/ha (50kg/fed)	125kg/ha (50kg/fed)	125kg/ha (50kg/fed)

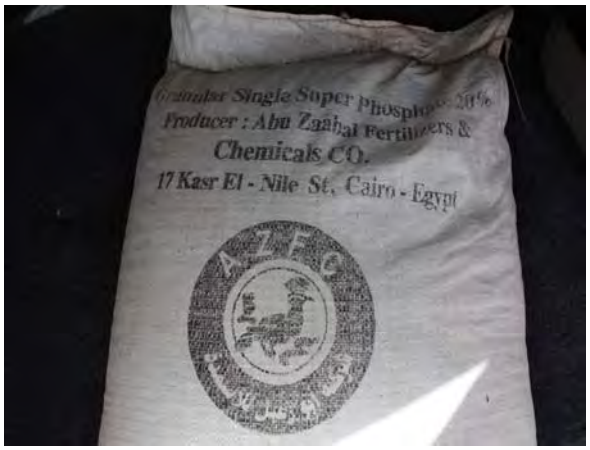
نقاط هامة:

1. قبل عملية الزراعة ، يجب إجراء عملية تحليل للتربة لمعرفة خصائص التربة التي تؤثر على التغذية والنواحي الفيزيائية.
2. كمية ووقت تطبيق السماد ، وخصوصاً الجرعة الثالثة يجب أن تحدد إعتماداً على الحالة الفعلية لنمو النباتات في الحقل.
3. إضافة السماد العضوي واحد من الطرق الفعالة لتحسين خصوبة التربة وتحسين خصائص التربة كما هو الحال في التربة الرملية، الملحية،...الخ.
4. ينمو الأرز بصورة جيدة تحت الظروف الحامضية (pH 5.0-6.5) ، لكن بصورة عامة ، تعتبر تربة السودان تربة قلوية (pH 8.0 ~). من نتائج التجارب الحقلية إتضح أن استخدام سلفات الأمونيوم (سماد حامضي) بدلاً عن اليوريا (سماد متعادل) يعتبر واحد من الطرق الفعالة لتحسين قيمة الـ pH في التربة مؤقتاً لتوفير الظروف الملائمة للأرز لتحقيق إنتاجية عالية.
5. التربة القلوية تمنع الأرز من إمتصاص العديد من العناصر الصغرى المغذية.

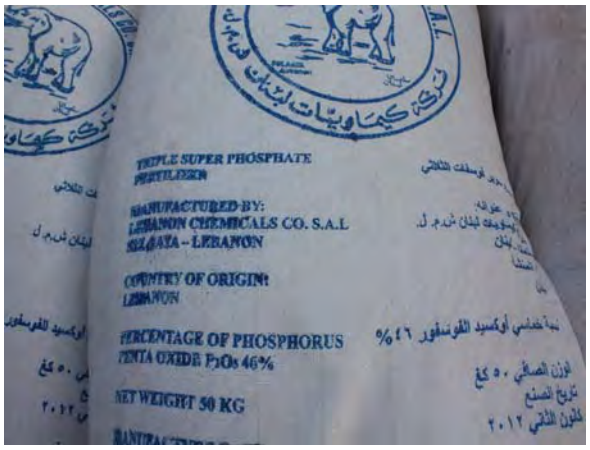
أنواع مختلفة من الأسمدة (أمثلة)

سماد عضوي 1- (1)

سماد عضوي 1- (2)



سوبر فوسات أحادي



سيوبر فوسفات ثلاثي

يوريا

سلفات الأمينيوم

ملحوظة: ليس صحيحاً الإعتقاد أنه كلما زادت كمية السماد المضافة للمحصول كلما زادت الإنتاجية . بل يجب تطبيق السماد بالكمية الموصى بها، والوقت الملائم ، وبالطريقة المناسبة.

ما هو الـ pH ؟ وما هو الـ EC ؟

- **pH** : هو قياس الحموضة أو القلوية لعنصر ما ، لمدى من:
  0 (أقصى حموضة) – 7 (تعادل) – 14 (أقصى قلوية).

- **EC** (التوصيل الكهربي) : هو قياس ملوحة التربة ويدل على مدى مقدرة المحاليل على نقل التيار الكهربي. مما يمكن من معرفة درجة ملوحة التربة.

كيف يمكن قياس قيمة الـ pH وقيمة الـ EC ؟

- الطريقة المباشرة: قم إدخال القضيب الكهربي في التربة لإجراء القياس
- الطريقة غير المباشرة: قم بوضع الجهاز في محلول مائي لإجراء القياس

ملحوظة: قبل استخدام الطريقة المباشرة ، يجب أم تكون التربة رطبة بواسطة منظف أو ماء مقطر. يجب أن تتم المعايرة في الوقت المناسب.

قياس قيمة الـ pH في الحقل

جهاز قياس الـ pH (الطريقة المباشرة)

جهاز قياس الـ EC (الطريقة المباشرة)

جهاز قياس الـ pH (الطريقة غير المباشرة)

③ تجويد عملية الزراعة

1. من الضروري ضبط الجرار وآلة الزراعة (السطارة) حسب حالة الحقل.
2. يجب على السائق (مشغل الآلة) أن يقوم بتفقد الحقل لتعديل طريقة القيادة/الزراعة وفقاً لحالة وظروف الحقل لتحقيق زراعة منتظمة بدون فراغات (حفر أو سطور ليس بها بذور).

الزراعة اليدوية بواسطة الكرك

(وهو آلة لزراعة الأرز في سطور)

عملية الزراعة

عمق زراعة كبير!
إنبات سيئ للبادرات

عمق زراعة مثالي !
إنبات جيد للبادرات

(1) عمق الزراعة (الأمثل : 2-3 سم)

عميق جداً (أكثر من 4 سم)

إنبات سيئ للبادرات !

عمق سطحي جداً

ضرر بواسطة الطيور، فقد التقاوي بواسطة مياه الري أو الأمطار وإنبات سيئ للبادرات المتأثرة بمبيدات الحشائش !

ملحوظة: الزراعة العميقة هي السبب الرئيسي في فراقات الزراعة . لذلك يجب فحص العمق أثناء عملية الزراعة في كلا طرق الزراعة (يدوياً أو آلياً).

عملية الزراعة

معدل تقاوي عالي جداً.
يؤدي إلى نمو سيئ وإنتاجية قليلة!

(2) معدل التقاوي (الأمثل : 20- 30 كجم/الفدان)

عالي جداً

نتيجة للمنافسة على الماء ، العناصر الغذائية ، الضوء ، لذلك لا يستطيع النبات النمو وإنتاجه سوف يكون قليل!

منخفض جداً

نتيجة لعدم الاستفادة من العناصر الغذائية ،الماء، والضوء ، لن يستطيع النبات النمو

وبالتالي ستنخفض الإنتاجية

ملحوظة: من نتائج التجارب والحقول الإيضاحية ثبت أنه ليس صحيحاً الإعتقاد أنه كلما زادت كمية التقاوي المضافة كلما زادت الإنتاجية.

عملية الزراعة

مسافات زراعة (بين السطور) ضيقة، غير مناسبة لإزالة الحشائش !
صعوبة عملية إزالة الحشائش وقلة الإنتاجية

(3) مسافات الزراعة (الأمثل : 30 سم ~)

ضيقة جداً

بسبب تقارب النباتات من بعضها البعض ، يكون النمو سيء وتصعب عملية إزالة الحشائش مما يؤدي إلى قلة الإنتاجية

واسعة جداً

نتيجة للعدد غير الكافي للنباتات بالنسبة لمساحة الحقل ، تكون الإنتاجية قليلة

ملحوظة: بحسب طرق إزالة الحشائش يدوياً أو آلياً ، يجب أن تكون المسافة بين السطور على الأقل 30 سم (أو أكثر).

تنفيذ عملية الزراعة بالطريقة المثلى !

بعد الزراعة،
يبدأ الري بالأمطار أو بالري الصناعي

مستنقع المياه يعوق نمو البادرات

بعد الزراعة ، يجب إجراء عملية تقسيم الحقل إلى أجزاء (التقطيع) بطريقة مناسبة للمساعدة في إدارة ري منتظم في كل أجزاء الحقل.

الحقل أعلاه لم يتم فيه عمل الجداول والتقانت بصورة مثلى. القطعة الواحدة (الرباط) كبيرة جداً ولا تساعد على الري بصورة منتظمة !

في الحقل أعلاه تم تقسيم الحقل إلى قطع بحجم مناسب بواسطة عمل الجداول والتقانات . تحت هذه الظروف ، من السهولة بمكان ري كل قطعة (رباط) في الحقل بطريقة منتظمة.

1. **يجب أن تتم عملية التقطيع على أساس مراعاة المناطق المرتفعة والمنخفضة.**
2. **يجب إعادة تقطيع الحقل بعد الرية الأولى إذا دعت الضرورة لذلك.**

④ الزراعة في التاريخ الأمثل

الزراعة في التاريخ الأمثل تساعد الأرزعلى النمو لمستوى جيد مما يجنبه التعرض لأضرار الأمطار، نقص المياه في مرحلة السنبلة، إرتفاع وإنخفاض درجات الحرارة، ... الخ.

تاريخ الزراعة الأمثل

إذا توفرت مياه الري ، فإن تاريخ الزراعة الأمثل هو:

الموسم الصيفي : قبل بداية هطول الأمطار

يونيو ⬅

*** في الأجزاء الشمالية من السودان تقل كمية الأمطار وترتفع درجات الحرارة. لذلك تم إقتراح تجربة الزراعة في الفترة من نهاية شهر يوليو وحتي شهر أكتوبر ، مع الوضع في الإعتبار تاريخ زراعة المحاصيل الشتوية الأخرى.**

الموسم الشتوي : قبل بداية إنخفاض درجات الحرارة

أكتوبر ⬅

أمطار غزيرة !

رجاءاً في ما يتعلق بتاريخ الزراعة ضع في الإعتبار النقاط التالية ;

1) الآثار الناجمة بسبب هطول الأمطار
2) الآثار الناجمة بسبب درجات الحرارة (إرتفاع أو إنخفاض)
3) الضرر الناجم بسبب هجمات الطيور، خاصة في حالة عدم وجود محصول بخلاف الأرز في المنطقة المحيطة

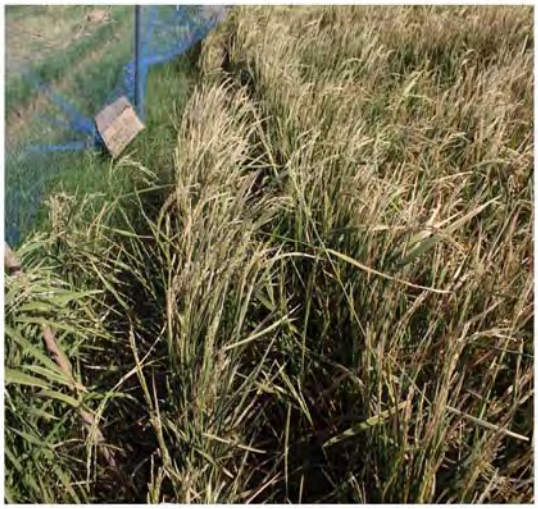
- تاريخ الزراعة يمكن تحديده من خلال الوضع في الإعتبار العديد من العوامل مثل هطول الأمطار ، درجة الحرارة ، توفر المياه، هجمات الطيور، ...الخ.
- بصورة عامة، يوصى بالإنتهاء من عملية الزراعة قبل ثلاثة أسابيع من موسم الأمطار ، الشيء الذي يمكن الأرز من النمو لإرتفاع يجنبه أضرار المطر.
- هنالك دلائل على أن إنتاجية الأرز المزروع في منتصف شهر سبتمبر منخفضة بصورة كبيرة مقارنة بالمزروع في منتصف شهر يوليو.

(1) أثر الأمطار على نمو الأرز

تؤثر على نمو النبات

تقاوي الرقاعة لن تكون قادرة على الإنبات

(2) أثر درجات الحرارة على نمو الأرز



لتفادي/تقليل (أضرار الحرارة) بسبب درجة الحرارة العالية، يجب تكرار الري و/أو الاحتفاظ بالمياه (عدم تصريفها).
تعديل تاريخ الزراعة يجب أيضاً وضعه في الإعتبار.

(3) أثر الطيور على نمو الأرز

الرقاعة

عملية الرقاعة مهمة جداً لتقليل الفراعات في السطور وذلك للحصول على إنتاجية جيدة ، لذلك يجب إكمالها في وقت وجيز

⑤ المكافحة الفاعلة للحشائش

بسبب ضعف الأرز مقارنة بالحشائش من حيث القدرة على إمتصاص العناصر الغذائية والماء من التربة ، فإن نمو الأرز قد يتأخر كثيراً بسبب نمو الحشائش.

مكافحة فاعلة للحشائش ⟵ حقل بدون حشائش

مكافحة الحشائش
(شهر واحد بعد الزراعة)

الحشائش تغطي كل الحقل !

مكافحة مثالية للحشائش!

مكافحة الحشائش (مرحلة السنبلة)

الكثير من الحشائش !

لا توجد حشائش !

يجب أن يكون الحقل نظيف وخالي من الحشائش في هذه المرحلة لتفادي المنافسة !

مكافحة الحشائش العامل الرئيسي والضروري المؤثر على الإنتاجية !

رجاءاً! لمكافحة الحشائش ضع في إعتبارك النقاط التالية:

- الحشائش أقوى من الأرز من حيث القدرة على إمتصاص العناصر الغذائية والماء من التربة. في حالة نمو الأرز والحشائش معاً في نفس الحقل ، فإن الحشائش فقط هي التي سوف تنمو وليس الأرز. هذا يعني أن الحشائش تصير أكبر فأكبر ، والأرز لا ينمو بالصورة المطلوبة حتي يتم تغطية كل الحقل بالحشائش.
- القيام بالمعاملات المناسبة لمكافحة الحشائش مثل عملية التروية، الحراثة ، العزيق بواسطة الطراد بالإضافة إلى نظافة الحقل قبل الزراعة تعتبر معاملات في غاية الأهمية.
- أهمية التطبيق الجيد لمبيدات قبل الإنبات والمكافحة اليدوية الكافية في الوقت المناسب خلال شهر واحد بعد الزراعة.
- إذا تمت المحافظة على نظافة الحقل حتى مرحلة السنبلة ، يمكن للأرز تفادي مشكلة منافسة الحشائش على العناصر الغذائية والماء وتحقيق إنتاجية عالية.
- إزالة الحشائش قبل تكوينها للأزهار مهمة للحد من الحشائش في الموسم التالي.

طرق مكافحة الحشائش

- مكافحة وقائية ، فلاحية

تحضير الارض، التروية قبل الزراعة، الدورة الزراعية، مسافات الزراعة، ...الخ

- مكافحة ميكانيكية

مكافحة يدوية (باليد ،بالمعدات اليدوية، ...الخ)

- مكافحة كيميائية (مبيدات الحشائش)

مبيد إختياري
مبيد غير إختياري
مبيد قبل الإنبات (مثال: بندامثالين)
مبيد بعد الإنبات (مثال: 2,4-D)

النوع، الكمية، التركيز، الزمن عوامل يجب أخذها في الإعتبار عند تطبيق المبيد

طرق مكافحة الحشائش (1)

طرق مكافحة الحشائش (2)

المكافحة الميكانيكية

مكافحة يدوية (باليد، بالمعدات اليدوية، ...الخ)

طرق مكافحة الحشائش (3)

المكافحة الكيميائية (مبيدات الحشائش)

تطبيق مبيدات الحشائش

ستومب أكوا
(بندامثالين)
(من النوع قبل الإنبات)
الجرعة: (1.5 لتر/للفدان)

رجاءاً إختر المبيد الأكثر
فعالية بناءاً على نتائج
المواسم السابقة، واتبع
بدقة تعليمات المنتج
(مبيد الحشائش) !

إذا لم تتبع التعليمات ...

ضرر المبيد
(السميّة)
مظاهر الإصابة
بضرر المبيد
(السميّة)

لا وجود لنبات الأزر بسبب
التطبيق غير الجيد
لمبيد الحشائش !

مبيدات قبل الإنبات

مبيدات بعد الإنبات

رجاءاً قم بمكافحة الحشائش في أطوارها الأولى !

مكافحة الحشائش في أطوارها الأولى ضرورية

إذا لم تبدأ عملية إزالة الحشائش ...

صعوبة مكافحة الحشائش في هذه المرحلة

...إذا لم تكن قد بدأت في إزالة الحشائش ...

مكافحة الحشائش ستكون أكثر صعوبة في هذه المرحلة

وأخيراً ...

سوف تغطي الحشائش كل الحقل

لن تكون هنالك إنتاجية

تجربة مكافحة الحشائش في حقل تجارب وزارة الزراعة، الجزيرة

(المعاملة الأولى بدون مكافحة حشائش = [Treatment -1]T-1)

تم التوصل لطرق فاعلة لمكافحة الحشائش. لكن يجب علينا بذل المزيد عملياً لتطوير طرق مكافحة حشائش فاعلة واقتصادية. في الوقت الحالي ، تحديد عدد مرات عمليات النظافة غير مهم. النقطة المهمة هل توجد حشائش أم لا.

أوضحت الصور أنه بدون مكافحة للحشائش ، لا يمكننا الحصول على أرز إطلاقاً !

عدد مرات عمليات المكافحة غير مهم

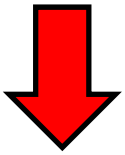
المهم هو هل توجد حشائش أم لا !

تكثيف النظافة اليدوية مهمة لمكافحة الحشائش !

تكثيف النظافة اليدوية هو:

مثال :

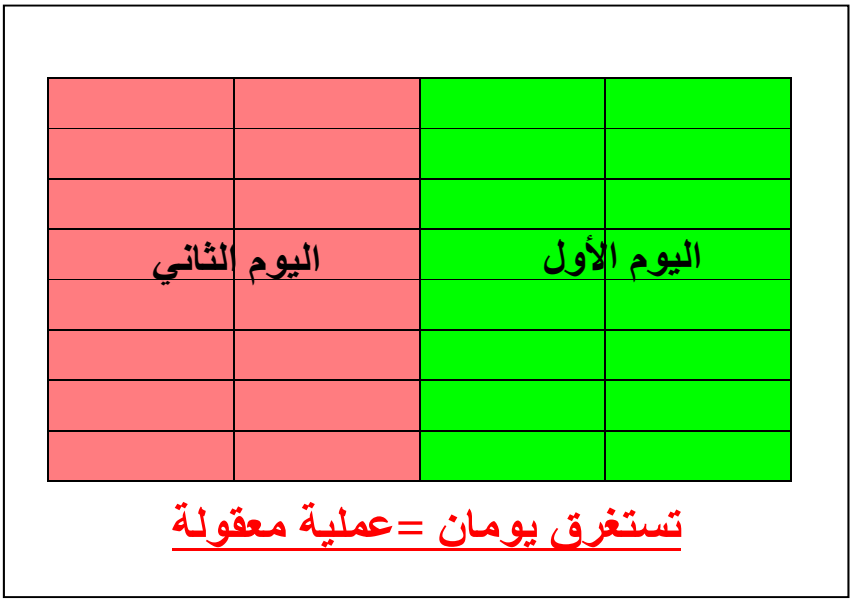
3 أشخاص × 10 أيام



30 شخص × 1 يوم

تكثيف النظافة اليدوية يمكن من إزالة الحشائش تماماً في زمن قصير ويساعد على القيام بالعمليات الفلاحية الأخرى التالية في وقتها !

تستغرق أربعة أيام =عملية سيئة



تستغرق يومان =عملية معقولة

تستغرق يوم واحد =عملية جيدة !

النتائج التي توضح إنتاجية تجربة مكافحة الحشائش

نتيجة إنتاجية تجربة مكافحة الحشائش

		التكرارات			الوحدة : كجم/هكتار	طريقة مكافحة الحشائش
		1	2	3	المتوسط	
المعاملات	1	98	1037	1991	1042	الشاهد (بدون مكافحة)
	2	3208	9564	9691	7488	مبيد قبل الإنبات + مبيد بعد الإنبات
	3	2195	8304	8465	6321	مبيد قبل الإنبات + نظافة يدوية (42DAS)
	4	6775	8623	6201	7180	مبيد قبل الإنبات + نظافة يدوية (42DAS+56DAS)
	5	2907	3771	10105	5594	نظافة يدوية (21DAS)
	6	2585	6624	7977	5729	نظافة يدوية (21DAS+30DAS)
	7	6569	10966	10978	9504	نظافة يدوية (21DAS+30DAS+56DAS)
	8	2059	7580	10838	6826	نظافة يدوية + مبيد بعد الإنبات (21DAS+30DAS)

التوصيات

- من الضروري إستخدام مبيدات الحشائش (من النوع قبل وبعد الإنبات) في الحقول ذات المساحات الكبيرة في السودان . ويعتبر تطبيق المبيدات فعال بناءاً على الإنتاجية والتحليل الإحصائي.
- النظافة اليدوية 3 مرات أكثر فعالية بناءاً على الإنتاجية والتحليل الإحصائي.
- نتيجة لذلك تطبيق المبيد من النوع قبل الإنبات فعال لكن غير كافي لوحده، وفي حالة عدم استخدام مبيد من النوع قبل الإنبات ، يجب إزالة الحشائش يدوياً مرتان في غضون شهر بعد الزراعة ، مما يساعد في أن تكون النظافة اليدوية الثالثة أكثر سهولة.
- النقطة المهمة هي أن تطبيق المبيد يجب أن يتم في الوقت المناسب، وبكمية وتركيز صحيح وفي زمن محدد (يوم واحد). هذه المعلومات يجب توضيحها للمزارع من أجل التحكم الجيد في العملية. وأن المبادرة في النظافة اليدوية في المراحل الأولى مهمة لسهولة إزالة الحشائش. إذا تم المحافظة على الحقل نظيف حتي مرحلة السنبلة ، يمكن للأرز أن يتجنب منافسة الحشائش على العناصر الغذائية والماء وتحقيق إنتاجية عالية. إزالة الحشائش قبل إزهارها مهم جداً للحد منها في الموسم التالي.

⑥ الإدارة الأمثل لمياه الري

من مرحلة تكوين السنابل (50 يوم بعد الزراعة) إلى مرحلة السنبلة (الإزهار) ، يحتاج الأرز إلى كمية كبيرة من الماء مقارنة بالمراحل الأخرى. أروي الحقل بكميات مياه كافية واحتفظ بها داخل الحقل !

الري المثالي ← مياه كافية

إدارة المياه (مرحلة السنبلة)

ماء كافي !

لا وجود للماء !

يجب أن يروى الحقل بإنتظام ، خاصة في هذه المرحلة !

في ما يتعلق بإدارة عملية الري يجب أخذ النقاط التالية في الإعتبار:

- مياه الري غير الكافية تتسبب في إضعاف نمو الأرز.
- مستنقع أو برك المياه بعد الزراعة تعوق إنبات وظهور بادرات الأرز بسبب نقص الأوكسجين.
- الري بإفراط في المرحلة الأولى قبل تكوين السنابل تؤخر تطور جذور الأرز.

نقاط مهمة:

- بعد أن يبدأ الأرز في تكوين السنابل، يحتاج الأرز لكميات كبيرة من المياه مقارنة بالمراحل الأولى وذلك لتعزيز نمو السنابل. بالتحديد ، مياه الري الكافية مهمة جداً في مرحلتي الإزهار والسنبلة. في حالة عدم كفاية مياه الري في تلك المرحلتين، فإن قلة كمية المياه تؤدي إلى تكوين حبوب فارغة أو غير ناضجة.
- في السودان عند إرتفاع درجات الحرارة ، ونقص مياه الري في/بعد مرحلة تكوين السنابل، وخاصة في مرحلتي الإزهار والسنبلة، يؤدي ذلك إلى تكوين الحبوب الفارغة بمعدل عالي وبالتالي تنخفض الإنتاجية.

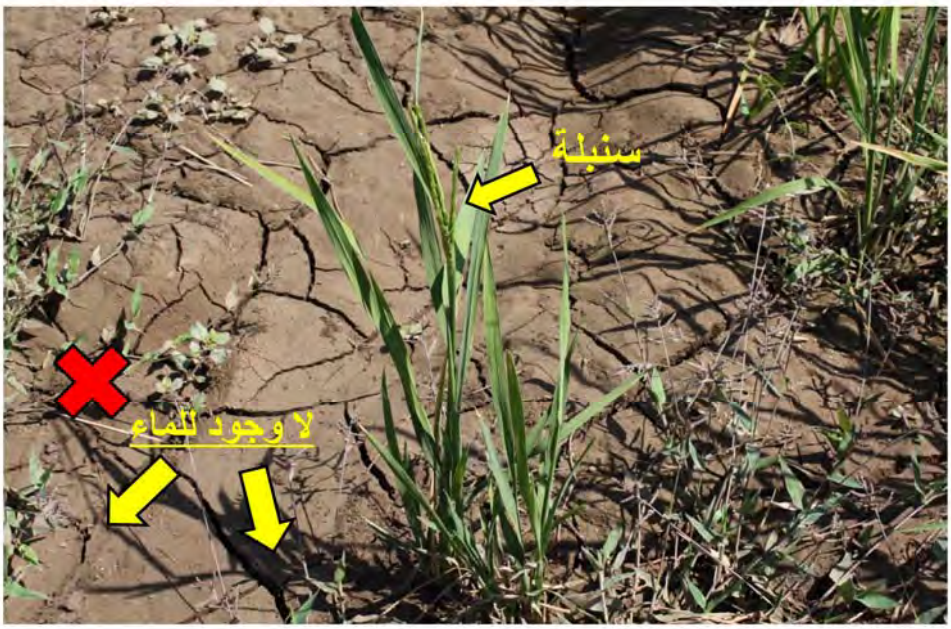
بعد الزراعة مباشرة

رجاءاً قلل كمية مياه الري !
بعد الزراعة مباشرة، لا داعي للإحتفاظ بكمية كبيرة من المياه.
الماء الزائد يعوق ويؤخر عملية الإنبات وظهور البادرات بسبب نقص الأوكسجين !

إنبات جيد للبذور !

الأرز يحتاج للماء (1)

الأرز يحتاج للماء (2)



1) **السنبلة البيضاء بسبب :**

① نقص كمية المياه

② الضرر بسبب الحشرات مثل ثاقبات الساق

(بواسطة الخبير السيد تسبوي)

2) **السنابل (الحبوب) العقيمة بسبب :**

نقص مياه الري مع إرتفاع في درجات الحرارة أثناء الفترة من مرحلة تكوين السنابل إلى مرحلة السنبلة (الإزهار)


مياه الري الكافية من الرية الأولى وحتى مرحلة السنبلة
إنتاجية عالية
مياه كافية


مياه ري غير كافية من الرية الأولى وحتى مرحلة السنبلة
إنتاجية منخفضة
لا وجود للماء

أهمية الجانب العملي والمتابعة اللصيقة

يجب القيام بتسجيل وحفظ المشاهدات والملاحظات اليومية في الحقل عن طريق استخدام المفكرة. ويعتبر تدوين حالة الأرز ، الحقل ، وأيٍ من العمليات الحقلية ، والحزم التقنية من الأشياء المهمة لتحقيق الإنتاجية المستهدفة وتجميع مختلف البيانات للمستقبل.

Diary for Upland Rice Cultivation

Year _____

State _____

Name _____

Date:

1. Actual situation

Upland rice

Related matter

2. Action or operation

Extensionists

Farmers

3. Technical points to follow

4. Other elements in needs for upland rice production

الأمراض، الحشرات ، ونقص أو زيادة العناصر

تلاحظ أن الإصابة بسبب الحشرات مثل ثاقبات الساق قليلة جداً. أما بالنسبة لنقص العناصر الصغرى مثل الزنك، الحديد،.. الخ هنالك مظاهر للإصابة بنقصها ، لكن ليست بالصورة الخطيرة ، وهنالك العديد من الأسمدة التي يمكن إستخدامها لتلافي النقص مؤقتاً.

تعفن الحبوب (*Burkholderia glumae*)

هذا المرض يحدث بسبب العوامل الجوية تحت ظروف الحرارة والرطوبة في مرحلة السنبلة . وهو من الأمراض التي تنتقل بالبذور. لذلك فإن من المطلوب إزالة السنابل والحبوب المصابة كلياً في حالة استخدام حبوب الأرز المحصودة كتقاوي للموسم التالي.

تسمم الحديد Iron toxicity

إرتفاع منسوب الماء في الأماكن المنخفضة في الحقل يسبب هذا الخلل نتيجة لنقص الأوكسجين. وعادة ما يؤثر على نمو الأرز بصورة خطيرة. لذلك من الواجب تصريف المياه وترك التربة لتجف ، حتى يتوفر للمحصول الأوكسجين الكافي.

فقط عن طريق الممارسة العملية اليومية للعمليات الفلاحية يمكن تحقيق إنتاجية جيدة !

إزالة الحشائش

الرقاعة

إزالة الحشائش

إزالة الحشائش

إدارة المياه

إزالة الحشائش

نظافة الحقل

إدارة المياه

يمكن تحقيق إنتاجية عالية
عن طريق التنفيذ الصحيح لكل العمليات التالية

1) استخدام بذور نقية
2) التحضير الجيد للأرض (التسوية)
3) تجويد عملية الزراعة
4) الزراعة في الزمن الأمثل (تاريخ الزراعة)
5) مكافحة الحشائش بالطرق الفعالة
6) إدارة الري بالطريقة الأمثل
7) الحصاد في الزمن المناسب (تاريخ الحصاد)

في حالة تجاهل أي واحدة من النقاط السبعة
لن يتحقق لك إنتاج عالي!!

الممارسة العملية اليومية للعمليات الفلاحية

⑦ الحصاد في التاريخ المناسب (وقت الحصاد)

الحصاد في الوقت المناسب مهم للحصول على حبوب سليمة وليست مكسورة .
يجب أن يبدأ الحصاد قبل أن تصل نسبة المحتوى الرطوبي للحبوب إلى أقل من 20% لتجنب جفاف الحبوب.

تاريخ الحصاد

متأخر جداً !

تاريخ أمثل !

عندما تصل 80 – 85% من جملة حبوب السنبلة إلى اللون الذهبي ، هذا يعني بداية الوقت الأمثل للحصاد.

آلة تقشير وتبييض الأرز

بعد التقشير والتبييض،
ماذا عن الأرز ؟

إذا لم يتم الحصاد في التاريخ المثالي
(نسبة المحتوى الرطوبي منخفضة جداً)

الكثير من الأرز المكسور
بسبب تأخر الحصاد
(= جفاف الحبوب)

الكثير من الحبوب الكاملة
بسبب الحصاد في تاريخ جيد

تخزين الأرز

يجب أن تتوفر في مكان تخزين الأرز الشروط التالية:

1. أن يكون جاف وبارد وجيد التهوية
2. تجنب دخول مياه الأمطار والتعرض لأشعة الشمس المباشرة
3. أن يكون خالي من الآفات

- ومن الضروري أن لا يزيد المحتوى الرطوبي للحبوب عن 15%
- في حالة التخزين في جوالات يجب أن يتم وضع الجوالات في مستوى أعلى من سطح أرضية المخزن لتجنب إنتقال الرطوبة
- يجب أن لا يزيد إرتفاع الجولات المرصوصة عن 3 أمتار لتجنب سقوط وتمزق الجولات
- في حالة التخزين لفترات طويلة يجب حفظ الأرز بصورته الخام ، ومن الضروري فحص حالة الحبوب المخزنة دورياً

فواقد التخزين:

- فواقد كمية Quantitative losses
- فواقد نوعية Qualitative losses

العوامل المؤثرة على تخزين حبوب الأرز:

1. الرطوبة
2. درجة الحرارة
3. الحشرات
4. القوارض
5. الكائنات الدقيقة
6. السوس
7. الطيور
8. خصائص الحبوب
9. شكل المخزن

بواسطة الخبير: تكوموتو

معلومات إضافية

الأرز في العالم وتصنيفه (1)

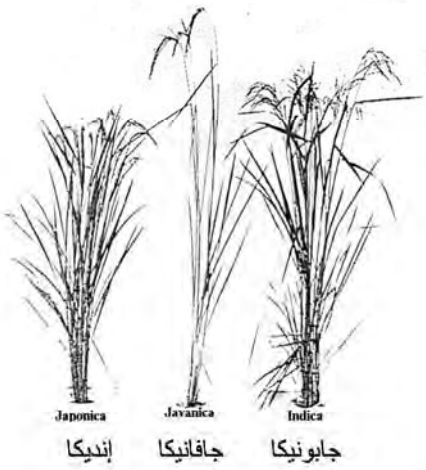
مساحة الأرز المزروع في العالم : 157,500,000 هكتار (2012، بروفسور إتو ، جامعة كيوشو)
إنتاج الأرز في العالم : 720,000,000 طن (2012 ، إحصاءات منظمة الفاو)
يستهلك الأرز كغذاء لنصف سكان العالم وكغذاء رئيسي لدول مثال دولة اليابان

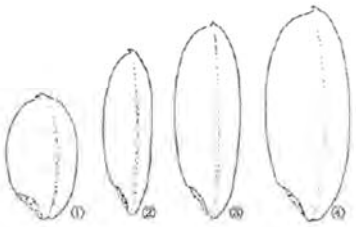
- *Oryza sativa L.* (Asia Rice)
  - Indica → IR-64, Tox, WITA, etc.
  - Japonica → Koshihikari, Nihonbare, etc.
  - Javanica → Moroberekan, Lac etc. (= tropical japonica)
- *Oryza glaberrima* Steud. (Africa Rice)
- *Oryza rufipogon* Griff.
- *Oryza nivara* Sharma et Shastry
- *Oryza longistaminata* A. Chev et Roehr.

تقريباً يوجد 20 نوع من الأرز البري في العالم

Progenitor of *Oryza sativa L. is O. rufipogon*
Progenitor of *Oryza glaberrima Steud is O. barthii*

الأرز في العالم وتصنيفه (2)





① : Japonica
②③: Indica
④ : Javanica

تصنيف الأرز حسب محتوى الأميلوز:

أرز غير جلاتيني : 10- 25% أميلوز + 90 – 75% أميلوبكتن
أرز جلاتيني : 100% أميلوبكتين

ماذا تعني كلمة NERICA ؟

NERICA = New Rice for Africa

الصنف نريكا نتاج عملية تهجين بين نوعين من أنواع الأرز هما
الأرز الأفريقي والأرز الأسيوي
(*O. Sativa* L. × *O. glaberrima* Steud.)

developed by Dr. Monty P. Jones
at WARDA (West Africa Rice Development Association)
which is involved in Africa Rice (Africa Rice Center)

تطور الصنف نريكا

♀ أرز أسيوي ♂ أرز أفريقي

O.sativa L.
WAB 56-104

x

O.glaberrima Steud.
CG 14

→

نريكا


Ministry of Agriculture & Forestry
وزارة الزراعة والغابات


JICA

Evaluation Sheet for Extensionists (Gezira State)

1: Poor 2: Relatively Poor 3: Moderate 4: Good 5: Excellent

Name	Examination (Max 100) ①			Self-evaluation (Max 25)			Yield Rating(*1)	Reliability with farmers or Collecting data (only for assigned to Trial site)				Working Atitude, Effort				Formulation Ability of Action Plan [inc.Experimental plan]				Management and Working Ability			Emergence Response Ability in Field			Monitoring (inc. Utilizing Diary) and Evaluation Ability				Total (*2)	Max (*3)	② Score (*4)	Total Score (①+②)/2
	Basic	IM&Ad	Total	1st year	2014	2015		H.R.	M.T.	Goto	Ando	H.R.	M.T.	Goto	Ando	H.R.	M.T	Goto	Ando	H.R.	Goto	Ando	H.R.	Goto	Ando	H.R.	M.T.	Goto	Ando				
Mr. A	97.5	41.0	138.5	8	20	–	5	5	5	4	4	4	4	4	4	5	5	3	3	5	4	4	5	4	4	4	4	4	4	97	115	84.3	90.9
Mr. B	95.0	55.0	150.0	9	20	–	5	5	4	4	4	4	4	4	4	5	5	3	3	4	4	4	4	4	4	4	4	4	4	94	115	81.7	88.4
Mr. C	80.0	45.0	125.0	9	15	–	5	4	3	3	3	4	4	4	4	4	4	2	2	4	4	4	4	3	3	3	3	3	3	80	115	69.6	74.8
Mr. D	–	–	–	9	–	24	5	5	5	4	4	4	4	3	3	5	5	3	3	4	4	4	5	3	3	4	4	3	3	90	115	78.3	N/A
Mr. E	82.5	39.0	121.5	5	11	–	2	5	5	4	4	5	5	5	5	5	5	4	4	4	4	4	5	4	5	4	5	5	5	103	115	89.6	86.0
Mr. F	97.5	72.0	169.5	10	19	–	5	5	5	4	4	5	5	5	5	5	5	4	3	5	5	5	5	4	4	4	5	4	4	105	115	91.3	94.4
Mr. G	–	–	–	9	–	24	4	4	3	2	3	4	4	3	3	3	3	2	3	4	3	4	4	3	3	3	3	3	3	74	115	64.3	N/A
Mr. H	50.0	28.0	78.0	10	15	–	5	4	3	3	3	4	4	3	3	4	4	2	2	4	3	4	4	3	3	3	3	3	3	77	115	67.0	58.5
Mr. I	–	–	–	–	–	–	2	3	3	2	2	3	2	3	3	3	–	3	3	3	4	4	4	4	5	3	3	3	4	69	110	62.7	N/A
Mr. J	95.0	54.0	149.0	9	21	–	5	5	4	3	3	5	4	4	4	5	5	4	4	5	4	4	5	4	5	4	4	4	4	98	115	85.2	90.1
Mr.K	97.5	47.0	144.5	9	18	–	4	5	5	4	4	5	5	5	5	5	5	4	4	5	5	5	5	4	5	5	5	5	5	109	115	94.8	96.1
Mr. L	87.5	43.0	130.5	5	14	–	4	5	5	4	4	5	5	4	5	5	5	3	3	5	5	5	5	4	5	4	4	4	4	102	115	88.7	88.1
Mr. M	92.5	61.0	153.5	10	23	–	5	4	4	3	3	3	4	3	4	5	4	3	3	4	3	4	4	3	4	3	3	3	3	82	115	71.3	81.9
Mr. N	95.0	31.0	126.0	7	19	–	5	5	5	5	5	5	5	5	5	5	5	4	4	5	5	5	5	4	5	4	5	4	4	109	115	94.8	94.9
Mr. O	97.5	56.0	153.5	6	12	–	2	3	3	3	3	2	3	3	3	2	–	3	3	3	3	3	3	3	3	3	2	3	3	62	110	56.4	76.9
Mr. P	85.0	32.0	117.0	15	22	–	3	5	5	4	4	5	5	5	5	4	–	4	4	5	5	5	4	5	5	5	4	4	4	99	110	90.0	87.5
Mr. Q	–	–	–	–	–	–	5	–	–	–	–	–	–	4	5	–	–	4	4	–	4	5	–	5	5	–	–	4	4	49	55	89.1	N/A
Mr. R	100.0	72.0	172.0	8	20	–	5	5	5	5	5	5	4	4	3	4	–	4	4	5	4	4	4	4	3	4	3	3	3	90	110	81.8	90.9
Mr. S	90.0	39.0	129.0	11	24	–	5	5	5	4	4	5	5	5	5	5	5	4	4	4	5	5	5	5	5	3	4	4	4	105	115	91.3	90.7
Mr. T	90.0	20.0	110.0	7	17	–	1	3	3	3	3	4	4	3	4	4	4	2	3	3	3	4	3	3	3	3	3	3	3	72	115	62.6	76.3
Mr. U	–	–	–	9	–	23	5	5	5	4	4	5	5	5	5	5	5	3	3	5	5	5	5	5	5	4	4	4	4	105	115	91.3	N/A
Mr. V	90.0	36.0	126.0	8	18	–	2	3	3	2	2	3	3	3	3	3	–	3	3	3	4	4	3	4	5	4	1	3	4	68	110	61.8	75.9
Mr. W	90.0	37.0	127.0	5	12	–	2	5	4	3	3	5	4	4	4	4	4	3	3	4	4	4	4	3	4	3	3	3	3	83	115	72.2	81.1
Mr. X	97.5	29.0	126.5	7	17	–	5	5	5	3	3	5	4	3	3	5	5	3	3	4	3	4	5	3	3	4	4	3	3	88	115	76.5	87.0
Ms. A	82.5	25.0	107.5	5	11	–	5	4	3	3	3	4	4	4	4	3	3	2	2	3	4	4	4	3	3	3	3	3	3	77	115	67.0	74.7
Ms. B	–	–	–	–	–	–	3	3	3	2	2	3	4	2	2	2	–	1	1	3	2	2	3	2	2	1	3	3	3	52	110	47.3	N/A
Ms. C	–	–	–	–	–	–	2	2	1	2	2	1	1	2	2	1	–	1	1	3	2	2	2	2	2	1	1	1	1	35	110	31.8	N/A
Ms. D	97.5	65.0	162.5	5	17	–	5	4	4	3	3	3	4	4	4	4	4	3	3	3	3	4	3	3	3	3	3	3	3	79	115	68.7	83.1
Ms. E	–	–	–	–	–	–	3	4	3	2	2	3	3	2	2	2	–	1	1	3	2	2	3	2	2	1	3	3	3	52	110	47.3	N/A
Ms. F	77.5	36.0	113.5	6	12	–	2	3	3	2	2	4	3	1	1	2	–	1	1	4	1	1	3	1	1	3	3	1	1	44	110	40.0	58.8
Ms. G	85.0	62.0	147.0	9	19	–	2	2	3	2	2	3	3	1	2	2	–	1	1	3	1	2	3	1	1	1	3	1	2	42	110	38.2	61.6
Ms. H	92.5	29.0	121.5	5	9	–	5	5	3	2	2	4	4	3	4	4	3	2	2	4	3	4	4	3	3	3	3	3	3	76	115	66.1	79.3
Ms. I	–	–	–	–	–	–	5	–	–	–	–	1	–	2	2	–	–	1	1	3	2	2	3	2	2	3	–	2	2	33	75	44.0	N/A
Ms. J	92.5	39.0	131.5	6	11	–	5	4	3	2	2	3	4	3	4	4	3	2	2	3	3	4	4	3	3	3	3	3	3	73	110	66.4	79.4
Ave.	89.5	43.7	133.2	7.9	16.6																										Ave.	71.0	81.9
																															% more than 70		88%

*1 Yield Rating : 5 = more than 3.5t/ha, 4 = 3.0-3.5t/ha, 3 = 2.5-3.0t/ha, 2 = 2.0-2.5t/ha, 1 = less than 2.0t/ha

*2 Total = Points from Yield Rating to Monitoring and Evaluation Ability

*3 Max varies according to the number of sampling.

*4 Score = Total ÷ Max × 100

H.R. means Head of Rice Promotion (Production) Unit

M.T. means Monitoring Team from the Project

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Evaluation Sheet for Extensionists (Sennar State)

1: Poor 2: Relatively Poor 3: Moderate 4: Good 5: Excellent

Name	Examination (Max 100) ①			Self-evaluation (Max 25)			Yield Rating(*1)	Reliability with farmers			Working Atitude, Effort			Formulation Ability of Action Plan			Management and Working Ability		Emergence Response Ability in Field		Monitoring (inc. Utilizing Diary) and Evaluation Ability			Total (*2)	Max (*3)	② Score (*4)	Total Score (①+②)/2
	Basic	IM&Ad	Total	1st year	2014	2015		H.R.	M.T.	Goto	H.R.	M.T.	Goto	H.R.	M.T	Goto	H.R.	Goto	H.R.	Goto	H.R.	M.T.	Goto				
Mr. A	55.0	32.0	87.0	5	17	–	1	3	3	3	3	3	3	4	4	3	3	3	3	3	3	3	2	50	85	58.8	**56.9**
Mr. B	57.5	0.0	57.5	5	–	20	1	3	3	2	3	3	3	4	4	3	4	3	4	2	4	4	2	52	85	61.2	**59.3**
Mr. C(*5)	87.5	55.0	142.5	12	21	–	1	5	—	3	5	—	4	5	3	3	4	3	4	3	4	—	2	49	70	70.0	**78.8**
Mr. D	87.5	33.0	120.5	–	–	–	1	5	4	4	5	5	5	5	5	5	5	5	4	4	4	4	4	74	85	87.1	**87.3**
Ms. A	85.0	29.0	114.0	5	20	–	1	5	4	4	5	5	4	5	5	4	5	4	5	3	5	5	4	73	85	85.9	**85.4**
Mr. E	82.5	45.0	127.5	14	22	–	1	5	4	4	4	4	4	4	4	4	5	4	5	3	5	5	4	69	85	81.2	**81.8**
Ms. B	72.5	26.0	98.5	5	17	–	1	5	5	4	5	5	4	5	5	4	5	4	5	3	5	5	4	74	85	87.1	**79.8**
Mr. F	85.0	38.0	123.0	7	12	–	1	4	4	3	4	4	4	4	4	4	4	3	4	3	4	4	3	61	85	71.8	**78.4**
Mr. G	–	–	–	–	–	–	1	5	4	3	5	4	3	5	4	3	4	3	5	3	5	4	3	64	85	75.3	**N/A**
Mr. H	–	–	–	7	–	21	1	5	4	3	4	4	4	5	4	4	4	3	4	3	4	4	3	63	85	74.1	**N/A**
Ms. C	85.0	56.0	141.0	10	20	–	1	5	4	4	4	5	4	5	5	4	4	3	5	3	5	4	4	69	85	81.2	**83.1**
Mr. I (*6)	77.5	35.0	112.5	5	20	–	1	5	—	3	5	—	4	5	4	4	4	3	4	3	4	—	2	51	70	72.9	**75.2**
Ms. D	82.5	30.0	112.5	5	16	–	1	4	4	3	4	4	4	5	4	3	5	3	4	3	5	4	3	63	85	74.1	**78.3**
Mr. J	–	–	–	10	–	25	1	5	5	4	5	5	4	5	5	4	5	4	5	3	5	5	4	74	85	87.1	**N/A**
Mr. K(*5)	85.0	53.0	138.0	5	20	–	1	5	—	4	5	—	4	5	4	4	4	4	3	4	4	—	2	53	70	75.7	**80.4**
Mr. L	60.0	31.0	91.0	6	17	–	1	5	4	4	5	5	4	4	5	3	5	4	5	3	5	4	3	69	85	81.2	**70.6**
Ms. E	67.5	29.0	96.5	5	17	–	1	4	4	2	3	4	2	3	4	3	3	3	3	2	3	4	3	51	85	60.0	**63.8**
Ms. F	72.5	26.0	98.5	8	–	20	1	4	4	2	4	4	3	4	4	3	4	3	3	2	4	3	3	55	85	64.7	**68.6**
Ms. G	80.0	44.0	124.0	6	13	–	1	4	4	2	4	4	3	4	4	3	4	3	3	2	4	4	3	56	85	65.9	**72.9**
Mr. M	–	–	–	–	–		1	2	—	2	1	—	1	1	3	3	1	1	1	1	1	—	1	20	70	28.6	**N/A**
Mr. N	75.0	19.0	94.0	7	–	21	1	5	5	4	5	5	5	5	5	5	4	4	5	4	5	5	3	75	85	88.2	**81.6**
Ms. H	72.5	47.0	119.5	9	16	–	1	5	4	3	5	5	3	5	5	3	4	3	5	2	5	5	3	66	85	77.6	**75.1**
Ms. I	97.5	41.0	138.5	5	20	–	1	5	5	3	5	5	4	5	5	5	4	3	5	3	5	5	3	71	85	83.5	**90.5**
Mr. O	82.5	48.0	130.5	7	20	–	1	5	5	3	5	5	4	5	5	4	5	3	5	3	5	5	3	71	85	83.5	**83.0**
Mr. P	–	–	–	5	–	25	1	5	4	3	5	4	4	5	4	3	5	3	5	3	5	4	3	66	85	77.6	**N/A**
Mr. Q	–	–	–	9	–	23	1	5	4	3	5	4	4	5	4	3	4	3	4	3	5	4	3	64	85	75.3	**N/A**
Mr. R	–	–	–	5	–	25	1	5	4	3	5	4	4	5	4	3	5	3	4	3	5	4	3	65	85	76.5	**N/A**
Ave.	**77.5**	**35.9**	**113.4**	**7.0**	**18.0**																				Ave.	**74.3**	**76.5**
																									% more than 70		**80%**

*1 Yield Rating : 5 = more than 3.5t/ha, 4 = 3.0-3.5t/ha, 3 = 2.5-3.0t/ha, 2 = 2.0-2.5t/ha, 1 = less than 2.0t/ha

*2 Total ＝ Points from Yield Rating to Monitoring and Evaluation Ability

*3 Max varies according to the number of sampling.

*4 Score ＝ Total ÷ Max × 100

*5 The extensionists participated the training course in Japan during the cultivation season 2015.

*6 The extensionist was qualified as trainer in 2014 and was assigned as Technical Advisor for Arab Sudanese Seed Company in 2015.

H.R. means Head of Rice Promotion (Production) Unit

M.T. means Monitoring Team from the Project

Evaluation Sheet for Extensionists (Gedaref State)

1: Poor 2: Relatively Poor 3: Moderate 4: Good 5: Excellent

Name	Examination (Max 100) ①			Self-evaluation (Max 25)			Yield Rating(*1)	Reliability with farmers or Team working ability (only for assigned to Ministry's site)			Working Atitude, Effort			Formulation Ability of Action Plan			Management and Working Ability		Emergence Response Ability in Field		Monitoring (inc. Utilizing Diary) and Evaluation Ability			Total (*2)	Max (*3)	② Score (*4)	**Total Score (①+②)/2**
	Basic	IM&Ad	Total	1st year	2014	2015		H.R.	M.T.	Goto	H.R.	M.T.	Goto	H.R.	M.T	Goto	H.R.	Goto	H.R.	Goto	H.R.	M.T.	Goto				
Mr. A	82.5	43.0	125.5	8	21	–	1	4	4	3	5	5	5	5	5	4	4	4	4	4	4	5	3	69	85	81.2	**81.8**
Ms. A	80.0	27.0	107.0	6	19	–	1	–	–	–	3	–	2	2	2	2	3	2	2	1	1	–	1	22	60	36.7	**58.3**
Ms. B	70.0	23.0	93.0	6	17	–	5	4	4	3	4	4	4	3	4	3	4	3	3	3	3	4	3	61	85	71.8	**70.9**
Mr. B	87.5	34.0	121.5	7	17	–	5	5	5	5	5	5	5	5	5	4	5	4	5	4	4	5	4	80	85	94.1	**90.8**
Mr. C	72.5	40.0	112.5	5	22	–	5	5	5	4	5	5	5	5	5	4	5	4	5	4	3	5	3	77	85	90.6	**81.5**
Ms. C	–	–	–	8	–	19	5	5	4	3	5	5	4	4	5	4	4	3	4	3	3	5	4	70	85	82.4	**N/A**
Ms. D	–	–	–	–	–	–	1	3	–	2	4	–	2	2	2	2	3	2	2	1	1	–	1	28	70	40.0	**N/A**
Mr. D(*5)	90.0	37.0	127.0	7	18	–	1	–	–	–	5	–	4	4	3	4	4	4	4	3	3	–	2	41	60	68.3	**79.2**
Mr. E	87.5	26.0	113.5	5	11	–	1	4	4	2	5	5	2	4	4	2	4	2	4	2	3	4	2	54	85	63.5	**75.5**
Mr. F	67.5	18.0	85.5	6	10	–	1	4	4	3	5	5	3	4	4	4	4	3	4	2	3	5	3	61	85	71.8	**69.6**
Mr. G	82.5	21.0	103.5	5	11	–	1	4	4	3	5	5	3	4	4	2	4	3	4	2	3	5	2	58	85	68.2	**75.4**
Ave.	**80.0**	**29.9**	**109.9**	**6.3**	**16.2**																				Ave.	**69.9**	**75.9**
																									% more than 70		**78%**

*1 Yield Rating : 5 = more than 3.5t/ha, 4 = 3.0-3.5t/ha, 3 = 2.5-3.0t/ha, 2 = 2.0-2.5t/ha, 1 = less than 2.0t/ha

*2 Total = Points from Yield Rating to Monitoring and Evaluation Ability

*3 Max varies according to the number of sampling.

*4 Score = Total ÷ Max × 100

*5 The extensionist participated the training course in Japan during the cultivation season 2015.

H.R. means Head of Rice Promotion (Production) Unit

M.T. means Monitoring Team from the Project

Evaluation Sheet for Extensionists (River Nile State)

1: Poor　2: Relatively Poor　3: Moderate　4: Good　5: Excellent

Name	Examination (Max 100) ①			Self-evaluation (Max 25)			Yield Rating(*1)	Reliability with farmers			Working Atitude, Effort			Formulation Ability of Action Plan			Management and Working Ability		Emergence Response Ability in Field		Monitoring (inc. Utilizing Diary) and Evaluation Ability			Total (*2)	Max (*3)	② Score (*4)	**Total Score (①+②)/2**
	Basic	IM&Ad	Total	1st year	2014	2015		H.R.	M.T.	Goto	H.R.	M.T.	Goto	H.R.	M.T	Goto	H.R.	Goto	H.R.	Goto	H.R.	M.T.	Goto				
Ms. A							She was qualified as trainer with 73.3 points in 2013 and was promoted to Head of Rice Promotion Unit from 2014.																			**73.3**
Ms. B	100.0	37.0	137.0	10	16	–	1	4	4	4	4	4	4	3	4	3	4	4	4	3	4	4	3	61	85	71.8	**85.9**
Ms. C	77.5	34.0	111.5	6	16	–	1	3	–	4	4	–	4	1	–	1	3	3	3	3	2	–	2	34	65	52.3	**64.9**
Mr. A	–	–	–	–	–	–	1	3	–	2	3	–	2	1	–	1	3	2	3	2	2	–	1	26	65	40.0	**N/A**
Ms. D	–	–	–	–	–	–	1	1	–	1	1	–	2	1	–	1	1	1	1	1	2	–	1	15	65	23.1	**N/A**
Ms. E	92.5	43.0	135.5	14	18	–	1	4	4	4	4	4	4	3	4	2	4	3	4	1	4	4	3	57	85	67.1	**79.8**
Mr. B	–	–	–	–	–	–	1	3	–	3	1	–	1	1	–	1	1	1	1	1	2	–	1	18	65	27.7	**N/A**
Ms. F	–	–	–	–	–	–	1	2	–	2	1	–	1	1	–	1	1	1	1	1	2	–	1	16	65	24.6	**N/A**
Mr. C	60.0	34.0	94.0	5	17	–	1	2	–	2	2	–	2	1	–	1	2	2	3	2	2	–	1	23	65	35.4	**47.7**
Ms. G	–	–	–	–	–	–	1	1	–	1	1	–	1	1	–	1	1	1	1	1	2	–	1	14	65	21.5	**N/A**
Mr. D	85.0	39.0	124.0	9	14	–	1	3	–	4	4	–	4	1	–	1	3	3	3	3	2	–	2	34	65	52.3	**68.7**
Ms. H	–	–	–	–	–	–	1	1	–	1	1	–	1	1	–	1	1	1	1	1	2	–	1	14	65	21.5	**N/A**
Mr. E	50.0	33.0	83.0	5	17	–	1	4	3	4	4	4	4	3	3	2	4	3	4	3	4	4	2	56	85	65.9	**57.9**
Ms. I	37.5	20.0	57.5	6	17	–	1	3	–	2	2	–	2	1	–	1	2	2	3	2	2	–	1	24	65	36.9	**37.2**
Ms. J	–	–	–	–	–	–	1	4	4	1	4	4	2	3	2	1	3	1	3	1	3	2	1	40	85	47.1	**N/A**
Ms. K	92.5	–	–	6	–	15	1	3	3	1	3	3	2	3	2	1	3	1	3	1	2	2	1	35	85	41.2	**66.8**
Ms. L	95.0	–	–	5	–	12	1	4	3	1	4	3	2	3	2	1	3	1	3	1	3	2	1	38	85	44.7	**69.9**
Ave.	**76.7**	**34.3**	**106.1**	**7.3**	**16.4**																				Ave.	**42.1**	**64.3**
																									% more than 70		**33%**

*1 Yield Rating :　5 = more than 3.5t/ha,　4 = 3.0-3.5t/ha,　3 = 2.5-3.0t/ha,　2 = 2.0-2.5t/ha,　1 = less than 2.0t/ha

*2 Total ＝ Points from Yield Rating to Monitoring and Evaluation Ability

*3 Max varies according to the number of sampling.

*4 Score ＝ Total ÷ Max × 100

H.R. means Head of Rice Promotion (Production) Unit

M.T. means Monitoring Team from the Project

Evaluation Sheet for Extensionists (Northern State)

1: Poor 2: Relatively Poor 3: Moderate 4: Good 5: Excellent

Name	Examination (Max 100) ①			Self-evaluation (Max 25)			Yield Rating(*1)	Reliability with farmers			Working Atitude, Effort			Formulation Ability of Action Plan			Management and Working Ability		Emergence Response Ability in Field		Monitoring (inc. Utilizing Diary) and Evaluation Ability			Total (*2)	Max (*3)	② Score (*4)	**Total Score (①+②)/2**
	Basic	IM&Ad	Total	1st year	2014	2015		H.R.	M.T.	Goto	H.R.	M.T.	Goto	H.R.	M.T	Goto	H.R.	Goto	H.R.	Goto	H.R.	M.T.	Goto				
Mr. A							He was qualified as trainer with 78.8 points in 2014 and was promoted to Head of Rice Promotion Unit from 2015.																				78.8
Mr. B	–	–	–	–	–	–	1	5	—	2	5	—	1	1	—	1	5	1	5	1	4	—	1	33	65	50.8	N/A
Mr. C	92.5	39.0	131.5	6	18	–	1	4	4	3	5	4	4	4	3	3	4	3	4	3	4	4	3	60	85	70.6	81.5
Mr. D	87.5	49.0	136.5	6	18	–	1	4	4	4	5	4	4	5	4	3	5	4	5	4	5	4	3	68	85	80.0	83.8
Mr. E	92.5	55.0	147.5	15	23	–	1	5	—	3	5	—	4	1	—	1	5	3	5	3	3	—	2	41	65	63.1	77.8
Mr. F	–	–	–	–	–	–	1	4	—	2	3	—	3	1	—	1	4	3	4	3	3	—	2	34	65	52.3	N/A
Mr. G	90.0	49.0	139.0	6	20	–	3	5	5	4	5	5	4	5	5	4	5	4	5	4	5	5	3	76	85	89.4	89.7
Mr. H	92.5	36.0	128.5	5	12	–	1	4	5	3	5	4	3	4	4	3	4	3	4	3	4	5	2	61	85	71.8	82.1
Mr. I	77.5	54.0	131.5	5	9	–	3	5	5	4	5	5	4	4	4	3	5	4	5	4	5	5	3	73	85	85.9	81.7
Ave.	88.8	47.0	135.8	7.2	16.7																				Ave.	70.5	82.2
																									% more than 70		100%

*1 Yield Rating : 5 = more than 3.5t/ha, 4 = 3.0-3.5t/ha, 3 = 2.5-3.0t/ha, 2 = 2.0-2.5t/ha, 1 = less than 2.0t/ha

*2 Total ＝ Points from Yield Rating to Monitoring and Evaluation Ability

*3 Max varies according to the number of sampling.

*4 Score ＝ Total ÷ Max × 100

H.R. means Head of Rice Promotion (Production) Unit

M.T. means Monitoring Team from the Project

Evaluation Sheet for Extensionists (White Nile State)

1: Poor　2: Relatively Poor　3: Moderate　4: Good　5: Excellent

Name	Examination (Max 100) ①			Self-evaluation (Max 25)			Yield Rating(*1)	Reliability with farmers			Working Atitude, Effort			Formulation Ability of Action Plan			Management and Working Ability		Emergence Response Ability in Field		Monitoring (inc. Utilizing Diary) and Evaluation Ability			Total (*2)	Max (*3)	② Score (*4)	Total Score (①+②)/2
	Basic	IM&Ad	Total	1st year	2014	2015		H.R.	M.T.	Goto	H.R.	M.T.	Goto	H.R.	M.T	Goto	H.R.	Goto	H.R.	Goto	H.R.	M.T.	Goto				
Mr. A							Mr. Khalid was recognized as the most relialble/competent extensionist in 2014 and was promoted to Head of Rice Promotion Unit from 2015.																				
Mr. B	92.5	32.0	124.5	–	–	–	1	5	–	3	5	–	3	1	–	1	5	2	4	2	4	–	1	37	65	56.9	74.7
Mr. C	70.0	26	96.0	6	19	–	1	5	4	3	5	5	3	4	4	2	4	3	5	2	4	4	2	60	85	70.6	70.3
Mr. D	–	–	–	–	–	–	1	3	–	2	4	–	2	1	–	1	4	2	3	2	2	–	1	28	65	43.1	N/A
Mr. E	90.0	36.0	126.0	9	16	–	1	5	4	3	5	5	4	4	4	3	4	3	4	3	4	4	2	62	85	72.9	81.5
Ms. A	–	–	–	–	–	–	1	4	–	2	4	–	2	1	–	1	5	2	3	2	3	–	1	31	65	47.7	N/A
Ms. B	–	–	–	–	–	–	1	3	–	2	3	–	2	1	–	1	3	2	2	2	2	–	1	25	65	38.5	N/A
Ms. C	52.5	7.0	59.5	6	11	–	1	3	–	2	3	–	2	1	–	1	4	2	2	2	3	–	1	27	65	41.5	47.0
Ms. D	–	–	–	–	–	–	1	2	–	2	2	–	2	1	–	1	3	2	1	2	1	–	1	21	65	32.3	N/A
Ms. E	82.5	41.0	123.5	12	17	–	1	4	4	2	4	5	2	3	5	2	5	2	5	2	5	4	1	56	85	65.9	74.2
Mr. F	–	–	–	–	–	–	1	3	–	2	4	–	2	1	–	1	5	2	3	2	3	–	1	30	65	46.2	N/A
Mr. G	–	–	–	–	–	–	1	5	–	3	5	–	4	1	–	1	5	3	4	3	3	–	1	39	65	60.0	N/A
Ms. F(*5)	100.0	88	188.0	8	9	–	1	5	–	3	5	–	4	1	–	1	5	3	4	3	3	–	1	39	65	60.0	80.0
Mr. H	92.5	55	147.5	5	19	–	1	5	5	4	5	5	4	5	5	4	5	4	5	3	5	5	3	73	85	85.9	89.2
Mr. I	95.0	54	149.0	6	13	–	1	5	5	3	5	5	3	4	5	3	4	3	5	2	5	4	2	64	85	75.3	85.1
Mr. J	–	–	–	–	–	–	1	3	–	2	4	–	2	1	–	1	3	2	3	2	3	–	1	28	65	43.1	N/A
Mr. K	–	–	–	–	–	–	1	4	–	2	4	–	2	1	–	1	4	2	3	2	3	–	1	30	65	46.2	N/A
Mr. L	–	–	–	–	–	–	1	4	4	2	5	4	3	4	4	2	5	2	5	2	5	4	2	58	85	68.2	N/A
Ms. G	65.0	19.0	84.0	5	8	–	1	4	4	2	5	4	3	4	4	2	5	2	5	2	5	5	2	59	85	69.4	67.2
Mr. M	57.5	30.0	87.5	5	8	–	1	4	4	2	5	4	3	5	4	2	4	2	5	2	4	4	2	57	85	67.1	62.3
Ms. H	–	–	–	6	–	17	1	5	4	2	4	4	3	5	4	2	5	2	5	2	5	5	2	60	85	70.6	N/A
Mr. N	–	–	–	5	–	20	1	5	4	2	5	5	3	5	4	2	5	2	4	2	5	4	2	60	85	70.6	N/A
Ms. I	–	–	–	9	–	18	1	4	4	2	5	4	3	4	4	2	4	2	5	2	4	5	2	57	85	67.1	N/A
Ms. J	–	–	–	6	–	18	1	5	4	2	5	4	3	5	4	2	4	2	5	2	5	5	2	60	85	70.6	N/A
Ave.	79.8	38.8	118.6	6.8	13.3																				Ave.	59.5	73.2
																									% more than 70		70%

*1 Yield Rating :　5 = more than 3.5t/ha,　4 = 3.0-3.5t/ha,　3 = 2.5-3.0t/ha,　2 = 2.0-2.5t/ha,　1 = less than 2.0t/ha

*2 Total ＝ Points from Yield Rating to Monitoring and Evaluation Ability

*3 Max varies according to the number of sampling.

*4 Score ＝ Total ÷ Max × 100

*5 The extensionist participated the training course in Egypt during the cultivation season 2015.

H.R. means Head of Rice Promotion (Production) Unit

M.T. means Monitoring Team from the Project

بسم الله الرحمن الرحيم

Workshop for Further Development of Upland Rice Production in Sudan
19 January, 2016
11:30- Grand Holiday Villa (Churchill Ballroom)

Attendance Sheet

NO	Name	Organization		
1.	Dr. Abdalla Suliman Abdalla Suliman	Minister - Gedaref SMoA		
2.	Dr. Baha Eldeen Ahmed	Minister - Sennar SMoA		
3.	Dr. Mohamed Abdalla Omer Abdalla	Minister – White Nile SMoA		
4.	Eng. Ali Gadoom El Ghali	Undersecretary - MoAF		
5.	Dr. Adel Yousif Eltaib	DG, IC – MoAF		
6.	Mr. Elamien Hassan Elamien	DG, PAE – MoAF		
7.	Mr. Ibrahim Hassan Abuzied	DG, TTEA – MoAF		
8.	Mr. Mahgoub Musa A. Mohamed	DG, PPD - MoAF		
9.	Mr. Fadul Beshir	DG, NRD, - MoAF		
10.	Mr. Mansour Fateh Elrahman Mansour	DG, Irrigated sector - MoAF		
11.	Ms. Salma Yousef Shalawani	IC – MoAF		

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12.	Ms. Nada Ibrahim Mohamed	IC – MoAF		
13.	Mr. Hussain A. Elsharief	Bilateral Cooperation Department, IC – MoAF		
14.	Mr. Zin Aldbdin Mohammed	TU – MoAF		
15.	Mr. Mohieldin Ali Mohamed	National Rice Coordinator, NRP – MoAF		
16.	Mr. Salah M. Taha	DG, National Wheat Project – MoAF		
17.	Mr. Yasir Hassein Mohamed	NRP – MoAF		
18.	Mr. Abbas Elsir Mohamed Elamin	CO DG, ARC – MoAF		
19.	Prof. Ahmed A. Elsiddig	National Rice Research Coordinator, ARC – MoAF		
20.	Ms. Suzan Dafa Allah	Media Department - MoAF		
21.	Ms. Dar Elsalam Basheir	Media Department – MoAF		
22.	Ms. Manahel Bahar Eldein	Media Department – MoAF		
23.	Dr. Saif Aldean Hassan Aboud	DG - Gezira SMoA		
24.	Mr. Ahmed Elamin Abas	Manger of promising crops - Gezira SMoA		
25.	Mr. Abdelmonuim Magzoub	Head of rice unit - Gezira SMoA		
26.	Mr. Tarig Osman Awad	Extensionist - Gezira SMoA		
27.	Mr. Yassein Elsadig	Extensionist - Gezira SMoA		
28.	Mr. Siddig Hassan	Extensionist - Gezira SMoA		

29.	Mr. Mohammed Elsamani	Extensionist - Gezira SMoA		
30.	Mr. Fadlelmola Ali Eldow	Extensionist - Gezira SMoA		
31.	Mr. Abd Elgadir Bakri Derweesh	Extensionist - Gezira SMoA		
32.	Mr. Ashraf A. Khalid Serag	Extensionist - Gezira SMoA		
33.	Ms. Kholud Elnour Elimam	Extensionist - Gezira SMoA		
34.	Mr. Osama Haj Musa	Extensionist - Gezira SMoA		
35.	Ms. Eman Abdeen Mohammed	Extensionist - Gezira SMoA		
36.	Mr. Gamal Abd Elatif Elkhalifa	Head of rice unit- Sennar SMoA		
37.	Mr. Alhadi Fadul Abdallah	Leader extensionist - Sennar SMoA		
38.	Mr. Elzein Mohammed Hamid	Leader extensionist - Sennar SMoA		
39.	Mr. Elhindi Omer Elmadani	Leader extensionist - Sennar SMoA		
40.	Ms. Afraa Abdalla Emam	Extensionist - Sennar SMoA		
41.	Mr. Babikir Ahmed	Extensionist - Sennar SMoA		
42.	Ms. Tahani Mohammed Mustafa	Extensionist - Sennar SMoA		
43.	Ms. Lubna Mohammed	Extensionist - Sennar SMoA		
44.	Mr. Ahmed Mohamed Yousif	DG - White Nile SMoA		
45.	Mr. Khalid Saeed Ibrahim	Head of rice unit - White Nile SMoA		

46.	Ms. Hayat Musa Farah	Extensionist White Nile SMoA		
47.	Ms. Nafiesa Noah Mohamed	DG - Gedaref SMoA		
48.	Mr. Elhussein Elsafi Ali	Head of rice unit - Gedaref SMoA		
49.	Mr. Mustafa Ismail Mohammed	Extensionist - Gedaref SMoA		
50.	Mr. Abuobeida Hasabelrasoul Ahmed	Extensionist - Gedaref SMoA		
51.	Mr. Hag Attwa Tag Elsir	DG – River Nile SMoA		
52.	Mr. Saleh Abdo Saeed	Director of Technology Transfer - River Nile SMoA		
53.	Ms. Hagir Mohamed	Head of rice unit - River Nile SMoA		
54.	Ms. Nimat Hashim Ali	Extensionist- River Nile SMoA		
55.	Mr. Abd Alaziz Hassan	Coordinator, Khartoum Office - River Nile SMoA		
56.	Mr. Osman Galal Osman Satti	Head of rice unit – Northern SMoA		
57.	Mr. Elsayed Mohamed Abdoon	Co-Manager - Northern SMoA		
58.	Mr. Ala Eldiin Idris	Extensionist - Northern SMoA		
59.	Mr. Ahmed Hamid Mohmoud	Ministry of International Cooperation		
60.	Ms. Amira Omer	Ministry of International Cooperation		
61.	Prof. Mamoun Ibrahim Dawelbet	Private Sector – CTC Group		
62.	Dr. Izz Eldeen Hassan Mohamed	Private Sector – CTC Group		

63.	Mr. Hideki Ito	Ambassador of Japan – Embassy of Japan		
64.	Mr. Koji Hase	Embassy of Japan		
65.	Mr. Hatem Elhag Abbas	Embassy of Japan		
66.	Mr. Seiichi Koike	Resident Representative - JICA Sudan Office		
67.	Ms. Mikako Yajima	JICA Sudan Office		
68.	Mr. Mohamed Elmugtaba	JICA Sudan Office		
69.	Mr. Osamu Nakagaki	JICA project		
70.	Mr. Akio Goto	JICA project		
71.	Mr. Takamasa Ando	JICA project		
72.	Mr. Takeshi Matsuda	JICA project		
73.	Dr. Hassan Elobied	JICA project		
74.	Ms. Nadia Mohammed	JICA project		
75.	Mr. Abdelhadi	Khartoum - Sudan		
76.	Ms. Haidar Jaber Eldar	Sudan Radio		

Upland Rice Cultivation Trial & Demonstration Farms in Gezira State

Takamasa ANDO

JICA Expert

Capacity Building Project for the Implementation of the Executive Programme for the Agricultural Revival

Upland Rice Cultivation Trial

- **Nitrogen Source Trial**
- **Seed Rate and Plant Spacing Trial**
- **Organic Fertilizer Trial**
- **Irrigation Interval Trial**
- **Potential of Upland Rice in Sudan**

The Trial Conditions

Period	**2014-2015**
Location	**Horticulture Research Station in Wad Medani, Gezira State**
Variety	**NERICA 4**
Sowing Method	**Drilling**
Sowing Time	**June**
Harvest Time	**September or October**
Experiment Design	**Randomized Complete Block Design**
No of Replication	**3**
Irrigation	**Pump Irrigation**

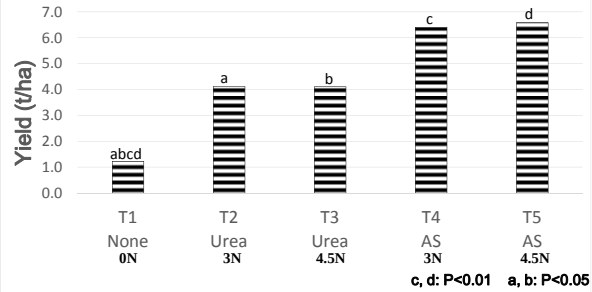
Nitrogen Source Trial

Objective: To identify the appropriate type(Urea and AS) and amount of Nitrogen fertilizer

Treatment	1N=43.8 N kg/fed
T-1: 0.0 N (control)	
T-2: 3.0 N (7.14 N kg/ha) (Urea)	
T-3: 4.5 N (10.71 N kg/ha) (Urea)	
T-4: 3.0 N (7.14 N kg/ha) (AS)	
T-5: 4.5 N (10.71 N kg/ha) (AS)	

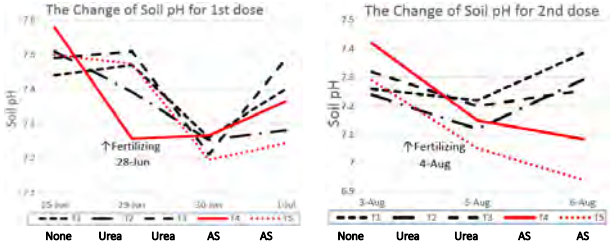
AS: Ammonium Sulphate
Fertilizers are divided into 3 doses.

The Result of Yield



Optimum Condition: T4 (AS 3.0N kg/fed)

The Change of Soil pH



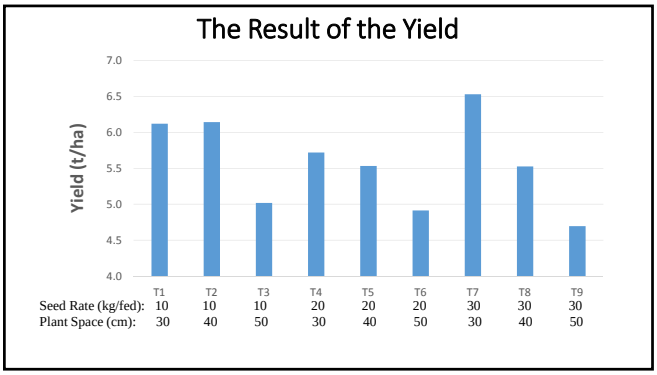
Seed Rate and Plant Spacing Trial

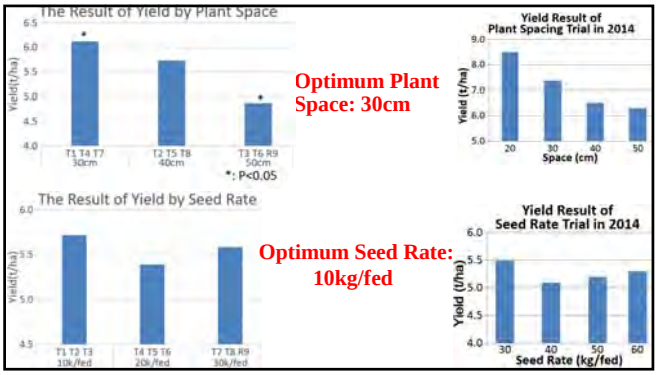
Objective:

To identify an appropriate balance of seed rate and plant space

Treatment

	Seed Rate		Space
T-1	24kg/ha (10 kg/fed)	&	30 cm
T-2	24kg/ha (10 kg/fed)	&	40 cm
T-3	24kg/ha (10 kg/fed)	&	50 cm
T-4	48kg/ha (20 kg/fed)	&	30 cm
T-5	48kg/ha (20 kg/fed)	&	40cm
T-6	48kg/ha (20 kg/fed)	&	50 cm
T-7	72kg/ha (30 kg/fed)	&	30 cm
T-8	72kg/ha (30 kg/fed)	&	40 cm
T-9	72kg/ha (30 kg/fed)	&	50 cm



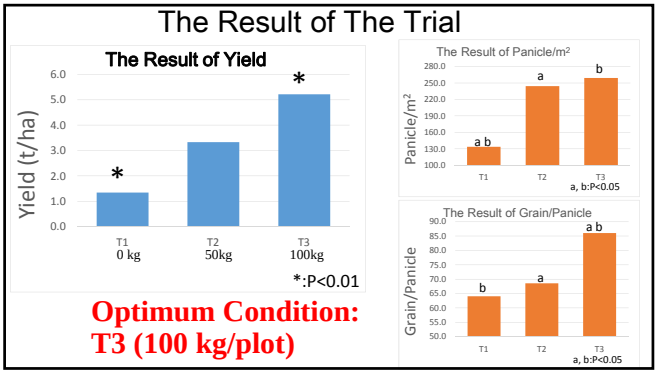


Organic Fertilizer Trial

Objective: To identify appropriate manure amount to improve sandy and infertile soil

Treatment	1 plot=9m²
T-1:	0 kg/plot (control)
T-2:	50 kg/plot
T-3:	100 kg/plot

No basal-dressing is applied.
Only Urea is applied as top-dressing at two doses.
Cattle Manure is used as Organic Fertilizer.



Irrigation Interval Trial

Objective: To identify an appropriate irrigation interval

Treatment	1 plot=16m^2
T-1: Every 4 days	
T-2: Every 4 days until 50DAS → Every 2 days	
T-3: Every 7 days	
T-4: Every 7 days until 50DAS → Every 4 days	
T-5: Every 10 days	
T-6: Every 10 days until 50DAS → Every 4 days	

DAS: Days after sowing

The Result of The Trial

- Accurate irrigation management is difficult due to rainfall.
- This trial should be conducted at an indoor facility in which irrigation water can be easily controlled without rainfall.

Potential of Upland Rice in Sudan

Yield of Weed Control Trial in 2013

		Yield (t/ha) R1	R2	R3	1 plot = 16m^2 Treatment (DAS: days after sowing)
T	1	0.10	1.04	1.99	Control
	2	3.21	9.56	9.69	Herbicide (Pre-emergence+Post-emergence at 42DAS)
	3	2.19	8.30	8.46	Herbicide (Pre-emergence)+Handweeding (1 time at 42DAS)
	4	6.78	8.62	6.20	Herbicide (Pre-emergence)+Handweeding (2 times at 42 and 56 DAS)
	5	2.91	3.77	**10.11**	Handweeding (1 time at 21 DAS)
	6	2.58	6.62	7.98	Handweeding (2 times at 21 and 30 DAS)
	7	6.57	**10.97**	**10.98**	Handweeding (3 times at 21, 30 and 56 DAS)
	8	2.06	7.58	**10.84**	Handweeding (2 times at 21 and 30 DAS)+Herbicide(Post-emergence at 42DAS)

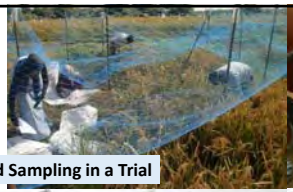
More than 10t/ha was achieved. This is same level as Egypt.


Field of 10 t/ha.


Irrigation Interval Trial, 2014


Instruction from JICA Expert, 2015

Organic Fertilizer Trial, 2015


Yield Sampling in a Trial


Yield Component Calculation


Soil pH measurement in N Source Trial


Explanation of Trials to Visitors

Demonstration Farms, Gezira in 2015

Demo Site	Locality	Area (Fed)	No. of Extensionist	Sowing Date	Harvest Date
Wad Bahai	Hasahisa	2.0	3	11/07/2015	10/11/2015
Shibairab	South Gezira	2.0	1	30/06/2015	22/10/2015
Abdelrahman	Hasahisa	2.0	1	07/07/2015	27/10/2015
Wad Alasha	South Gezira	2.0	1	25/06/2015	25/10/2015
Frejab	Hasahisa	2.0	1	10/07/2013	3/12/2015
Sowriba*	South Gezira	2.0	2	23/06/2015	-
TOTAL		12.0	9		

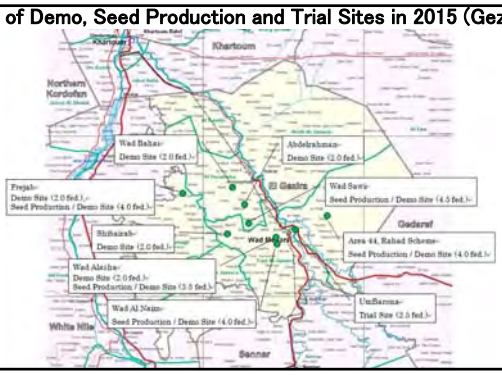
*Sowriba was cancelled because most of the seeds were eaten by birds after sowing.

Seed Production and Demonstration Farms, Gezira in 2015

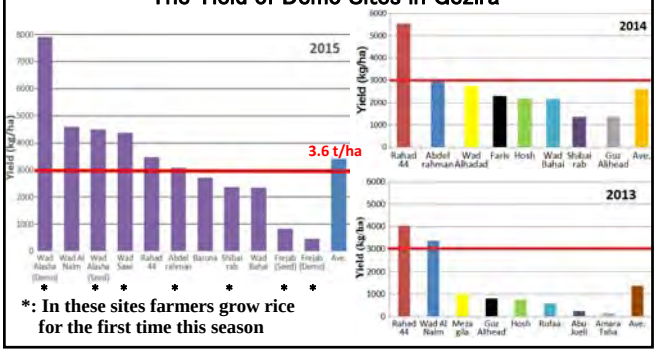
Demo Site	Locality	Area (Fed)	No. of Extensionist	Sowing Date	Harvest Date
Area 44, Rahad Scheme	Um Algora	4.0	3	17-21/07/2015	5/11/2015
Wad Sawi	Hasahisa	4.5	2	03-04/07/2015	28-29/10/2015
Frejab	Hasahisa	4.0	1	10/07/2015	3/12/2015
Wad Al Naim	South Gezira	4.0	1	25/06/2015	21-22/10/2015
Wad Alasha	South Gezira	3.5	1	27/06/2015	26-27/10/2015
UmBarona*	Wad Medani	1.0	-	22/06/2015	19-20/10/2015
TOTAL		21.0	8		

*UmBarona is not demonstration farm.

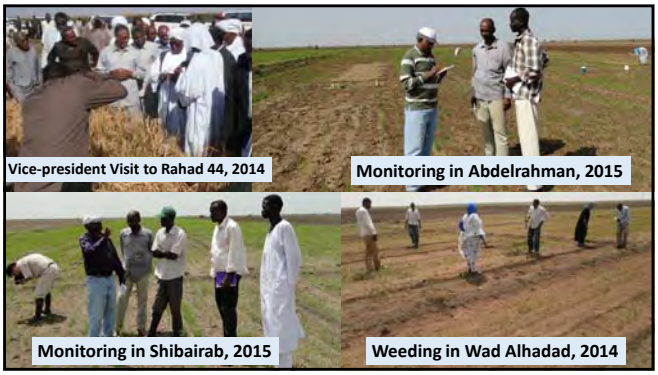
Map of Demo, Seed Production and Trial Sites in 2015 (Gezira State)



The Yield of Demo Sites in Gezira



*: In these sites farmers grow rice for the first time this season



Conclusion on the Key Factors to Achieve High Yield

- Strong Political Initiative & Budget Allocation
- **High Awareness & High Motivation**
- Coordination & Communication
- Farmer Selection & Field Selection
- Training & Technical Knowledge

شكرا جزيلا Thank you

The Achievement of the Project

Demonstration Farm activity in Sennar, Gedaref, River Nile, Northern and White Nile States for season 2014 and 2015

19th January, 2016

Capacity Building Project
for the Implementation of the Executive Programme
for the Agricultural Revival

Akio GOTO
JICA Expert

Federal Ministry of Agriculture & Forestry

Japan International Cooperation Agency

Rice yield is result (fruit) of appropriate and timely each operation

↓

The achievement on demonstration farm activity by the Project with Ministries and famers, etc. need to be evaluated from various aspects.

↓

However, rice yield should be one of the most visible and significant indicators for evaluating demonstration farm activity.

Sennar State (1)

Yield Result (by sampling & whole area) season 2014

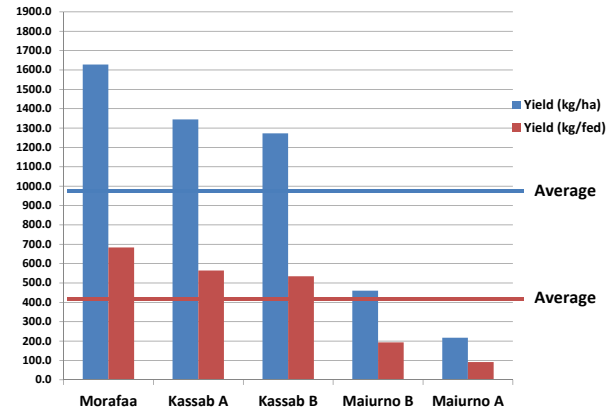
Site	Area (Fed)	Area (Ha)	Yield (crop cut) (kg/ha)	Yield (crop cut) (kg/fed)	Yield (whole area) (kg/ha)	Yield (whole area) (kg/fed)
Morafaa	2.5	1.05	4587	1926	1628	684
Maiurno A	2.0	0.84	1349	566	218	91
Maiurno B	2.0	0.84	2251	945	460	193
Kassab A	2.5	1.05	4981	2092	1345	565
Kassab B	2.5	1.05	4152	1744	1273	535
Total/Average	11.5	4.83	3464	1455	985	414

Sennar State (2)

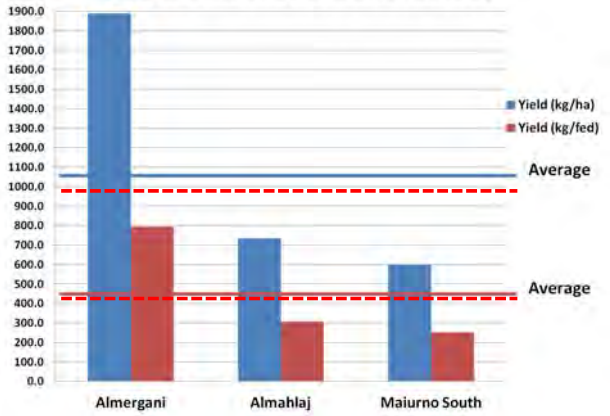
Yield Result (by sampling & whole area) season 2015

Site	Area (Fed)	Area (Ha)	Yield (crop cut) (kg/ha)	Yield (crop cut) (kg/fed)	Yield (whole area) (kg/ha)	Yield (whole area) (kg/fed)
Mairuno South	2.5	1.05	3305	1388	602	253
Almahlaj	2.5	1.05	3332	1399	735	309
Almergani	2.5	1.05	4325	1817	1891	794
Total/Average	7.5	3.15	3654	1535	1076	452

Yield of Demonstration farms in 2014

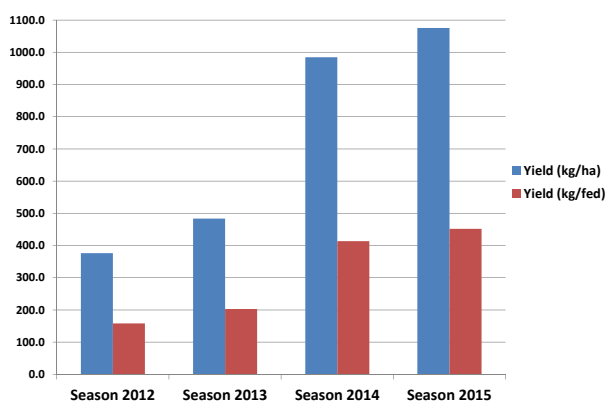


Yield of Demonstration farms in 2015



Maiurno A and B site (11/11/2014)

Almergani site (11/11/2015)



Issues to be solved for the future in Sennar State

- Site selection (water availability, soil fertility, etc.) based on criteria
- Late land preparation
  - → Low quality of operation
  - → Damage by rainfall
- Quality and timing of each operation
- Off-Type
- Possession of own Agricultural machineries

Gedaref State (1)

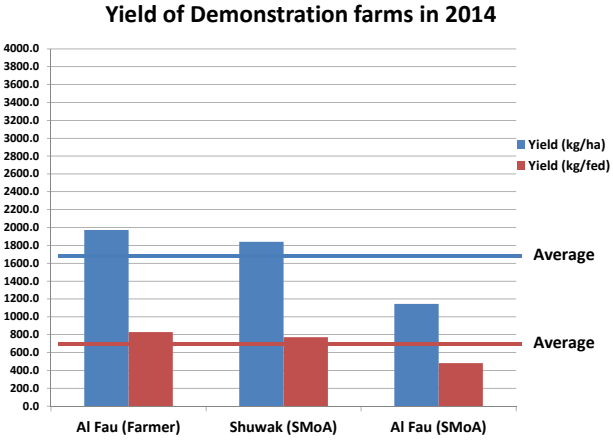
Yield Result (by sampling & whole area) season 2014

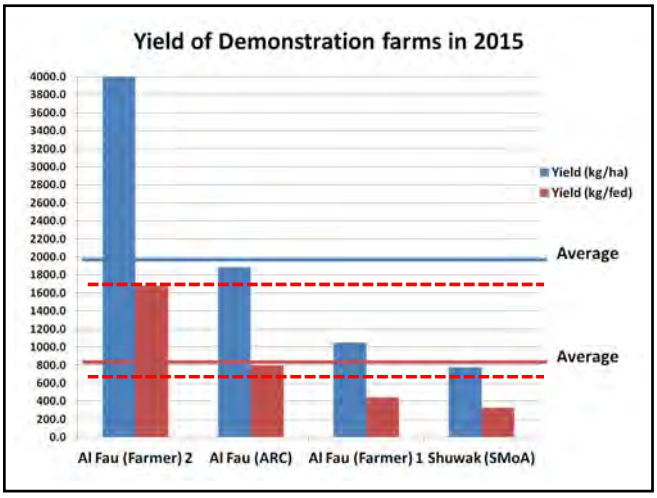
Site	Area (Fed)	Area (Ha)	Yield (crop cut) (kg/ha)	Yield (crop cut) (kg/fed)	Yield (whole area) (kg/ha)	Yield (whole area) (kg/fed)
Al Fau (SMoA)	2.0	0.84	4240	1781	1145	481
Al Fau (Farmer)	2.0	0.84	4310	1810	1973	829
Shuwak (SMoA)	2.0	0.84	8128	3414	1840	773
Total/Average	6.0	2.52	5559	2335	1653	694

Gedaref State (2)

Yield Result (by sampling & whole area) season 2015

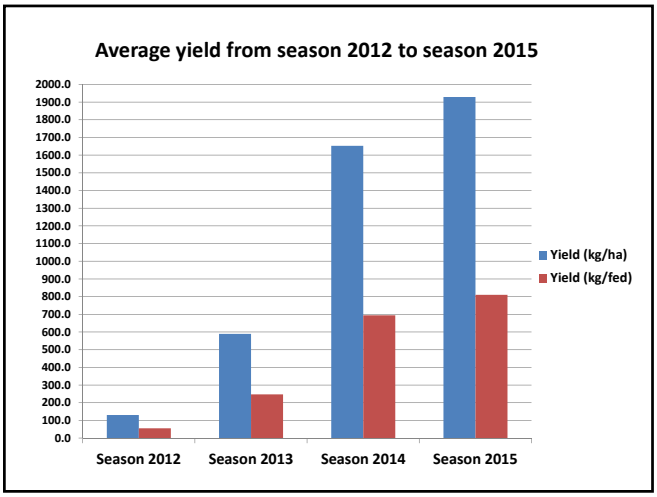
Site	Area (Fed)	Area (Ha)	Yield (crop cut) (kg/ha)	Yield (crop cut) (kg/fed)	Yield (whole area) (kg/ha)	Yield (whole area) (kg/fed)
Al Fau (ARC)	2.0	0.84	4876	2048	1889	793
Al Fau (Farmer) 1	2.0	0.84	4423	1858	1053	442
Al Fau (Farmer) 2	2.0	0.84	5609	2356	3996	1678
Shuwak (SMoA)	2.0	0.84	3523	1479	777	326
Total/Average	8.0	3.36	4608	1935	1929	810





Al Fau (Ministry) site (02/11/2014)

Al Fau (Farmer field) 2 site (31/10/2015)



Issues to be solved for the future in Gedaref State

- Site selection (farmer, water availability, soil fertility, etc.) based on criteria
- Late land preparation
  - → Low quality of operation
  - → Damage by rainfall
- Quality and timing of each operation
- Off-Type
- Non-uniform growth (esp. Shuwak site)
- Number and assignment of Extensionists

River Nile State (1)

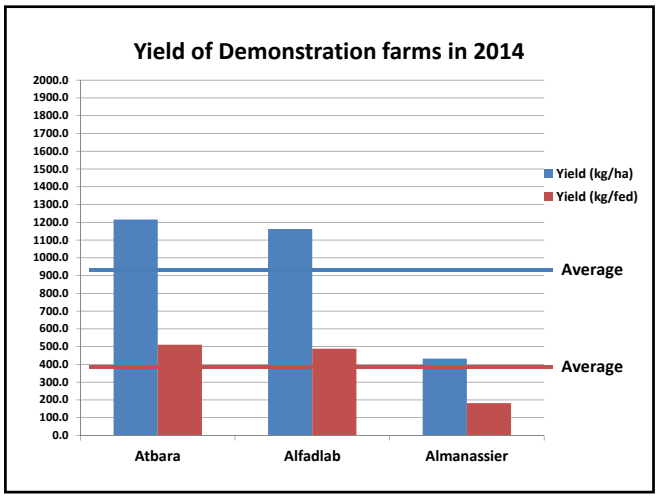
Yield Result (by sampling & whole area) season 2014

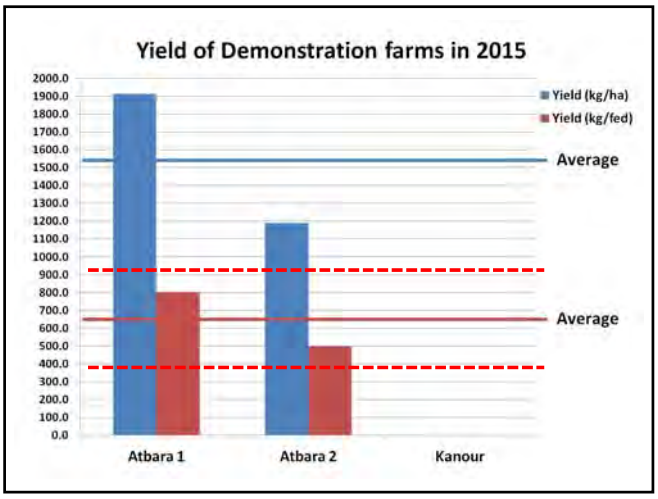
Site	Area (Fed)	Area (Ha)	Yield (crop cut) (kg/ha)	Yield (crop cut) (kg/fed)	Yield (whole area) (kg/ha)	Yield (whole area) (kg/fed)
Almanassier	1.0	0.42	2726	1145	433	182
Atbara	1.0	0.42	2344	984	1215	511
Alfadlab	1.0	0.42	4784	2009	1162	488
Total/Average	3.0	1.26	3285	1379	937	394

River Nile State (2)

Yield Result (by sampling & whole area) season 2015

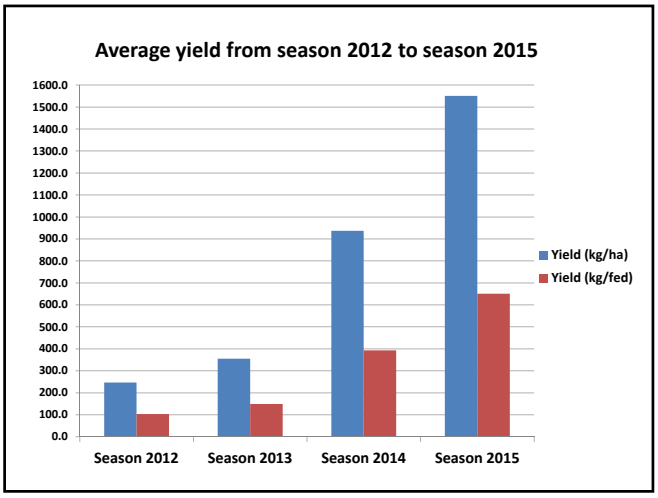
Site	Area (Fed)	Area (Ha)	Yield (crop cut) (kg/ha)	Yield (crop cut) (kg/fed)	Yield (whole area) (kg/ha)	Yield (whole area) (kg/fed)
Atbara 1	1.0	0.42	2448	1028	1912	803
Atbara 2	1.0	0.42	2098	881	1189	500
Kanour	1.0	0.42	N/A	N/A	N/A	N/A
Total/Average	3.0	1.26	2273	636	1551	652





Almanassier site (31/10/2014)

Atbar 1 site (22/10/2015)



Issues to be solved for the future in River Nile State

- Site selection (water availability, accessibility, etc.) based on criteria
- Sowing operation without missing hills
- Sowing time to avoid high temperature
- Quality and timing of each operation (re-sowing, weeding, etc.)
- Water management for minimizing empty grains
- Damage by birds
- Off-Type

Northern State (1)

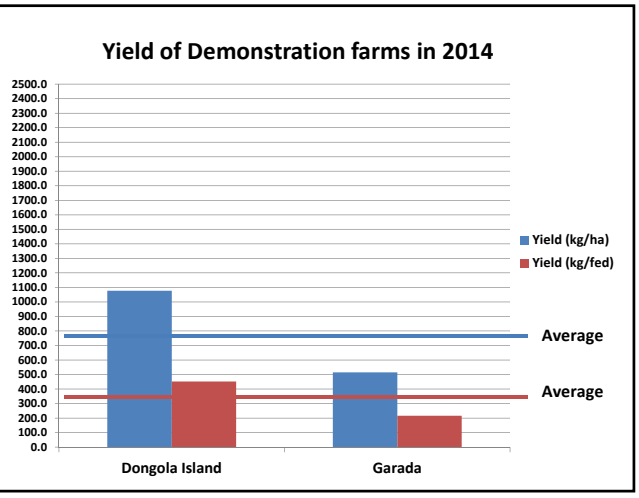
Yield Result (by sampling & whole area) season 2014

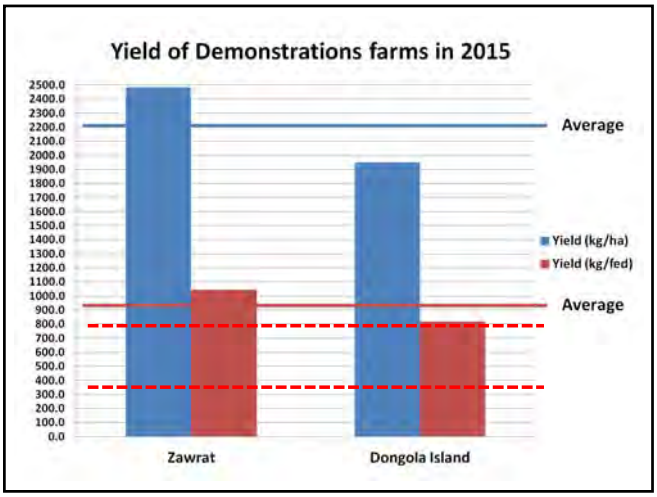
Site	Area (Fed)	Area (Ha)	Yield (crop cut) (kg/ha)	Yield (crop cut) (kg/fed)	Yield (whole area) (kg/ha)	Yield (whole area) (kg/fed)
Dongola Island	1.0	0.42	3965	1552	1077	452
Garada	1.0	0.42	3541	1487	515	216
Total/Average	2.0	0.84	3753	1520	796	334

Northern State (2)

Yield Result (by sampling & whole area) season 2015

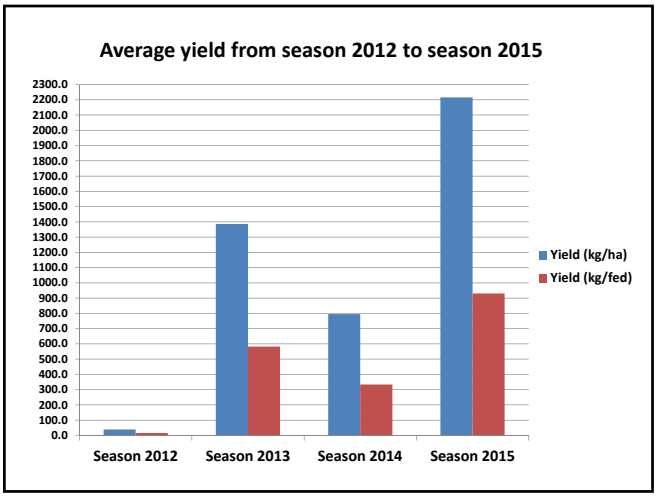
Site	Area (Fed)	Area (Ha)	Yield (crop cut) (kg/ha)	Yield (crop cut) (kg/fed)	Yield (whole area) (kg/ha)	Yield (whole area) (kg/fed)
Dongola Island	1.0	0.42	4861	2042	1949	819
Zawrat	1.0	0.42	4608	1935	2481	1042
Total/Average	2.0	0.84	4735	1839	2215	931





Gerada site (30/10/2014)

Zawrat site (21/10/2015)



Issues to be solved for the future in Northern State

- Site (= farmer, soil characteristics, etc.) selection based on criteria
- Sowing time under consideration of winter crop
- Quality and timing of each operation (weed control, fertilization, etc.)
- Damage by birds
- Water management for avoiding empty grains
- Off-Type

White Nile State (1)

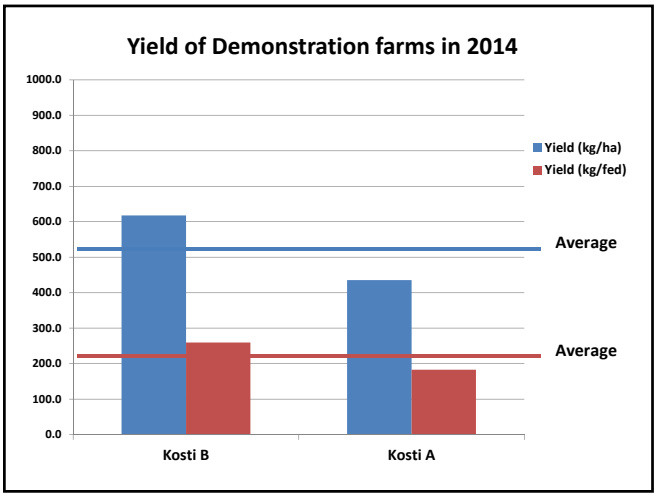
Yield Result (by sampling & whole area) season 2014

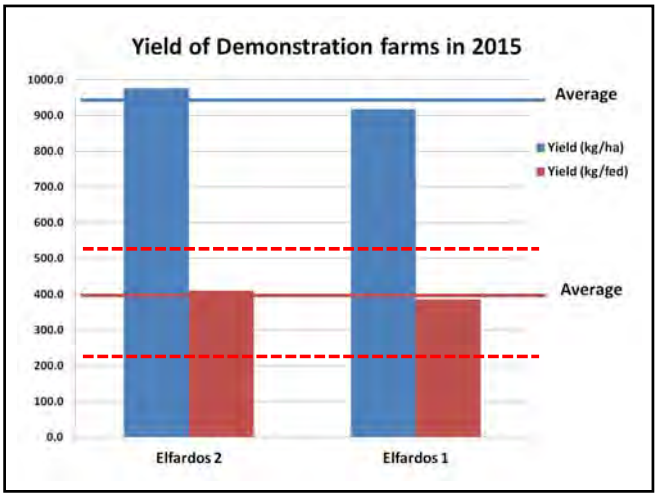
Site	Area (Fed)	Area (Ha)	Yield (crop cut) (kg/ha)	Yield (crop cut) (kg/fed)	Yield (whole area) (kg/ha)	Yield (whole area) (kg/fed)
Kosti A	3.0	1.26	4514	1896	436	183
Kosti B	3.0	1.26	3808	1599	618	259
Total/Average	6.0	2.52	4161	1748	527	221

White Nile State (2)

Yield Result (by sampling & whole area) season 2015

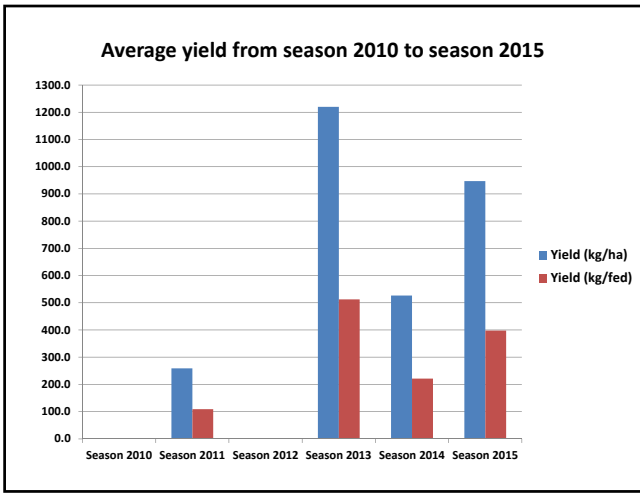
Site	Area (Fed)	Area (Ha)	Yield (crop cut) (kg/ha)	Yield (crop cut) (kg/fed)	Yield (whole area) (kg/ha)	Yield (whole area) (kg/fed)
Elfardos 1	2.0	0.84	3778	1587	918	385
Elfardos 2	2.0	0.84	3286	1380	976	410
Total/Average	4.0	1.68	3532	1484	947	398





Kosti A and B site (13/11/2014) (from one side and from opposite site)

Elfardos 1 and 2 site (20/10/2015) (from one side and from opposite site)



Issues to be solved for the future in White Nile State

- **Keeping strong will and concrete actions (management of the fields, utilizing extensionists, etc.)**
- **Off-type**
- **Site selection (accessibility, soil characteristics, water availability, etc.) based on criteria**
- **Quality and timing of each operation (weeding, water management, etc.)**
- **Late harvesting**

There are still several issues to be solved on demonstration farm activity.

The Project already identified some important "clues" to solve them with Sudanese side as bottle neck issues.

It is the time to try to solve the issues and implement this activity by yourselves.

The Achievement of the Project

In the field of Training and other programme such as in Uganda, Egypt and Japan

whole period of the Project (2010.3 – 2016.3) and extension period (2014.3 – 2016.3)

Federal Ministry of Agriculture & Forestry

Japan International Cooperation Agency

Training and other programme outside Sudan (2010.3 – 2016.3)

378 Counterparts of MoA

330 Extensionists/Staff participated in Training to Uganda, Egypt and Japan.

34 High Officials participated Observation Programme for Rice Development in Egypt and Japan.

14 Researchers participated Technical Exchange for Rice Research in Uganda and Japan.

Training for Extensionists in Uganda

- Whole period (2010.3 – 2016.3)
  150 extensionists

Basic Training on Rice Cultivation	101
Advanced Training on Rice Cultivation	49

- Extension Period (2014.3 – 2016.3)
  27 extensionists

Advanced Training on Rice Cultivation	27

Training for Extensionists in Egypt

- Whole project period (2010.3 – 2016.3)
  128 extensionists

Agricultural Machinery Training	15
Weed Control Training	48
Irrigation & Water Management Training	30
Rice Post-Harvest & Processing Training	35

- Extension project period (2014.3 – 2016.3)
  78 extensionists

Weed Control Training	28
Irrigation & Water Management Training	30
Rice Post-Harvest & Processing Training	20

Technical Training in Japan

- Whole project period (2010.3 – 2016.3)
  52 extensionists/researchers/staff

- Extension project period (2014.3 – 2016.3)
  18 extensionists/researchers/staff

  - Upland Rice Cultivation and Variety Selection Techniques
  - Appropriate Management of Land and Water Resources
  - Development of Agricultural Cooperative
  - Development of core Agricultural Researchers for Rice Promotion
  - CARD and CAADP for Sub-Sahara African Countries, and more…

Observation Programme for High Officials

- To Japan
  11 high officials (5 Ministers of SMoAs, etc.)
  (Dec 2010, Oct - Nov 2012)
- To Egypt (Extension project period)
  23 high officials (Undersecretary, DGs of SMoAs, etc.)
  (Aug 2014, Sep 2015)

Technical Exchange for ARC Researchers

- To Uganda
  6 researchers (Mar 2014)
- To Egypt (Extension project period)
  8 researchers (Sep 2015)

1. CROP IMPROVEMENT

Activity 1.1 Grain yield and quality Performance of some upland rice genotypes under irrigated conditions of the Sudan

Testing sites: Rahad and Kosti

MINISTRY OF AGRICULTURE AND FORESTRY
AGRICULTURAL RESEARCH CORPORATION
RICE RESEARCH PROGRAM

Rice Research Activities and Training
(2014 and 2015)

Ahmed A. Elsiddig
National Rice Research Coordinator

2. MECHANIZATION

Activity 1.1 Effect of different sowing methods on yield and yield components of aerobic rice (2015)

Testing site: Medani

1. CROP IMPROVEMENT

Activity 1.2 Maintenance and seed multiplication of released rice varieties

Testing site: Medani

3. AGRONOMY

Activity 1.2 Response of aerobic rice varieties to planting date under irrigated conditions

Testing sites : Medani and Kosti

3. AGRONOMY

Activity 1.1 Effect of seed rate and row spacing on growth, yield and yield components of aerobic rice under irrigated conditions

Testing sites: Medani and Kosti

4. WATER MANAGEMENT

Activity 1.2 Irrigation scheduling of rice crop

Testing sites: Medani and Kosti

4. WATER MANAGEMENT

Activity 1.1 Irrigation without moisture stress with continuous soil moisture monitoring (Crop water requirement)

Testing sites: Medani and Kosti

5. PLANT NUTRITION

Activity 1.2 Zn-Phosphorus interaction effect on rice grain yield and quality under irrigated conditions

Testing site: Medani

5. PLANT NUTRITION

Activity 1.1 Response of irrigated upland rice to nitrogen and phosphorus fertilization under irrigated soil conditions

Testing site: Medani

TRAINING

Scientific Exchange Program
- Uganda. March, 2014
- Egypt. September, 2015

Development of Core Agricultural Researcher
- Japan. June-August, 2014
- Japan. June-August, 2015

CARD Meetings
- Japan. September, 2015
- Ghana. November, 2015

6. WEED CONTROL

Chemical weed control in irrigated upland rice

Testing site: Medani (2014) and Kosti (2015)

THANK YOU FOR YOUR ATTENTION

Ministry of Agriculture and forestry
National Rice Project

Summary Of The Activities On Rice Development

Presented by: Mohieldin Ali Mohammed
National Rice Coordinator
MoAF
19 January 2016

Introduction

Why rice to be the best choice for us :

- World wise rice represent very great value of the national economy for many countries –More than half of the world population depends on rice in their livelihood.
- The consumption of rice is increasing year by year, while the total production ,fail to attain the same rate of increments , so always there is a gab between the two ends
- All the trials conducted on Sudan ,showed the success of the crop to be cultivated at various regions of the country .
- The availability of adequate climate, water resources and fertile soils are comprising the essential and basic needs for a successful growth of the crop .
- The successful results obtained offer a chance for us to select rice to be the best choice among the other cereals crops for its high productivity and profitability .

Previous Trials

Gezira Scheme:(1973–1980) Under the Chinese technical assistance.

Area of (12000 hec) 28500 feddans was cultivated with an average yield of 2.5 – 3.6 ton / fed ,but later on the trial was associated with other problems to end the rice project activities in 1980 .

White Nile State: (1978 – 1984) Under the Japanese technical assistance.

Many varieties were tested , achieving promising results , and a feasibility study for a large scale production project was implemented for 10000 feddan at Abu Gassabaa basin

For political reasons the project was terminated in 1984 .

Con. Previous Trials

The Vietnamese trial March 2009 – Nov. 2010 :

At the White Nile State , 59 varieties were tested at two successive seasons – when analysing the results , Nine varieties showed their suitability to Sudan , attaining more than 3.6 ton / fed. These activities ended at this point.

Chinese trials : 2011 – 2012 at Al Selate Project:

Eight hybrid varieties were cultivated and compared with local varieties –more than 3.7 ton / feddan was achieved .

The Indonesian trials 2013 - 2014 with collaboration of ARC (ARC Rahad Substation).

Con. Previous Trails

So many trials were conducted in Sudan , but all of them did not achieve the second part of the target goal

Why ?

Jica is the first body who answered the question

Jica provide us with the answer practically within the capacity building project .

Jica Role in Developing Rice Sector In Sudan

Make use of all the previous trials , Jica recognized that (**MAN**) is the fundamental effective tool to start with for a sustainable rice sector taking at the same time the other requirements for rice production

Capacity Building Program
March 2010 –March 2016

- A comprehensive training program ,was implemented for the participants to cover all the stages of rice crop growth .
- Training abroad for the agricultural staff of the target states , provide the participants with rice technologies and the technical know-how .
- Upland rice technical and appropriate cultivation methods were transferred to extensionists and then to farmers through (ToT& FFS) .
- Challenges faced during running the project activities , such as pure seeds , weed control , irrigation problems , harvest and post harvest operation etc. were listed .
- The problems listed were discussed at the second rice forum (Jan 2014) under the title of (bottle neck issues) .
- Jica rice experts succeeded in solving some of the bottle neck issues .
- The high yields records obtained from the demo-farms , is a real translation impact of the effective training of the extensionist and farmers Jica provided the States rice units with machineries and equipment's to enhance rice development process.

NRP Plan 2016/2017
Planning for Better Future in Rice

NRP plan 2016/2017 includes the following pillars

1. Considerable budget allocated to support the Demo-farm activities.
2. Improvement of the traditional sector (technical know-how, new varieties, with collaboration of ARC.
3. Continue training and capacity building program for the staff and farmers with collaboration of ARC and assisting organization.
4. Secure the production inputs and machineries for the fully financed area.
5. Assist in establishing additional partnerships with local and foreign investor to expand the area of commercial production.
6. Assist in implementing feasibility studies in new project for rice production.

Government Intervention

To make use of the achieved goal from Jica program , and to develop rice sector to a sustainable stage. MoAF took further steps to support NRP activities to achieves the main goal of the project (self sufficiency in rice commodity , **These steps are:**

- Support the rice promotion units at the states level , according to volume of activities practiced.
- MoAF pay for securing rice seeds for the next season 2016 / 2017 .
- MoAF purchased 20 rice seed driller , 19 small processing units and 10 motor cycles to enhance the rice situation at the states targeted for rice production.
- MoAF established a responsible body for seed propagation to secure pure seeds for the production areas according to the government agricultural policy .
-

Con. Government Intervention

- MoAF agreed to finance the rice production areas (2016 / 2017)for the farmers and secure the required inputs through ABS and complete the circle of marketing for the farmers involved .
- The preparation were agreed to establish the (rice main center) at the Gezira State and a processing plant will be installed.
- ARC formally represented in NRP to assist in solving the rest of the (bottle neck Issues) and to complete the work in developing the technical for rice production in The Sudan.
- MoAF open the door for partnerships and investors to expand the area of rice production

Plan for Rice Cultivation
Season 2016/2017

Ecosystem& varieties	Area /Fed	location	Financing body
Aerobic Nerica 4	2210	Gezira state and other state	MoAF
Aerobic ARC released varieties	70	ARC Medni & kosti	MoAF
Submerged Basmati & Babingeda	500	South Darfour Alradoom	MoAF Farmers
Submerged Egyptian varieties	600	Gezira	investor
Submerged local varieties	15000	White Nile	Farmers, MoAF technical assistant
Submerged Basmati	380	White Nile Umtakal	Crown rice project (partnership)
Total	18760		

بسم الله الرحمن الرحيم

اللهم صلِّ وسلم على سيدنا محمد النبي الأمي وعلى آله وصحبه وسلم

Gezira State

Ministry of , Animal Wealth and Natural

GENERAL ADMINISTRATION OF AGRICULTURE

Rice Promotion Unit

In Collaboration with

Japan International Cooperation Agency (JICA)

Upland Rice Cultivation Activities - Season 2015-2016

Prepared by:

Rice Promotion Unit

Jan. 2016

Activities of Season 2015-2016

- Seed selection started from Jan. to May 2015
- Sites selection started from March to June
- Sowing date from mid of June to mid of July
- Harvest from end of Oct. to mid of Nov.
- Extension days were conducted (Wad Alasha & Wad Bahai)
- Visits of JICA experts & Sudanese counterparts and visit of the final evaluation team

Gezira State - Rice Promotion Unit

Location of Trials- farms - Umbarona season 2015

No.	Trial	Area/Plot
1	Plant Spacing & Seed Rate	27
2	Organic Fertilizer	9
3	Nitrogen Source	15
4	Nitrogen Amount	12
Total Area 1.5 Fed.		

Rice Promotion Unit - Gezira State

Yield of Seed Production farms season 2015

No.	Farm	Locality	Area Fed.	Targ. Yield t/fed.	Actu. Yield t/fed.	Achiev. %
1	Wadsawi	Hassaheisa	4.5	2	1.6	80%
2	Rahad	Umalgora	4	1.2	1.5	125%
3	Wadalnaeim	S. Gezira	4	1.5	1.7	113.3%
4	Wadalasha	S. Gezira	3.5	1.5	1.5	115.4%
5	Fregab	Hassaheisa	4	1	0.3	30%
Total			20	1.40	1.32	94.3%

Rice Promotion Unit - Gezira State

Yield of Demo-farms farms season 2015

No.	Farm	Locality	Area Fed.	Targ. Yield t/fed.	Actu. Yield t/fed.	Achiev. %
1	Wadalasha	S. Gezira	2	1.5	2.5	166.7%
2	Abdelrahman	Hassaheisa	2	1	1.14	114%
3	Sheberab	S. Gezira	2	1	1	100%
4	Wadbahai	Hassaheisa	2	1	0.8	80%
5	Fregab	Hassaheisa	2	1	0.2	20%
Total			10	1.10	1.13	102.7

Rice Promotion Unit - Gezira State

Average Yield per fed. From 2011 to 2015

No.	Season	Area Fed.	No. of demo-farms	No. Of Farmers	Average Yield ton/fed.
1	2010-2011	5	1	1	-
2	2011-2012	20	5	5	0.94
3	2012-2013	42	9	9	0.96
4	2013-2014	36.4	9	9	1.6
5	2014-2015	18.5	8	8	1.2
6	2015-2016	10	5	5	1.2

Rice Promotion Unit - Gezira State

Comparison per feddan from 2011 to 2015

Crop	Cost SDG/Fed.	Yield SDG/Fed.
Rice 2011	948	3600
Rice 2012	1455	3630
Rice 2013	2265	4200
Rice 2014	3100	6000
Rice 2015	3275	6000

Rice Promotion Unit - وحدة تطوير الأرز

Comparison per feddan between Sorghum & Rice Season 2015-2016

Crop	Cost SDG/fed.	Yield SDG/Fed.
Sorghum	1500	* 3000
Upland rice	3275	6000

* Without residues

Rice Promotion Unit - وحدة تطوير الأرز

Post-harvest Program:

No.	Location	Locality	No. of Milling machines	Implementation
1	Fadasi	Wad Medani	2	100%
2	Hassaheisa	Hassaheisa	2	100%
3	Alhoush	South of Gezira	2	100%
4	Haj Abdalla	South of Gezira	2	Under 3 phase installation
5	Umbarona	Wad Medani	1	Under 3 phase installation
6	Fregab	Almanagil	1	Under 3 phase installation
7	Rahad 44	Umalgora	2	Under 3 phase installation

Rice Promotion Unit - Gezira State

Training by JICA:

Country	No. of Trainees From Jan. to Dec. 2010	No. of Trainees From Jan. to Dec. 2011	No. of Trainees From Jan. to Dec. 2012	No. of Trainees From Jan to Dec. 2013	No. of Trainees From Jan. to Sep. 2014	No. of Trainees From Jan. to Sep. 2015
Japan	-	2	8	7	4	0
Uganda	6	11	28	7	4	3
Egypt	-	-	-	18	13	10
Total	**6**	**13**	**36**	**32**	**21**	**13**

The Total Number: 121 Participants

Rice Promotion Unit - Gezira State

Training by JICA:

Country	No. of Trainees In Rice Cultivation	No. of Trainees In Rice post harvest
Japan	20	1
Uganda	59	-
Egypt	30	11
Total	**109**	**12**

The Total Number: 121 Participants

Rice Promotion Unit - Gezira State


Training in Egypt
Training in Uganda


Post Harvest Activities


Umbarona - Season 2015-2016
Mr. Tsuboi Visit


Rahad 44 Seed Production Farm
Season 2015-2016


Wad Sawi Seed Production Farm
Season 2015-2016


Wad Alasha Seed production Farm
Season 2015-2016


Wad Alnaeim Seed production
Farm Season 2015-2016


Wad Alasha Demo-farm Farm
Season 2015-2016


Shiberab Demo-farm
Season 2015-2016


Abdelrahman Demo-farm
Season 2015-2016


Wad Bahai Demo-farm
Season 2015-2016


Extention Day – WadAlasha

بسم الله الرحمن الرحيم

اللهم صلِّ وسلم على سيدنا محمد النبي الأمي وعلى آله وصحبه وسلم

Gezira State

Ministry of , Animal Wealth and Natural

General Administration of Agriculture

Rice Promotion Unit

In Collaboration with

Japan International Cooperation Agency (JICA)

Upland Rice Cultivation in Gezira State Plan of Season 2016-2017

by:

Rice Promotion Unit

Jan. 2016

Introduction

The Ministry of Agriculture, Gezira State in collaboration with JICA established in 2010 a unit of rice promotion. This unit focuses on field operations of demo-farms for rice cultivation of Nerica4. The unit aims to spread upland rice cultivation in Gezira State and to improve rice productivity. To achieve these goals, the unit conducted field trials to provide farmers with the suitable techniques on upland rice cultivation and conducted seed multiplication farm, to provide pure seed.

Current Situation Analysis:

- The total cultivated area in the last season is 10 feddans .
- The area of seed multiplication and trial farms is 21 feddans and the number of farmers is 10 farmers
- Total yield from seed production farms is 25 tones
- The average yield is 1.2 ton/fed.
- Many farmers gained skills and experience on upland rice cultivation (55 farmers since 2011)
- Many farmers have a great desire to cultivate rice

Current Situation Analysis:

- Many extensionists participated in training programs organized and funded by JICA in Japan, Uganda ,Egypt and internal training by Japanese expert(post-harvest...)
- Extension days were conducted (Wad Alasha & Wad Bahai)
- JICA provides different agricultural machineries, but now most of it need maintenance (combine harvesters ...etc.)
- JICA provides all inputs
- S.MoA provided one combine harvester

Problems of last Season:

- Delay payment of benefits to farmers who participated in the program
- Seeds purity
- Late land preparation due to late finance
- Inappropriate Weed Control due to unavailability of suitable herbicides
- A lack of Transportation means for extension workers
- Delay of finance regarding to rice milling machines installation (3 Phase)

Plan Strategy:

The plan focused on:

A. Strengthen and improve extension work

B. Improve field management practices

C. Formulate monitoring & evaluating procedures

Overall Goal:

To contribute to national food security, increased income and reduce poverty towards the attainment of self sufficiency from sustainable rice production.

Objectives of season 2016-2017:

1. **Increase yield in demo-farm to more than 1.5 ton/fed. (3.6 ton/ha)**
2. **Increase yield in seed multiplication farms to get pure seeds of Nerica4(1.7ton/fed)**
3. **Continue accumulating data in trial farm by conducting some trials**
4. **Conduct schools farmers to train farmers regarding to rice cultivation techniques & post-harvest technology**
5. **Operate rice milling machines to produce white rice for local markets**
6. **Continue training programs for extension workers inside & outside Sudan in collaboration with JICA and related organizations.**

Target Area:	**2000 Feddans**
Target Yield:	**1.5 ton/fed (3.6 ton/ha)**
Plan Location:	**Gezira State**
Target Groups:	**Farmer's of Gezira & Rahad Schemes**
Stakeholders:	**FMoA , JICA , MoA Gezira State – RPU, Farmers**
Plan Duration:	**Nine Months**
Starting Date:	**1/3/2016**
Ending Date:	**1/1/2017**

SWOT Analysis:

Strengths	Weaknesses
• Suitable natural resources • Profitability of rice • Extension skills & accumulated Experience • Government Commitment	• research • Low private sector participation • Low mechanization/ Operator's Skills • Access to credits and finance
Opportunities	**Threats**
• Increasing demand of rice consumption • Open local and regional markets • Technical assistance by JICA • Regional and international initiatives	• Availability of Pure seeds • Irrigation /Weeds • Harvest and post-harvest losses • Rising inputs costs

Constrains:

1. **Seed Purity/availability**
2. **Delay payment of benefits to farmers who participated in the program**
3. **A lack of credit and micro-finance institutions**
4. **Machinery Adjustment/operation**
5. **Soil Problems (Fertility; pH; micro-elements)**
6. **Water management , irrigation and drainage facilities**
7. **Weeds incidence/control**
8. **Birds/Rodents/Termites incidence/control**
9. **Insufficient experience in Post-harvest technology**
10. **Unavailability of clear marketing plan/system**

Demo-farms:

No.	Location	Locality	Area Per Feddan
1	Mezigila	South of Gezira	2
2	Alhoush	South of Gezira	2
3	Wad Elnaeim	South of Gezira	4
4	Wad Sawi	Hassaheisa	2
5	Abd Alrahman	Hassaheisa	4
6	Rahad 44	Umalgora	4
7	Shibairab	South of Gezira	2
Total			**20**

Trial Farm:

No.	Location	Locality	Area Per Feddan
1	Umbarona	Wad Medani	**2.5**

Seed Multiplication Farms:

No.	Location	Locality	Area Per Feddan
1	Rahad 44	Umalgora	4
2	Faris	Hassaheisa	4
3	Beriab/Hadad	South of Gezira	4
4	Wad Elnaeim	South of Gezira	4
5	Wad Alasha	South of Gezira	4
Total			**20**

FMoA Farms:

No.	Locality	Area Per Fed.
1	South of Gezira	500
2	Umalgora	500
3	Hassaheisa	500
4	Wad Medani	300
5	Alkamleen	200
Total		**2000**

Cost:

The total cost of season 2016-2017 is:

5298000 SDG

The Republic of Sudan
Sennar State
Ministry of Agriculture, Animal Resources & Irrigation

Rice Promotion Unit

THE PRESENTAIOM CONTAINS:

--Evaluation.(2015-2016)
--Action plan .(2016-2017)
--Challenges.
--Sustainability.

Background:

Upland Rice (Nerica4) Cultivation in Sennar State started as follow:

- **in 2012** in (2) Location (Maiurno and Kassab) as demonstration farm every site 2.5 fed.

- **In 2013** Rice Promotion Unit was establish and collaboration with JICA and NRDS the total cultivated area increased to 12.5 fed (Demo-Farm) in 5 Location.

- **in 2014** cultivated (5) site as demonstration farm the total area 11.5 fed

-**in 2015** Rice Promotion Unit was selected (3) location (demonstration farm) Almergani , Almahlaj and Maiurno every site 2.5 fed Table shows (demo-farm 2015)

Location Of Demonstration – Farm Season 2012

Table(1)

Location	Area/Fed	Sowing method	Yield kg/fed
Kassab	2.5	Seed driller	338.14
Maiurno	2.5	Seed driller	476.92

Location Of Demonstration – Farm Season 2013

Table(2)

Location	Area/Fed	Sowing method	Yield kg/fed
Kassab (1)	2.5	Karack	285.71
Kassab (2)	2.5	Karack	233.86
South Maiurno	2.5	Seed driller	416.73
North Wad hashim	2.5	Seed driller	201.50
Almaraffaa	2.5	Seed driller	507.6
Total	12.5		

Locations Of Demonstration – Farm Season 2014

Table(3)

Location	Area/Fed	Sowing method	Yield kg/fed
Kassab (1)	2.5	Seed driller	1344.8
Kassab (2)	2.5	Seed driller	1272.9
Maiurno (1)	2	Seed driller	386.7
Maiurno (2)	2	Seed driller	215.8
Almaraffaa	2.5	Seed driller	683.4
Total	11.5		

Activities:-

1. Capacity Building
2. Organization capacity Building .
3. Data and Information Management .
4. Planning , implementation , monitoring and evaluation for promotion of rice production .
5. Budget preparation .

In the field of capacity building

- **Most of agricultural extension's received training courses (in Egypt, Uganda & Japan) in the fields of:**
  - **Basic and advanced knowledge of upland rice cultivation**
  - **Management of irrigation water**
  - **Weed control**
  - **Post harvest and processing**
  - **Rice variety for Africa**
  - **Appropriate Management of Land and Water –Resources for Sustainable Agriculture**

Bottle neck issues

1. Land Preparation (leveling)
2. Seed purity .
3. Weed control (Herbicide) ..
4. Marketing channel .
5. Harvest time .
6. Machinery and equipment kind and quantity needed .
7. Vehicles very important for follow up.

Seed preparation, sowing & weeding

All the demonstration farms results proved the success of the crop in Sennar state

.

Chisel plow 14/4/2015

Almahlaj Site

Leveling 28/5/2015

Almahlaj Site

ReLeveling 18/6/2015

Almergani Site

Leveling

Maiurno Site, 21-25/6/2015

Pre emergence-Stum Aqua 22/6/2015

Almeragni site

Plotting 28/6/2015

Maiurno Site

Irrigation

First Irrigation Maiurno Site, 4-13/7/2015

ACTIVITY	PLAN DATE	ACTUAL DATE	REASON	PERSON ON CHARGE	Implement er	REMARKS	Problem	Solution	Recommen dations
SECOND IRRIGATI ON	5/7/2015	22-23/7/2015	Rain fall	Faisal	Team	Easy	----------	----------	----------

Maiurno Site

First Irrigation 7/7/2015

Second Irrigation 13/7/2015

Weeding

First weeding 5-6/8/2015

Experts of JICA visit Sennar State 28/ 8/2015

Dr. Hassan Visit Sennar State 30/ 8/2015

Presentation with D.Hassan

31/ 8/2015

Visit Mr.Goto Elmergani Site 9/9/2015

Extensionists visit Demonstration farm Upland Rice in Jazera state 16/9

Urea-second dose

Plan :14/9– Actual : 17/9/2015

Person on charge : HASHIM

Almahlaj Site

14th Irrigation

Plan :1/10– Actual : 2/10/2015

Person on charge **:ABEER**

Almergani Site

Mr. GOTO visited Sennar state 5/10/2015

Heading Stage 8/10/2015

Almergani site

Visiting: mr.Goto to Field Upland Rice Almahlaj 10/10

Mr.Goto Visit Sennar State

10/ 10/2015

Visiting: D.Hassan to Field Upland Rice Almahlaj 11/10/2015

Visiting: Dr.Hassan to Field Upland Rice Almergani 11/10/2015

supervisory mission Visited Sennar state 19/10/2015

supervisory mission Visited Sennar state 19/10/2015

Field day of upland rice-Sennar state 15/11/2015

Field day of upland rice-Sennar state 15/11/2015

Wali of Sennar state & Ambassador of Japan

Field day of upland rice-Sennar state 15/11/2015

Minister of agriculture-sennar state

Ambassador of Japan

Field day of upland rice-Sennar state 15/11/2015

Field day of upland rice-Sennar state 15/11/2015

Word of head of Rice Promotion Unit – Sennar state

Word of minister of agriculture-sennar state

Field day of upland rice-Sennar state 15/11/2015

Word of ambassador of Japan

Field day of upland rice-Sennar state 15/11/2015

Field day of upland rice-Sennar state 15/11/2015

Evaluation 2015-2016

Table(4)

Site	Target yield	Actual yield	%	Reasons
Mauirno	800 Kg/Fed	252.66 kg/fed	31.6%	➢ insufficient budget ➢ lack of agricultural machinery(disc harrow-leveler) ➢ Shortage of water ➢ The impact of termites ➢ Impurity of seeds
Almahlaj	750 kg/fed	308.8 kg/fed	41.2%	➢ Shortage of water ➢ implanting ➢ green hopper & mice ➢ The impact of termites
Almerghani	800 kg/fed	794 kg/fed	99.3%	➢ Off type ➢ weeding

Challenges

The most important challenges and constrains that face production of upland rice in Sennar state are the followings:

- ❖ purity of seeds .
- ❖ Insufficiency in agricultural machines (e.g planter , land leveler , land preparation equipment).
- ❖ Poor access to credit facilities and delays of finance .
- ❖ Lack of effective method on weed control .
- ❖ Marketing
- ❖ Harvest and Post-Harvest

Action plan for rice promotion unit in Sennar state season 2016

- ➢ **current situation analysis : low productivity**
- ➢ **plan strategy : to increase up land rice productivity**
- ➢ **target area : 7.5 feddan**
- ➢ **target yield : 1ton/feddan**
- ➢ **plan location : Sennar irrigated schemes**
- ➢ **target group : farmers of Sennar irrigated schemes**
- ➢ **plan duration : 8months**
- ➢ **starting date : 15th march**
- ➢ **Ending date : 20th October 2016**

Demonstration fields 2016-2017

Table(5)

Site location	Locality	Area /fed	Sowing method
Dar alnaeem	Sennar	2.5	Seed driller
Banut	North Sennar	2.5	Seed driller
Kassab	North Sennar	2.5	Dibbling
Total		7.5	

Operation plan (2016)

Activities	Expected results	Frame time							Person in charge	Implementing agent	Cost (SDG)	Required inputs	Remarks
		2016											
		3	4	5	6	7	8	9	10					
Team selection	Good management									Head team	MOA	Table	Different inputs	Paid by MOA
Site selection	Good field													"
Farmers selection	Good farmers													"
Land preparation	Good growth	15		15										"
sowing	Good irrigation management				20	30								"
Irrigation(1-14)	Good growth				25			10						"
Weed control	Weed control					3		30						"
Fertilization	Good growth	20					15							By JICA
Harvesting	High yield							25	20					By MOA
Extensionest training	Capacity building	15		15		5	20			JICA	JICA			By JICA

Thank you very much
Domo Arigato Gozaimasu
ولكم جزيل الشكر

بسم الله الرحمن الرحيم

MINISTRY OF AGRICULTURE, FORESTS AND IRRIGATION

GEDARIF STATE

RICE PROMOTION UNIT

UPLAND RICE CULTIVATION PLAN SEASON 2016

UPLAND RICE CULTIVATION PLAN SEASON 2016

- CURRENT SITUATION ANALYSIS:
  - Total cultivated area for 2015 season was (8) feddans.
  - 4 Feddans grown by tow Farmers in Rahad Scheme.
  - 2 Feddans by the ARC-Alfao farm, and
  - 2 Feddans by the Ministry of Agriculture at Elshoak farm.

TABLE 1: RESULTS OF TARGET AND OBTAIND YELD FOR THE DIFFEREN FARMS

Field and farmer	Area (feddan)	Target yield (tons/feddan)	Obtained yield (Tons/feddan)	% from target
Alarabi farm	2	1.25	1.678	134
Gadain farm	2	1.25	0.442	035
ARC Farm	2	1.25	0.793	063
Elshoak farm	2	1.25	0.326	026

PROBLEMS OF SEASON 2015

- **Poor Land Leveling And Poor Seedbed Preparation.**
- **Irrigation Constraints In Rahad Scheme (Gadain And Arc Farms).**
- **Infestation Of Termites (Gadain, ARC and Elshoak farms).**
- **Poor Weed Control**
  - **Improper And Expensive Hand Weeding**
  - **Lack Of Herbicides (No Recommended Herbicides For Rice).**
- **Appearance Of Off Types Due To Uncertified Seeds (affected the quality of the produce).**
- **Delayed Harvesting Due To Lack Of Combine Harvester**
  - **This Lead To Harvest Losses**

THE PLAN STRATEGY FOR SEASON 2016

- **Securing Good Seeds (Pure).**
- **Good Land Preparation, Seedbed And Leveling.**
- **Selection Of New Farmers at good sites to avoid irrigation constraints.**
- **Improving The Follow Up And Extension Work.**
- **Solving Weed Control, Irrigation and Harvesting Constraints.**
- **Encouraging The Private Sector For participation In Rice Development Program.**

THE OBJECTIVES OF SEASON 2016 PLAN

- Attaining a minimum of 1.35 tons/feddan for all farms.
- Strengthen the technology transfer means.
- Involvement of more farmers in the field days.
- Harvesting and milling of rice with recommended machinery and at the optimum time.

Summing up

TARGET AREA	8 FEDDANS
TARGET YIELD	1.35 TONS/ FEDDAN
TARGET GROUPS	FARMERS OF RAHAD SCHEME IN GEDARIF STATE
DURATION OF THE PLAN	9 MONTHS
STARTING DATE	1ST OF APRIL 2016
END DATE	30 OF DECEMBER 2016

THANK YOU

Rice Production unit River Nile State

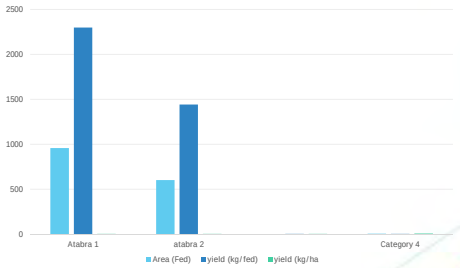
Demonstration farms season 2015

NO.	Location	Locality	Area per Fed.
1	Food security Project	Atabra 1	1
2	Food security Project	Atabra 2	1
	Total		2

Yield Results of Demonstration farms in River Nile State

Site	Area (Fed)	Target yield 2015 (kg/fed.)	Yield (whole area) (kg/Fed)
Atabra 1	1	1000	957
Atabra 2	1	650	600

Yield Results 2015



Problems of last seasons

1. Water management ,
2. Weeds control
3. Damage of birds
4. mixed seed
5. late harvest
6. lack of transportation means for extension workers
7. we face many problem shortage of budget

Plan of season 2016

Plan Objectives:
Target Area: 6 Feddan in 3 site
Target Yield: 1 ten /feddan
Plan Location Some Agricultural Project in River Nile State

Target Group Farmers
Plan Duration nine month
Starting Date.15/march
Ending Date.20/november

plan of operation▶

Activities	Expected Result	Implementation Date	Exetiosionist on Charge	Implementer Agent	Inputs	Cost
Team Selection	More following		salih	RPU+TTAE		
Site Selection	Good Way good soil	1/4/2016	team	RPU	car	
Farmer Selection	technology application	1/4/2016	team	RPU	car	
Pre watering		10/6/2016				
Land Preparation:			team	RPU+AED		
1- plowing	to breaking soil	25/6/2016	team	RPU+AED	Tractor +desk plow	120
2- harrowing	Good growth	5/7/2016	team	RPU+AED	tractor +desk harrow	120
3- leveling	Good irrigation management	10/72016	team	RPU+AED	Tractor +scraper	250
adding (TSP)	good growth	5/7/2016	team	RPU	(50 kg)TSP	300
Sowing	good plant density	15/7/2016	team	RPU+AED	tractor +Seeds + Seed Driller	100
Plotting	Good irrigation management	16/7/2016	team	RPU+AED	Tractor+Plotton	70
Application of pre-herbicides:	Weed control	16/7/2016	team	RPU	Herbicides 1.5L	1000
First irrigation	Good growth	16/7/2016	team	Farmer	water	50
Re-sowing	good plant density	26/7/2016	team	RPU	seeds	100
Manual weeding	Weed control	5-6/8,28-29/8,19-20/9	team	Farmer	Hand tools	500
Fertilization	good growth	7/8-30/8 21/9/2016	Hussin-Fatima-Malik-yassir	RPU	Urea (150)kg	600
Covering by net	birds control	12/10/2016	team	RPU	net+pipe+ Hand tools	900
Field day	Know new farmers at upland rice	19/9/2016	team	RPU		10000
Roughing	Pure seeds	16/9-16/10/2016	team	RPU	By hand	
samplingyield	Yield estimation	29/10	team	RPU	Squire Meter + Sickles	
Stop irrigation	Prepare to harvesting	25/10	team	Farmer		
Harvesting	High yield	6/11/2016	team	RPU+AED	and tools+threshing machine	1000
Extensionist Training	More know technology application		team	JICA		
Irrigation	Good growth		team	Farmer	Hand tools	500
Cost				15610		

Cost for 6 feddans

NO.	Input	COST
1	Production input	32940
2	Field day	10000
3	transportation	36000
4	motivations	11200
	total	90140

Northern State

The ministry of agriculture animal Resources. Fisheries and Irrigation

Upland Rice production Unit

Season 2015

Introduction :

Upland rice has been grown in northern state since 2012 as demonstration farms and the performance of upland rice four years ago showed that a high potential of upland rice cultivation under northern state condition.

Season 2015 :

In season 2015 we implemented two demonstration farms in different locations one of them in Dongola Island which is classificated as first class soil (high fertile soil).

The second location in Alzawrat about 10 km north of Dongola city but soil classification is different from Dongola island site classificated as second class soil

land preparation :

Land preparation is one of the most important Operations in upland rice field specially leveling and we have been suffering from leveling operation since 2013 .

Weed control :

weed control is the biggest problem in upland rice field condition specially narrow leave weeds .

Alzawrat demonstration farm :

(broad leaves)

Dongola island demonstration farm :

Dongola Island soil is classificated as first class soil it is too fertile soil but the problem is weed control specially narrow leave weeds .

(narrow leaves)

Dongola island demonstration farm :

Alzawrat demonstration farm :

the effect of 2.4D :

2.4D is more effective on broad leave weeds .

Technology transfer :

R.P.U has been transferring upland rice cultivation techniques to farmers since 2012 through the media .

Evaluation team :

The evaluation team visited northern state 21 of October 2015 .

crop-cutting :

Four samples were taken from every site .

Harvesting :

Dongola island demonstration farm :

Harvesting :

Alzawrat demonstration farm :

post harvest :

R.P.U already has started post harvest processing but unfortunately the mousier content decreased to 10% .

Area :

Item	Area/fed		Remark
	plan	Actual	
Demo site	(3)	(2)	Due to too late sowing date which is overlapping with faba bean crop and farmer preferred to grow faba bean on optimum time and it was too late to look for another site that why R.P.U canceled the third site .

Yield :

field	Yield plan	Yield Achieved	Remark
Alzawrat site	(1)ton/fed	1.017tons/fed	- Good leveling and plotting . - No narrow leave weeds . - Good farmer selection . - Good water management . - No bird attack .
Dongola Island site	(1)ton/fed	818.6kg/fed	- bad leveling and plotting . - High competition of narrow leave weeds . - lazy farmer selection . - bad water management . - Total area less than(1)fed .

Problems :

- Budget (no budget on time) .
- Leveling .
- Weed control .
- Water management .
- Harvesting .

there is no combine harvester for rice to harvest rice on time at the optimum mousier content.

Recommendations :

- Budget for rice on time .
- Good Leveling .
- Pure seed .
- Pre-watering .
- Herbicide for narrow leaves weed
- Good Water management .
- combine harvester for rice .

Thank you

have

Anice rice

Northern State

The ministry of agriculture
animal Resources.
Fisheries and Irrigation

Upland Rice production Unit

The action plan season 2016

The Action Plan

Plan Title:

action plan for upland rice season 2016

- Introduction: upland rice has been grown in northern state since 2012 .
  in different locations and we achieved 1.017 ton/fed . In season 2015 .
- Location: northern state .
- Target Group: farmers .

- General Objectives:

- To develop and promote upland rice cultivation in northern state .
- Self-sufficiency and exporting .

Specific objectives :

- To cultivate (50) feddans as seed production to expand in 2017& (7) demonstration farm .
- To achieve 1.2 ton/ fed .
- Plan Duration: 8 months
- Starting Date: 30/4/2016
- Finishing Date: 30/12/2016

Analysis of current Situation

A :

- lack of budget on time .
- lack of extensionists .
- mixed seed . (off type)
- lack of car and motorcycles .
- lack of narrow leaves herbicide for weed control specially in island site .

Analysis of current Situation

B :

- summer is dead season in northern state .(availability of land).
- high potential of upland rice Cultivation (2.5 ton/fed).

Operation Plan

Activity	Expect Result	Duration	Start	Finish	Person on Charge	Implementer Agent	Inputs	Cost	Remark
Site selection	Good Location	7 Days	30/4	6/5	Alla Eldeen	Rice unit	----------	------	Rice unit
Seed preparation	Decrease off type	15 days	15/5	30/5	Fowzy	Rice unit	----------	------	Rice unit
Pre-watering	Weed control	7 days	7/5	14/5					
Primary tillage	Depth plow	3 Days	28/5	31/5	mandur	Northern co.	----------	200 SDG	M.OF. A
Super phosphate Application	Strong root system	3 days	21/6	23/6	Isam	Rice unit	Fertilizer	250 SDG	M.OF. A

Activity	Expect Result	Duration	Start	Finish	Person on Charge	Implementer Agent	Inputs	Cost	Remark
Secondary tillage	Soil softing	3 Days	24/6	26/6	Safwat	Northern co.	Seeds	100 SDG	M.OF. A
Leveling	Good seed bed	3 Days	27/6	29/6	Mohamed	Northern co.	----------	200 SDG	M.OF. A
Sowing	Good Distribution	3 Days	30/6	2/7	Mohamed	Northern co.	----------	100 SDG	M.OF. A
Plotting & Herbicide Application	Decrease Weeds	7 Days	3/7	9/7	Isam	Rice unit	Herbicide	------	Jica
First irrigation	Good germination	5 Days	10/7	15/7	Mandur	Farmer	Irrigation	110	M.OF. A

Activity	Expect Result	Duration	Start	Finish	Person on Charge	Implementer Agent	Inputs	Cost	Remark
Re-sowing	Good density plant	3 Days	20/7	21/7	fowzy	Farmer	----------	------	Rice unit
First Manual weeding	Decrease Competition	5 Days	30/7	4/8	Isam	Labors	----------	500 SDG	M.OF. A
First dose Of urea	Healthy plant	3 Days	5/8	7/8		Farmer	Fertilizer	------	M.OF. A
First dose of micro mix	Decrease Zinc deficiency	2 Days	11/8	12/8	fowzy	Farmer	Fertilizer	------	M.OF. A
Second manual weeding	Decrease Competition	5 Days	19/8	23/8	Isam	Labors		500 SDG	M.OF. A
Second dose of urea	Healthy plant	3 Days	24/8	26/8	fowzy	Farmer	Fertilizer	250 SDG	M.OF. A

Activity	Expect Result	Duration	Start	Finish	Person on Charge	Implementer Agent	Inputs	Cost	Remark
second dose of micro mix	Decrease Zinc deficiency	2 Days	30/8	1/9	Fowzy	Farmer	Fertilizer	------	M.OF. A
Third manual weeding	Decrease weeds	5 Days	7/9	11/9	Isam	Labors	----------	500 SDG	M.OF. A
Fourth manual weeding	No weeds	5 Days	21/9	25/9	Isam	Labors	----------	500 SDG	M.OF. A
Rouging	Pure seed	15 Days	26/9	10/10	fowzy	Extensionists	----------	------	Rice unit

Activity	Expect Result	Duration	Start	Finish	Person on Charge	Implementer Agent	Inputs	Cost	Remark
Irrigation (second – final)	High yield	90 Days	15/7	15/10	Mandur	Farmer	----------	3190 SDG	M.OF. A
Harvesting (cutting)	Decrease Losses	7 Days	25/10	31/10	Safwat	labors	----------	1500 SDG	M.OF. A
Threshing	Decrease Losses	3 Days	10/11	12/11	Safwat	Northern co.	----------	750 SDG	M.OF. A
Post harvest	Final product	Days	13/11	30/12	Mandur	Rice unit	----------	Total 8650	Rice unit

White Nile State
Ministry of Agriculture Irrigation and Forestry
Rice Unit Production

- ❖Current Situation-2015
- ❖Action Plan-2016

1

Current Situation:-

Up land Rice 2015

1. **Plan Strategic Objectives 2015:-**
   Agriculture Revival Achievement
2. **Periodical Objectives:**

- ❖ Food Security
- ❖ Increasing of National Income
- ❖ Introducing Up land Rice in irrigated Schemes& Private Sector

2

Targeted Technology

- **Using Pure Seeds**
- **Good Land Preparation**
- **Sowing at optimum time**
- **Appropriate irrigation**
- **Inputs Adding**
- **Harvesting**
- **Post harvest Techno**

3

ACTION PLAN 2015

- ❖Target Area : 4 Fadden
- ❖Cultivated Area : 4 Fadden
- ❖Harvested Area: 2.5 Fadden

Site	Area	Productive area	Target Yield	Yield(whole area)	Average/fed	Remarks
Fardos 1	2 fed	1.5 fed	1 Ton	1219 keg	813.7 keg	1/2 Fed attacked by birds
Fardos 2	2 fed	1 Fed	1 Ton	833 keg	833 keg	1 fed attacked by birds
Total/Ave	4 fed	2.5 fed	1 Ton	2052 keg	820.8 keg	

4

Good Land Preparation

Vegetative Growth Stage

Reproductive Stage

Maturity Stage

8

Factor Leads to low production:-

- 1.5 fed Un productive.
- Many empty panicles.
- Late Harvest (1-month).
- Manual harvest(cutting-gathering-thrashing).
- Over drying of the crop(weight) Total/Ave, 49 keg.
- Mousier contend at harvest 9.9 dg (Reco 17-20).

9

Proposal Action Plan- Rice Unite 2016-2017

crop	Duration	Starting	Finishing	Target Area	Target Yield	Target Farmers	Implementer	Finance
Upland Rice	7 month	15/6	15/12	4 fed	1.Ton	4	Rice Unit	MOA

Expansion Area

No	Sector	Target Area	Target Schemes	Duration	Implementer	Finance
1	Pilot schemes	150 Fadden	Irrigated Schemes	April 2016-2017	Rice unit	MoA+NRP
2	Private Sector	50 fadden	- Small Pumps - Metra	March 2016-2017	Rice unit	Farmers

10

Aciosiated Activities

Activity	Numbers	Implementer	Beneficiaries
Meetings	2	Rice Unit	15 Farmers
Field days	2	Rice Unit	125 Farmers
Farm Schools	4	– Rice Unit Subject matter specialist	25 Farmers

11

Obstructs:

- Using Pure Seeds
- Permanent Source of water
- Cultivating Rice after Legumes
- Pre-watering Improving
- Leveling Improving
- Using Seed drill
- Adding Post emergence Herbicide
- Using Combine Harvest Harvester
- Harvesting at Optimum Humidity

12

Participation

13

Rice Unit Members Participation

14

Pure Seeds Selection

15

Challenges

16

The Main Challenges:-

- Un availability of Combine Harvester
- Operation Budget (timelly&quantity)
- Pure Seeds of Nerica 4
- Post Harvest Equipments (limited&ordenary)

17

Thanks

18

Further Development for Upland Rice Production

Workshop

January 19, 2016

Grand Holiday Villa

Osamu Nakagaki

(JICA-Chief Advisor for Capacity Building Project for the Implementation of The Executive Programme for the Agricultural Revival)

Federal Ministry of Agriculture & Irrigation

Japan International Cooperation Agency (JICA)

1. Gigantic Breakthrough POLITICAL Decision Has Come for Rice Production

RICE has been strategic crop

2nd to wheat (in the documents)

Now it has become reality

With Implementation

2. New Cultivation Plan (Good &Big Challenges)

Fed. MoAF's Plan in 2016

Upland Rice Cultivation

In Large Scale

XXXX feddans in Gezira State

Where are these Pure Seeds from ?

From Gezira Sates (From The Project & N.R.P.)

3. What have been some critical issues ?

1), Little experiences and knowledges

2), Wheat has introduced earlier in 1959

3), People allured by bread

4), Bread eating habit surpassed Sorghum

5), Bread consumption expanded but domestic Wheat has not expanding as expected

4. Any Alternative ?

6), Rice Produced in Egypt (Productivity is world No.1)

7), Now 10 t /ha in Egypt ,

8), **Egypt in 1985 less than 5t/ha , in 2000 reached 10t/ha** ⇩ JICA

Japan in 1860 2.5t/ha---in 1960 5t/ha

9), In **Sudan** Rice can grow

10t/ha---Experiment 8t/ha---Farmer's Field

10), Why not go into rice production ?

5. Knowledge and experience can be acquired

1), Natural environment provide possible condition

2), Only depending on people's decision

3), Now Government decision is here

4), Farmers and all other stakeholders should be aware

5), Next Step is to take action

6), Only action and implementation can lead to fruits

6. Issues with respects to Implementation

1), Stages of overall planning (in the beginning)

2), **NRDS(National Rice Development Strategy in 2012)**

3), **NRDS need to be revised**

4), Rice Production plan is advised to be prepared based on previous experience (Facts &Records are vital)

5), PDCA (Plan-Do-Check and Action cycle) is important

6),Monitoring activities are strongly advised (PDCA)

7. Some points for NRDS Revision

1), Target production & some other figures set in 2011

2), These figures should be more realistic & to be updated

Table(1), Domestic Rice area, Productivity and production, 1995- 2009

Table (2), Rice domestic Demand projection (figure 2018 is proper or to be revised)

Table(3), T Gross Margin of rice, Groundnut and Sorghum

7. Some points for NRDS Revision

Continuation:

Table(4), remain unchanged

Table(5), Price of Rice in Different Points of Distribution channel (to be revised according to survey)

Table(6), Target Area in rice Development Plan (To be revised)

Table(7), Tentative Target Yield of rice ecosystems (to be revised)

7. Some points for NRDS Revision

Continuation:

Table(8), Estimated Rice Production of the rice ecosystems (tons) 2011-2018 (to be revised based on current plan)

Table(9), Capacity Building Program for Ministry of Agriculture, White Nile State (2011-2015) (delete, if this category is necessary, should be stated from the view point of covering overall country)

7. Some points for NRDS Revision

Continuation:

Table (10), Capacity Building Program proposed by Agricultural research Corporation(ARC) for the period 2011-2015 (to be revised according to necessity and plan)

7. Some points for NRDS Revision

1), Revision should be made with respects to 6, Table of Contents STRATEGY FOR SUB-SECTOR

The contents of this; from 6.1-6.9 are generally correct except 6.9.2 (page 34), however, through Sudan Rice Sector Development Forum, 8 Bottlenecks Issues of Rice Production (Refer: News Letter ; Hand-Out) are categorized. It is strongly advised to put these Bottlenecks issues in this, between 6.1 and 6.2.

7. Some points for NRDS Revision

2), Revision of 6.9.2.: Institutional Arrangement

Institutional arrangement is very important element for rice sector development

Figure 1; Institutional Development of Rice Development should be revised based on the current development of rice production and its policy. (In current Figure 1; NRDS Steering Committee is stated; Forum for Rice Sector Development, NATIONAL RICE COUNCIL

8. Some Notes for Further Upland Rice Development

No.1 **Continuous Effort** (concerned parties)

Government Policy (Federal & States Level)

Coordination: Fed MoAF & State's MoA

Financial Support

Organizational Framework (Stated No.2)

* **Rice Production Unit (at State level)**

Post-harvest Issues (& marketing)

8. Some Notes for Further Upland Rice Development

No.2 **Systematic Approach** (Gov, arrangement)

NRDS (National Rice Development Strategy)

National Rice Council (Need to activate)

ARC (Agriculture Corporation)

NRP (National Rice Project)

Extension System ? (ARC---Extension)

* **Egypt Case: Research & Extension; 500 demo sites**

8. Some Notes for Further Upland Rice Development

No.3 **3 Points (Ladder of Development Process)**

Political Will (shown)

Administrative Leadership

Coordination & Collaboration on the Ground

* **Farmers, Extensionists, Experts**

* Based on Daily Observation &Records

8. Some Notes for Further Upland Rice Development

No.4 **3 Stages of Development for Upland Rice**

1st Stage: Introductory (Plant Nature, Secure Pure Good Seeds Get knowledge & Experience Training etc.)

2nd Stage: Expansion (Amount of Pure Seed, Area, Post Harvest–milling, Research & Extension)

3rd Stage: Stable (Any Farmer Grow, Market)

8. Some Notes for Further Upland Rice Development

No.5 Outstanding Technical Points

1), Seed Purity : 30kg/ha

About 1 Million Seeds / fed.

99% Purity --- 10000 Off-types/fed.

99,9% Purity --- 1000 Off-types/fed.

99,99% Purity --- 100 Off-types/fed.

99,999% Purity --- 10 Off-types/fed.

99,9999% Purity --- 1 Off-type/fed.

8. Some Notes for Further Upland Rice Development

2), Land Preparation

How to make real leveling

Machinery issues (Heavy, Timing etc.)

Operator Skill

* Point of No return (No rectification, No remedy)

8. Some Notes for Further Upland Rice Development

3), Area of Planting & Target Yields Recommendation

2fed --- Get 2tons/fed = 4 tons

Less inputs (less money) & less work

Easier Work, Get higher yield

4fed --- Get 1 ton/fed = 4tons

More Inputs (more money) & More Work

8. Some Notes for Further Upland Rice Development

4), Proper Seed Drilling

Time of Seed Drilling, Distance of Drilling

Depth of Seed (less than 5cm, 2～3 cm)

Operation of Additional Seeding :Missing Hills

* Avoid too many seeds (Water &Nutrients Competition)

* Re-sowing After 7～10 days of 1st Sowing

8. Some Notes for Further Upland Rice Development

6), Weed Control

* Weed Control is Decisive Factor of Yield

Proper Herbicides and Hand Weeding (Tools)

No Weed before Booting Stage

Manual weeding

- Recommended by 1 day – 2 fed (for exp. 20-personnel X 1 day)
- Not-recommended by some days – 2 fed (for exp. 5-personnel X 4 Days)

8. Some Notes for Further Upland Rice Development

7), Harvesting Time

* Harvesting Time --- Decisive on Rice Grain Quality

Best Harvest Time --- Moisture 25%

(less than 20% causes a lot of grain cracking; milling)

Paddy Color Identification --- 80% become Yellowish

8. Some Notes for Further Upland Rice Development

8), **Post–Harvest (Milling)**

Milling method and system yet to be developed while expanding cultivation area. It is closely related with Marketing.

8. Some Notes for Further Upland Rice Development

9. Private Sector Investment on Upland Rice

How to cope with their interest.

10. Foreign Government Interest for Investment on Upland Rice.

How to cope with these investment.

8. Some Notes for Further Upland Rice Development

11. Sudan &World Production of Rice and Trade

	Production	Trade
Sudan	23000t～25000t(?)	Import 50000t(?) About 25 Million USD
World	About 600 millon t (470～480 m t)	41～42 million t

Source: USDA, etc.

Import: China 3.4～3.7 millon t Nigeria 2.5～3.5 million t
Philippines 1.7～2 million t
GCC Area; more than 1 million t
(Saudi:1.3 mt, Iraq:1.4 mt, Iran:1.7mt, etc.)

8. Some Notes for Further Upland Rice Development

12. Let Us Take Concrete Measures for Developing New Horizon of Rice Domain

別添18

MINUTES OF THE MEETING
11th JOINT COORDINATING COMMITTEE MEETING
BETWEEN
MINISTRY OF AGRICULTURE & IRRIGATION
AND
THE PROJECT TEAM
FOR THE CAPACITY BUILDING PROJECT FOR THE IMPLEMENTATION OF THE EXECUTIVE PROGRAMME FOR AGRICULTURAL REVIVAL

11th Joint Coordinating Committee (hereinafter referred to as "JCC") Meeting was held on 27 October 2015 hosted by the Ministry of Agriculture and Forestry (Hereinafter referred to as "MoAF") and the Project Team for "Capacity Building Project for the Implementation of the Executive Programme for Agricultural Revival" (hereinafter referred to as "the Project") at the meeting hall in MoAF. The major topics were progress of the Project activities in the first half of the Project Year 6, plan for the second half of Year 6, Report on terminal evaluation and outstanding issues. As a result of the discussion, JCC members had a mutual understanding on these topics.

Khartoum, Sudan, 27 October 2015

Ms. Igbal Abdel Elmagid
Acting Director General
International Cooperation Directorate
Ministry of Agriculture & Forestry
Republic of the Sudan

Mr. Osamu Nakagaki
Chief Advisor
Capacity Building Project for the
Implementation of the Executive
Programme for the Agricultural Revival

witnessed by

Mr. Shigeru Otake
Senior Representative
Sudan Office
Japan International Cooperation Agency

ATTACHMENT

Introduction

The chairman, Ms. Igbal Abdel Elmagid (Acting Director General, International Cooperation Directorate, MoAF), welcomed all participants and opened the 11th JCC meeting. After the members introduced themselves, Ms. Igbal explained the agenda of the meeting. The Project started the presentation of the progress of the Project Activity as follows:

1. Progress of the Project Activities from April to September 2015

1.1 Field Trial and Post-Harvest

Mr. Takamasa Ando (Rice Cultivation Expert of the Project) presented the 3 field trials such as Seed Rate x Plant Spacing Trial (Two-factor experiment), Nitrogen Source Trial and Organic Fertilizer Trial (Nitrogen). He explained the objective of 3 trials and contents of treatment. He also presented expected results of 3 trials.

With regard to the activity of post-harvest processing, Mr. Ando requested the MoA to install power unit to run rice milling unit because it haven't been installed yet at 10 locations in 6 states.

1.2 Cooperation with ARC Research Activity

Prof. Ahmed Abdelgadir Elsiddig (National Rice Research Coordinator, ARC, MoAF) explained what trials ARC conducts in 2015.

After his presentation, Mr. Akio Goto (Deputy Chief Advisor / Rice Cultivation Expert of the Project) presented the ceremony of handing over equipment to ARC and the activity of Dr. Ryoichi Ikeda (Expert of the Project on Cultivation Environment Analysis / Weed Control). He visited 3 ARC stations (Rahad, Kosti and Medani [HQ]) and discussed with researchers. He also conducted a lecture on rice in the ARC HQ for researchers.

1.3 Training for Extensionists in Country and Abroad

Mr. Takeshi Matsuda (Project Coordinator / Monitoring and Evaluation of Upland Rice Cultivation) presented training activity for extensionists.

<Training in Sudan>

Japanese experts conducted OJT for extensionists in the cultivation field, for example OJT on field preparation in May. The Project also invited Mr. Tsuboi from Uganda to give technical advice to extensionists and to follow up trainees in Uganda.

<Training in Uganda>

The Project conducted 1 advanced course for 12 extensionists for 12 days from 13 to 24 June 2015.

<Training in Egypt>

The Project conducted 3 courses on weed control (13 participants), water management (15 participants) and post-harvest technology (8 participants) from 22 August to 5 September. In addition, Observation Programme for High Officials (9 participants) and Technical Exchange for ARC researchers (8 participants) were carried out. High Officials deepened the understanding of rice cultivation and rice promotion activities in Egypt and researchers exchanged views with Egyptian rice researchers. It is expected to develop rice sector in Sudan through these programmes.

<Training in Japan>

The Project provided 7 courses for 8 participants from MoA in 2015.

In the end, Mr. Matsuda stressed the importance of application of skills and knowledge which participants gained, in their work place.

1.4 - Demonstration Farms

Mr. Ando presented the activity of demonstration farms in Gezira State (11 sites, 31 feddans) with pictures and explanation of important technical points. After Gezira State, Mr. Goto presented the activity in other 5 states (14 sites, 24.5 feddans). He showed actual conditions of all sites with pictures and explained problems which they faced, such as non-uniform growth, inappropriate irrigation management, too much seed rate, observation off-type, etc.

1.5 - Monitoring & Evaluation

Dr. Hassan Ali Elobied (National Consultant of the Project) explained the purpose of the system of Monitoring & Evaluation. There are 3 targets (Performance of team leader, extensionists and farmer) to monitor. The summary of monitoring activities was shown and the observations by monitoring activity were presented.

After his presentation, Mr. Goto explained the progress of revising the handbook on Upland Rice Cultivation and indicators to evaluate the progress of Output 2.
[The contents of their presentation is as per the attached as appendix III.]

2. Plan of the Project Activities in 2015

Mr. Goto explained the plan of the latter half of the FY2015. Field day would be conducted in Gedaref, Gezira and Sennar State. Post-harvest activity would be assisted by Mr. Osamu Tokumoto (Post-harvest Processing Expert). The Project would hold a workshop to summarize this year's activity and next year planning.

After the presentation from the Project finished, JCC members had an open discussion about the progress and the plan.

Mr. Mohamed Ali Salama (National Wheat Project, Northern State) made a comment on trial activity by JICA and ARC;
These results of trials should be utilized in a combined manner. Two efforts should be well coordinated and be integrated in the future.

Prof. Ahmed (ARC) replied this comment;
ARC started cooperation with JICA Project 2 years ago. That's why the Project did their trials by themselves. ARC appreciates JICA's trial.

Mr. Osamu Nakagaki (Chief Advisor of the Project) added the comment of Prof. Ahmed;
ARC was involved in the Project activity at later stage of the Project. Achievement by the Project will be released as a Handbook. In the future, ARC will use the Handbook. Both sides should be combined. JICA and ARC will not work independently from each other.

Ms. Igbal (Chairperson, Acting DG, IC, MoAF) made a comment on this topic;
Upland rice is new crop in Sudan. Achievement done by JICA is highly appreciated. ARC and JICA will be integrated to enlarge rice development. In future, ARC and JICA go together and this handbook will be accepted by the Ministry of Agriculture and to use for rice development in Sudan.

Mr. Gamal Abdel Latif (Head of Rice Promotion Unit, Sennar SMoA) made a comment on the monitoring system;
Sennar SMoA appreciates the monitoring system. We are improving upland rice cultivation step by step. We need monitoring evaluation system more in the field.

Ms. Nafisa Noah Mohamed (DG, Gedaref SMoA) made a comment on ARC research;
ARC research is done in certain state. Applied research for future is hoped to do in other states, too.

Dr. Saifaldean Hassan Aboud (DG, Gezira SMoA) made a comment;
Gezira SMoA appreciates JICA's effort to introduce this strategic crop (upland rice). Gezira state has gained benefit so much. It is chance now to promote upland rice in Gezira and other state. To use this strategic crop, Gezira has land and capable farmers. It is sure that Gezira State is ready to continue and sustain this activity. We have knowledge and trained extensionists.

3. Report on Terminal Evaluation

Mr. Mitsuo Nishiya (Joint Terminal Evaluation Team member, NTC International Corp) started their presentation of the report of Joint Terminal Evaluation. Firstly, he explained the objective of the Terminal Evaluation, evaluation activities and inputs. After that he showed the confirmation of achievement of Output and Project Purpose. Joint Terminal Evaluation Team expected that all indicators would be satisfied by the end of Project. He also explained the evaluation by 5 criteria (Relevance: High, Effectiveness: High, Efficiency: Relatively High, Impact: Positive, Sustainability: Moderate).
Mr. Masahiro Shiomi (Joint Terminal Evaluation Team member, Project Formulation Advisor, JICA Sudan Office) explained the reason why the team evaluated the Sustainability as Moderate. After that, he showed the Recommendations by the end of the Project period, the ones for sustainability and the ones for further rice promotion.
[The contents of their presentation is as per the attached as appendix III.]

After the presentation by JICA, JCC members had an open discussion about the report on Terminal Evaluation.

Ms. Igbal made a comment on their recommendation about Technical Handbook distribution;
To use Technical Handbook, an approval by Technology Committee is not necessary. In Sudan, we don't have enough information of rice. This handbook is appreciated and accepted by Ministry of Agriculture.

Mr. Shiomi replied;
Our understanding is different. DG of IC (Dr. Adel) confirmed that the approval is necessary. It will be very hard for JICA to work in Sudan under such conditions.

Prof. Ahmed replied;
Agricultural research on upland rice will be conducted by ARC. However, the Handbook can be used by farmers without any approval by Technology Committee. There is no regulation to stop it in Sudan.

Ms. Igbal added to Prof. Ahmed;
This is not a big problem. The Handbook can be used by farmers.

Dr. Saifaldean added to Ms. Igbal;
Gezira SMoA will use the Handbook to farmers. We look for more cooperation with JICA. We are fully engaged in this upland rice promotion activity.

Ms. Igbal added to Dr. Saifaldean;
Cooperation with JICA is highly appreciated. This is genuine cooperation.

Mr. Shiomi replied to Sudanese side;
Please discuss with DG of IC. He didn't say "the approval is not necessary. This is not a small problem. It is a big issue for JICA. JICA cannot continue further technical cooperation with Sudan if the technology produced by the Project needs to go through such approval process.

Mr. Kozo Ito (Senior Assistant Director, JICA HQ) added to Mr. Shiomi;
There is a big issue behind the Handbook. Technology transfer has done day by day by the Project. The Project trained extensionists and sent extensionists to training in other countries. Those things will not be utilized by Technology Committee. This is JICA's understandings. All JICA's cooperation should be technology transfer. This is purely MoA's internal matter. Official response is waited to JICA Sudan Office or to Japanese Embassy. I already reported to JICA HQ the cancellation of consideration of new project.

Mr. Ibrahim Hassan Abuzied (DG, Technology Transfer and Extension Administration, MoAF) replied;
In Sudan, we can use the technique without approval by Technology Committee. Technology Committee is concerned only with ARC scientific aspect (research result).

Mr. Ito replied to Sudanese side;
We are waiting for your response.

Dr. Saifaldean made a comnent;
We cannot wait the approval by Technology committee. Gezira SMoA has been using and will use the Handbook by the extensionists and farmers.

Mr. Hussain Abdella Elsharif (Joint Terminal Evaluation Team member, Bilateral Cooperation, IC, MoAF) made a comment;
As a Joint Terminal Evaluation Team, we didn't agree to the idea of "distribution of the Handbook to farmers". But there is no limitation to use handbook in the field by extensionists and farmers.

Mr. Shiomi replied to Mr. Hussain;
In the Joint Terminal Evaluation Report, it is written only to extensionist and ARC. It is different from the conclusion of the report. It will be regulated since the Evaluation Report is signed by DG of IC (Dr. Adel).

Mr. Nakagaki replied to Mr. Shiomi;
From the beginning of the Project until now, there has not been any disturbance whatsoever to use our technique at all.

Dr. Hassan proposed the members of JCC;

To solve this issue, MoA will issue the official letter to JICA, which mentioned to accept the technology developed by the Project and to use it.

Ms. Igbal replied to Dr. Hassan;
This JCC meeting agreed to use handbook for farmers without approval by Technology Committee. MoA will issue official letter to JICA.

Mr. Shiomi added to Ms. Igbal;
In the letter, every technology made by JICA should be accepted.

4. Outstanding Issues

There are 2 outstanding issues which the Project raised such as 1) Coordination between Federal MoAF (NRP) & State MoAs, and 2) Development of Upland Rice (Activity on National Rice Council, etc.).

Mr. Nakagaki explained each issue;
Nation Rice Project (NRP) is not properly managed. It is important for good sustainability. Federal MoAF should consider this.
National Rice council is not moving yet. Federal MoAF should put more care of implementation of this regard.

Mr. Nakagaki raised another issue;
Federal MoAF requested SMoAs to make rice development plan and 6 SMoAs provided 1 year plan and 5 year plan. Then Federal MoAF was allocated budget from Ministry of Finance. However no support from Federal MoAF for rice development, no allocation budget to 6 States. Federal Minister and Undersecretary promised but no implementation.

After Mr. Nakagaki raised 3 issues, JCC members had an open discussion.

Ms. Igbal made a comment on the issue of no allocation budget;
The reason of no allocation to states will be clarified. This is the issue of coordination between Federal and States. International Cooperation Directorate will mobilize the coordination.

Dr. Hassan added to Ms. Igbal;
Federal MoAF was allocated 10 million SDG from Ministry of Finance as budget for rice development.

Dr. Saifaldean made a comment;
There is no budget disbursement from Federal MoAF to Gezira SMoA. Gezira SMoA conducted their activity from their limited own budget.

At the end of the meeting, Ms. Igbal summarized what members discussed;
The official letter regarding the handbook will be issued by Federal MoAF to JICA.
IC will take responsibility of coordination between federal and states.

Recommendations from 11th JCC meeting;
1. The human resource system in the Federal MoAF should be implemented, and the need assessments should be considered.

2. The states should prepare the plan for 2016 in order to capture the national budget preparation.
3. The National Rice Project should be capacitated (Human, physical wise).
4. National Rice Council should be mobilized.
5. Coordination between the Federal and the States should be in place.

APPENDIX

APPENDIX I. List of Participants

APPENDIX II. Agenda

APPENDIX III. Presentation documents

JCC Meeting for
Capacity Building Project
11:00 hrs-27 October, 2015
Meeting Hall, Federal MoAF

NO.	Name	Organization& Position		
1	Ms. Igbal Abdel Elmagid	Acting DG, International Cooperation (IC) Directorate, MoAF		
2	Prof. Ahmed Abdelgadir Elsiddig	National Rice Research Coordinator, ARC, MoAF		
3	Mr. Ibrahim Hassan Abuzied	DG, Technology Transfer and Extension Administration, MoAF		
4	Ms. Fatima Rahma	Director, Bilateral Cooperation, IC, MoAF		
5	Mr. Hussain Abdella Elsharif	Bilateral Cooperation, IC, MoAF		
6	Ms. Salma Yousef Shalawani	DG office, IC, MoAF		
7	Ms. Ibcar Abdu Eljaber	Bilateral Cooperation, IC, MoAF		
8	Dr. Saifaldean Hassan Aboud	DG, Gezira SMoA		
9	Mr. Elfadil Abdel Motalib	Director of Agriculture, Gezira SMoA		
10	Mr. Abd Elmonem Magzoub	Head of rice unit, Gezira SMoA		
11	Ms. Nafisa Noah Mohamed	DG, Gedaref SMoA		
12	Mr. Elhussein Elsafi Ali	Head of rice unit, Gedaref SMoA		
13	Mr. Khalid Saeed Ibrahim	Head of rice unit, White Nile SMoA		
14	Mr. Osman Galal Osman Satti	Head of rice unit, Northern SMoA		
15	Mr. Mohamed Ali Salama	National Wheat Project, Northern SMoA		
16	Mr. Gamal Abdel Latif	Head of rice unit, Sennar SMoA		
17	Mr. Abdelaziz Hassan	Coordinator, Kharoum Office, River Nile SMoA		
18	Ms. Midori Nakata	Embassy of Japan		
19	Mr. Shigeru Otake	Senior Representative, JICA Sudan Office		
20	Mr. Kozo Ito	Senior Assistant Director, JICA HQ		
21	Mr. Mitsuo Nishiya	NTC, International Corp		
22	Mr. Masahiro Shiomi	Project Formulation Advisor, JICA Sudan Office		
23	Mr. Osamu Nakagaki	Chief Advisor, JICA Project		
24	Mr. Akio Goto	Deputy Chief Advisor / Rice Cultivation 1, JICA Project		
25	Mr. Ando Takamasa	Rice Cultivation 2, JICA Project		
26	Mr. Tokumoto Osamu	Rice Harvest & Post-Harvest Processing, JICA Project		
27	Mr. Takeshi Matsuda	Project Coordinator, JICA Project		
28	Dr. Hassan Ali Alobied	National Consultant, JICA Project		
29	Ms. Nadia Mohamed	Administrative Assistance, JICA Project		

11th Joint Coordination Committee (JCC) Meeting

Capacity Building Project for the Implementation of "the Executive Programme for the Agricultural Revival"

AGENDA

Venue: Federal Ministry of Agriculture (Meeting Hall)

11:00 hrs – October 27th, 2015 (Tuesday)

1. **Progress of the Project Activity from April to September 2015**

   1) Experiment Site
   2) ARC Research Activity
   3) Training in Country and Abroad
   4) Demonstration Site
   5) Monitoring & Evaluation Activity

2. **Plan of the Project Activity from October 2015 to February 2016**
3. **Report on Terminal Evaluation**
4. **Outstanding Issues**
   - Coordination between Federal MoAF (NRP) & State MoAs
   - Development of Upland Rice (Activity on National Rice Council, etc.)
5. **Others**

11th Joint Coordination Committee Meeting
27th October 2015

Capacity Building Project for the Implementation of the Executive Programme for the Agricultural Revival

March 2010 - March 2016

AGENDA

- **Progress of the Project Activity from April to September 2015**
  - 1) Experiment Site
  - 2) ARC Research Activity
  - 3) Training in Country and Abroad
  - 4) Demonstration Site
  - 5) Monitoring & Evaluation Activity
- **Plan of the Project Activity from October 2015 to February 2016**
- **Report on Terminal Evaluation**
- **Outstanding Issues**
  - Coordination between Federal MoAF (NRP) & State MoAs
  - Development of Upland Rice (Activity on National Rice Council, etc.)
- **Others**

Project activities in Year 6
(April – September 2015)

Output 2

- **Planning, implementing, monitoring & development of appropriate cultivation technique for promotion of rice production are enhanced.**

Main Objective for 2 years extension period

During 2 years expansion until March 2016, the Project focuses on …..

1) **Development of Upland Rice Cultivation Technique**
   - Field Trial
   - Post-harvest Technique
   - Cooperation with ARC Research Activity
2) **Training for Extensionists**
   - Training course in Uganda, Egypt, Japan
   - Training through Demo Farm Management

Output 2 - Activities

1. Field Trial and Post-harvest
- To develop appropriate upland rice cultivation techniques

2. ARC Research Activity
- To collaborate with ARC in developing rice cultivation techniques

3. Training in Country and Abroad
- To train extensionists and farmers on appropriate rice cultivation techniques

4. Demonstration Farms
- To promote upland rice cultivation to farmers' fields

5. Monitoring & Evaluation
- To train extensionists on management skill utilizing Action Plan and Diary

Activity 1.1 – Plan for FY 2015

Field Trial

- Development of appropriate upland rice cultivation techniques
- Plant Spacing × Seed Rate Trial, Nitrogen Source Trial, Organic Fertilizer Trial
- Field of MoA Gezira State

Field Trial Site in 2015

Field Trial	Locality	Area (Fed)	Supervisors
UmBarona	Wad Medani	1.5	Mr. Abdelgahadir Mr. Osama and 6 others

Rice Cultivation Trial in Gezira

- **Seed Rate × Plant Spacing Trial （Two-factor）**
- **Nitrogen Source Trial**
- **Organic Fertilizer Trial**

Seed Rate × Plant Spacing Trial

- **Objective:**

To identify an appropriate balance of seed rate and plant spacing, in consideration of mechanical weeding

Seed Rate × Plant Spacing Trial

Treatment
T-1 24kg/ha (10 kg/fed) & Space 30 cm
T-2 24kg/ha (10 kg/fed) & Space 40 cm
T-3 24kg/ha (10 kg/fed) & Space 50 cm
T-4 48kg/ha (20 kg/fed) & Space 30 cm
T-5 48kg/ha (20 kg/fed) & Space 40cm
T-6 48kg/ha (20 kg/fed) & Space 50 cm
T-7 72kg/ha (30 kg/fed) & Space 30 cm
T-8 72kg/ha (30 kg/fed) & Space 40 cm
T-9 72kg/ha (30 kg/fed) & Space 50cm

Seed Rate × Plant Spacing Trial

Nitrogen Source Trial

- **Objective:**

To identify the appropriate type (Urea and Ammonium Sulphate) and amount of Nitrogen fertilizer for upland rice cultivation in Alkaline Soil

Nitrogen Source Trial

Treatment 1N=43.8kg/fed
T-1: 0 N kg (control) T-2: 3.0 N kg/fed (7.14 N kg/ha) (Urea) T-3: 4.5 N kg/fed (10.71 N kg/ha) (Urea) T-4: 3.0 N kg/fed (7.14 N kg/ha) (AS) T-5: 4.5 N kg/fed (10.71 N kg/ha) (AS) AS: Ammonium Sulphate Fertilizers are divided into 3 doses.

Expected Results: Yields with AS could be higher than yields with Urea.

Nitrogen Source Trial

Organic Fertilizer Trial

- **Objective:**

To identify appropriate manure amount in sandy and infertile soil in Sudan.

Manure is a useful means to improve soil fertility.

Organic Fertilizer Trial

Treatment	1 plot=9m^2
T-1: 0 kg/plot (control) T-2: 50kg/plot T-3: 100kg/plot No basal-dressing is applied. Only Urea is applied as top-dressing at two doses. Cattle Manure is used as Organic Fertilizer.	

Expected Results: T-3 is the highest yield.

Organic Fertilizer Trial

Activity 1.2 – Post-Harvest Processing

Installation & Operation of Rice Milling Units (RMU)

- **21 RMUs out of 22 have been assembled in 6 States.**
- **Power unit (e.g. 3 phase electricity, Diesel engine) should be installed at 10 locations in 6 States, as soon as possible. (JICA is waiting more than 1 year.)**
- **Trained extensionists Husking & Milling technique**

Rice Quality Analysis

- To produce Valuable White Rice more, i.e., Head Rice, the Quality of Paddy, Brown rice were analyzed through the year, and suggested the Appropriate Harvest Time to protect Broken rice production.
- These Data Base will contribute to Rice Production and Rice Post-harvest Technology in Sudan.

Activity 2 - Plan for FY 2015

Cooperation with ARC Research Activity

- ARC Research Activity
- Technical Advice and Lecture by Dr. Ikeda

Hand over Equipment to ARC for their Rice Research Activity

04/06/2015
A ceremony of handing over equipment for ARC rice research activity (at Gezira State MoA)

Main equipment is Soil Nutrient Tester, Drying Chamber, Electrical Current-meter, Electric Balance, etc.

Site visit, Technical advice and Presentation by Dr. Ikeda (Authority of Rice) to ARC researchers on Research Stations in Gezira, White Nile and Gedaref State

ARC, White Nile

ARC, HQ

31/08/2015
Discussion in Rahad Research Station, Gedaref State

01/09/2015
Site visit with Mr. Nakagaki in Kosti Research Station, White Nile State

02/09/2015
Lecture on Rice in ARC HQ (Medani) for Researchers, Gezira State

02/09/2015
Site visit to ARC HQ (Medani) with Mr. Nakagaki, Gezira State

Activity 3.1 – Plan for FY 2015

Training in Sudan

- Training as OJT for extensionists and farmers
- W/S :
  ① Before sowing
  ② Mid of season
  ③ Harvesting time

Activity 3.1 - Training in Sudan (1)

24/05/2015

OJT on field preparation at Experimental field by JICA Expert

Activity 3.1 - Training in Sudan (1)

26/05/2015

OJT on field preparation at Demonstration farm by JICA Expert

Activity 3.1 - Training in Sudan (2)
Site visit and Technical advice by Mr. Tsuboi (Expert in Uganda)

06/09/2015

Technical advice to Extensionists on Field Trial in Gezira State

07/09/2015
Site visit and technical advice to Extensionists at Wad Al Naim Site, Gezira State

07/09/2015
Site visit and technical advice to Extensionists at Wad Alasha Site, Gezira State

07/09/2015
Site visit and technical advice to Extensionists at Wad Sawi Site, Gezira State

07/09/2015
Site visit and technical advice to Extensionists at Wad Alasha Site, Gezira State

10/09/2015

Discussion with the Minister of SMoA, Gezira State

10/09/2015

Giving lecture on Field experiment to extensionists, Gezira State

08/09/2015

Site visit and technical advice to Extensionists at Al Fau (ARC field), Gedaref State

08/09/2015

Site visit at Al Fau (Farmer field) with Mr.Nakagaki, Gedaref State

09/09/2015

Site visit and technical advice to Extensionists and Farmers at Al Mergani Site, Sennar State

09/09/2015

Site visit and technical advice to Extensionists at Maiurno South Site, Sennar State

12/09/2015

Site visit and technical advice to Extensionists at Atbara 1 site, River Nile State

12/09/2015

Site visit and technical advice, especially on water management at Kanour site, River Nile State

Activity 3.2 – Plan for FY 2015

Training in Uganda

- Advance course (12Days)

Activity 3.2 - Training in Uganda

Training in Uganda

- <u>Advanced Course (12 Days)</u>
  - 13-24July 2015
  - 12 participants (Gezira=3, Sennar=3, Gedaref=2, River Nile=1, Northern=1, White Nile=2)

Activity 3.3 - Plan for FY 2015

Training in Egypt

- Weed Control (2weeks)
- Water Management (2weeks)
- Postharvest Technology (2weeks)
- Observation Programme for High Officials (1week)
- Technical Exchange for Researchers (1week)

Activity 3.3 - Training in Egypt (1)

Training in Egypt

- Weed Control Course (2 weeks)
  ⇨ 22 August – 05 September 2015
  ⇨ 13 participants (Gezira=2, Sennar=3, Gedaref=3, River Nile=2, Northern=1, White Nile=2)
  * 2 participants couldn't attend the course due to unexpected emergency cause.
- Water Management (2weeks)
  ⇨ 22 August – 05 September 2015
  ⇨ 15 participants (Gezira=3, Sennar=3, Gedaref=3, River Nile=2, Northern=2, White Nile=2)

Activity 3.3 - Training in Egypt (2)

Training in Egypt

- Postharvest Technology (2weeks)
  ⇨22 August – 05 September 2015
  ⇨ 8 participants (Gezira=2, Sennar=2, Gedaref=1, River Nile=1, Northern=1, White Nile=1)


Weed Control


Water Management


Post-harvest

Activity 3.3 - Training in Egypt (3)

Special Programme in Egypt

- Observation Programme for High Officials (1 week)
  ⇨ 04 - 10 September 2015
  ⇨ 9 participants (High Officials)
  DG of IC in FMoAI, DGs [GMs] of 6 States MoAs, National Rice Project, Rice Unit Managers of Gezira State, etc.

Activity 3.3 - Training in Egypt (4)

- In order to develop Rice Sector in Sudan, High Officials deepened the understanding of rice cultivation and rice promotion activity in Egypt and learned Egyptian experience.

Activity 3.3 - Training in Egypt (5)

Special Programme in Egypt

- Technical Exchange for ARC researchers (1 week)
  ⇨ 04 - 10 September 2015
  ⇨ 8 participants (researchers-ARC)

Activity 3.4 - Training in Japan (1)

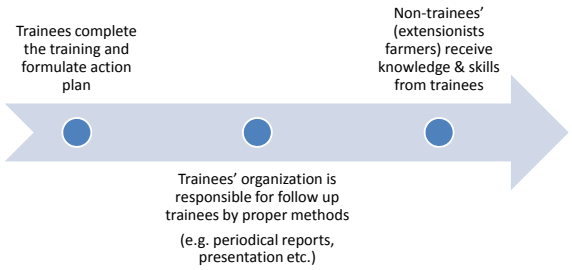
1) Development of Agricultural Cooperative and Improvement of Management Capacity	• Abdalla Mohammed Ali Eljenay - Technology Transfer and Extension Administration, Federal MoAF • 10 May - 18 Jul 2015
2) Agricultural Extension Planning and Management	• Sania Alseemat Fadulalmola - Technology Transfer and Extension Administration, Federal MoAF • 5 Jul - 5 Sep 2015
3) Development of core Agricultural Researchers for Rice Promotion in Sub- Saharan Africa	• Amna Ahmed Abdalla - Agricultural Research Corporation, Federal MoAF • 9 Jul - 13 Aug 2015
4) Appropriate Management of Land and Water Resources for Sustainable Agriculture in Arid/Semi-arid Regions	• Alhadi Fadul Abdallah Yagoub - Rice Promotion Unit, Sennar State MoA • 2 Aug - 25 Dec 2015

Activity 3.4 - Training in Japan (2)

5) Post-harvest Rice Processing for English Speaking African Countries	• Khalid Abdallah Ahemad - Rice Promotion Unit, Gedaref State MoA • 12 Aug - 27 Sep 2015
6) Promotion of African Rice Development through strengthening coordination between CARD and CAADP for Sub-Sahara African Countries (A)	• Mohieldin Ali Mohamed Bakheet - National Rice Coordinator, National Rice Project, Federal MoAF • Ahmed Abdelgadir Elsiddig - National Rice Research Coordinator, Agricultural Research Corporation, Federal MoAF • 16 - 27 Aug 2015
7) Farmer-Led Extension Method (B)	• To be nominated • 5 Jan – 6 Feb 2016

Post training

- Monitoring & evaluation of the trainees



Activity 4 – Plan for FY 2015

Demonstration Farms

- <u>Introducing upland rice cultivation to farmers' fields</u>
  - Gezira State (demo) (5 sites) (Seed/demo) (5 sites)
  - Sennar State (3 sites)
  - Gedaref State (4 sites)
  - River Nile State (3 sites)
  - Northern State (2 sites)
  - White Nile State (2 sites)
  - **Total : 24 sites in 6 States**

Demonstration Farms, Gezira in 2015

Demo Site	Locality	Area (Fed)	No. of Extensionist	Sowing	Sowing method	Sowing Space
Wad Bahai	Hasahisa	2.0	3	11/07/2015	Seed Driller	25cm
Shibairab	South Gezira	2.0	1	30/06/2015	Seed Driller	25cm
Abdelrahman	Hasahisa	2.0	1	07/07/2015	Seed Driller	25cm
Wad Alasha	South Gezira	2.0	1	25/06/2015	Seed Driller	25cm
Frejab	Hasahisa	2.0	1	10/07/2013	Seed Driller	25cm
Sowriba*	South Gezira	2.0	2	23/06/2015	Seed Driller	25cm
TOTAL		12.0	9			

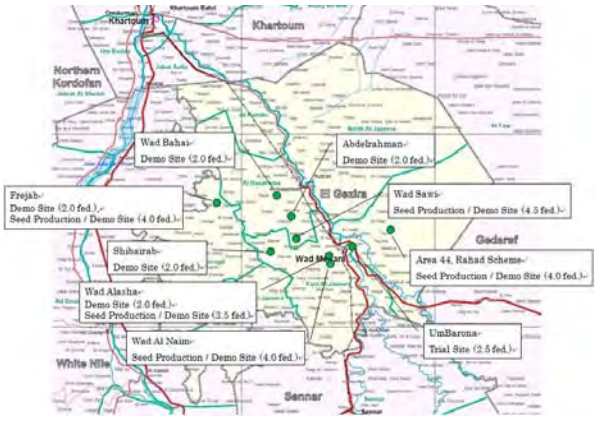
*Sowriba was cancelled because most of the seeds were eaten by bird after sowing.

Seed Production and Demonstration Farms, Gezira in 2015

Demo Site	Locality	Area (Fed)	No. of Extensionist	Sowing	Sowing method	Sowing Space
Area 44, Block 9 (Rahad Scheme)	Um Algora	4.0	3	17-21/07/2015	Seed Driller	30cm
Wad Sawi	Hasahisa	4.5	2	03-04/07/2015	Seed Driller	25cm
Frejab	Hasahisa	4.0	1	10/07/2015	Seed Driller	25cm
Wad Al Naim	South Gezira	4.0	1	25/06/2015	Seed Driller	25cm
Wad Alasha	South Gezira	3.5	1	27/06/2015	Seed Driller	25cm
UmBarona*	Wad Medani	1.0	-	22/06/2015	Seed Driller	30cm
TOTAL		21.0	8			

*UmBarona is not demonstration farm.

Map of Demo, Seed Production/Demo and Trial Site in 2015 (Gezira State)



Pre-watering in Wad Bahai

After Irrigation in Shibairab

Rogueing (Removing off-type) in Abdelrahman

Fertilizing (Urea) in UmBarona

Rice without Rogues (off-type) in Wad Al Naim

Rice with Rogues in Wad Sawi

Hand Weeding in Frejab (Seed Pro.)

Germination, Laser Leveler in Wad Alasha(Seed Pro.)

Rice Cultivation 1st time in Wad Alasha (Demo)

Missing Hills in Frejab (Demo)

Missing Hills and Additional Sowing in Area 44, Rahad Scheme

Demonstration Farms in other States

State	Site	Area (Fed)	No. of Extensionist	Sowing	Sowing method	Sowing Space
Sennar	Maiurno South	2.5	14	27/06/2015	Seed Driller	30cm
	Almahlaj	2.5	7	22/06/2015	Seed Driller	30cm
	Almergani	2.5	6	21/06/2015	Seed Driller	30cm
Gedaref	Al Fau (ARC)	2.0	5	18/06/2015	Seed Driller	30cm
	Al Fau (Farmer 1)	2.0		02/07/2015	Seed Driller	30cm
	Al Fau (Farmer 2)	2.0		25/06/2015	Seed Driller	30cm
	Shuwak(Ministry)	2.0	4	14-16/06/2015	Hand	30cm
River Nile	Atbara 1	1.0	4	15/06/2015	Seed Driller	30cm
	Atbara 2	1.0	4	15/06/2015	Seed Driller	30cm
	Kanour	1.0	5	16/06/2015	Seed Driller	30cm
Northern	Dongola Island	1.0	9	26/07/2015	Seed Driller	24cm
	Zawrat	1.0		26/07/2015	Seed Driller	24cm
White Nile	Elfardos 1	2.0	7	24/06/2015	Seed Driller	30cm
	Elfardos 2	2.0	7	24/06/2015	Seed Driller	30cm
TOTAL		24.5	72			

Map of Demo and Seed Production Site 2015 (Sennar, Gedaref, River Nile Northern and White Nile State)

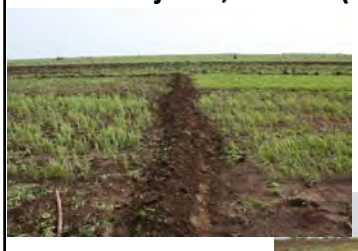
Maiurno South Site, Sennar (09/09/2015)

Rice growth was generally good, but non-uniform growth and missing hills were observed.

Poor leveling and improper sowing operation caused missing places.

Weeding was done at several times under rainy condition, but it need to be completed.

Almahlaj Site, Sennar (09/09/2014) 79DAS



The field was divided two areas (A & B) for conducting proper management based on different growth stage.

Early growth stage area (B) because of executing re-sowing in August.

More growing stage area (A) due to conducting re-sowing in July.

Implementing proper management on weeding, fertilization water management and measure for termites was required.

Almergani Site, Sennar (09/09/2015)

Rice growth was good, but different growth stage between first sown rice and re-sown rice was observed.

High dense re-sown place. Conducting thinning was needed for proper growth to avoid competition.

Keeping water was required to minimize damage by termites.

Al Fau (ARC field) Site, Gedaref (08/09/2015)

Uneven growth was observed. Rice plants started heading, but irrigation water was not enough.

NERICA 4 plant and off-type plant grow together at one hill. Under this condition, it is very difficult to remove off-type plants.

To avoid competition on water, field must be kept clean before heading.

Al Fau (Farmer field 1) Site, Gedaref (08/09/2015)

A lot of missing places were observed because of improper sowing and plotting operation.

Uneven land condition without appropriate plotting caused poor seedling emergence.

Remaking ridges and canals was required for implementing proper management, especially on water.

Al Fau (Farmer field 2) Site, Gedaref (08/09/2015)

Rice plants were in full heading stage. To avoid empty grains, keeping water was required.

Off-type plants were observed in the field. Practical measure for obtaining pure seed must be considered and taken properly.

'Grain rot' was observed. This disease is seed transmitted disease, so removing affected grains completely was required for using harvested rice as seed for next season.

Shuwak Site, Gedaref (15/09/2015)

Non-uniform growth must be solved and realizing uniform growth is key to obtain stable good yield.

To take measures for limiting damage by termites is also key for next season.

It is good time to harvest NERICA 4 for obtaining pure seed because NERICA 4 was in maturity stage, but off-type was still in heading stage.

Atbara 1 Site, River Nile (12/09/2015)

Rice plants were in full heading stage, but water was not kept in the field.

White head due to lack of water and damage by birds were observed. Immediate irrigation and setting-up birds net were required.

Removing off-type plants was necessary, but keeping water in the field has first priority to obtain filled grains as much as possible.

Atbara 2 Site, River Nile (12/09/2015)

89DAS

Rice plants were in heading stage, but due to lack of water, a lot of empty grains were observed.

Insufficient water not only caused occurrence of empty grains, but also affected the growth of re-sown rice plants.

Damage by birds was already observed. Setting up birds net for protecting rice was required as soon as possible.

Kanour Site, River Nile (12/09/2015)

88DAS

Rice plants were in full heading stage, but without keeping water under high temperature condition, most of grains became already empty grains.

09/08/2015 54DAS

The condition of rice and field was good at this time due to executing proper management.

12/09/2015 88DSA

Please keep enough water in the field from panicle initiation to heading stage to avoid occurrence of empty grains !

Dongola Island Site, Northern (13/09/2015)

49DAS

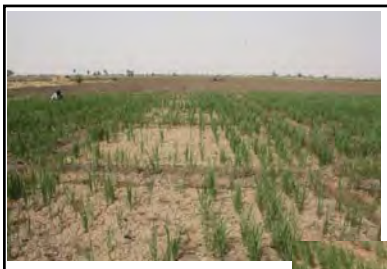
Rice growth was generally good, but weeding must be implemented.

To control weeds especially perennial grass and to conduct proper water management are keys to obtain good yield.

Plant spacing between row and row must be considered from the viewpoints of difficulty of hand weeding and impeding of rice growth.

Zawrat Site, Northern (13/09/2015)

Rice growth was not bad, but implementing irrigation as soon as possible was required.



Although re-sowing was conducted, missing places were not overcome.

Dense sowing caused competition on water and nutrient. Especially, symptom of lack of water was observed.

Elfardos 1 and 2 Site, White Nile (14/09/2015)

The view of the field (left : 1, right : 2)
Rice growth was not bad, but missing places and non-uniform growth were observed.

Seedling emergence of re-sown seeds was good, but it was high density which affected rice growth.

Rice growth was good at this place and plant height was high, so pay high attention to avoid lodging !

Filed was kept clean generally due to weeding at several times, but complete weeding was required.

A lot of off-type plants were observed.
It must be considered how to obtain pure seeds in this situation for next season.

Activity 5 - Plan for FY 2015

Monitoring & Evaluation

- Formulating Action Plan
- Utilizing Diary
- Regular (monthly) monitoring by the Project

Activity 5 - Monitoring & Evaluation

New Approach from 2014

- Introduce "New Production and Management System" by utilizing Action Plan
- Introduce "Diary for Upland Rice Cultivation" to all extensionists

Purpose of M&E System

- Monitoring is important management tool to track unit plan and to facilitate decision making at Field Level to achieve field target.

We monitor:

Inputs	Extensionists
	Farmers
Activities	Agricultural Operations
Outputs	Qualified Extensionists
	Rice

Target	Items of Monitoring				
Team Leader Performance	Managing the Team	Identifying and solving the problems as the team	Motivating team members and farmers	Strong Initiative as Team leader	Sharing Information with Team Members
Extensionists Performance	General Working Attitude	Utilizing knowledge and skill (work on the field)	Transferring upland rice techniques to the farmer	Identifying problems on the rice and taking action for solution	Utilizing the diary (keeping record)
Farmer Performance	Following and implementing advice from the extensionist	Working on the field	Reliability of the extensionist	Cooperation and coordination with extensionist	

Summary of the activities implemented (up to September 2015)

	Gezira SMoA	Sennar SMoA	Gedaref SMoA	River Nile SMoA	Northern SMoA	White Nile SMoA
Formulating Action Plan	19, 20 Apr	11, 12 Feb 6,7 Apr 20 Apr	10, 11 Mar 6 May	23, 24 Feb 27 Apr	25 Feb 28 Apr	15-17 Feb 22 Apr
Presentation of Action Plan	28 May	1 Jun	3 Jun	14 Jun	15 Jun	22 Jun
Monitoring Activity	26, 27 May 23-25 Jun 28–30 Jul 27 Aug	31 May 28, 29 Jun 5 Aug 31 Aug	2 Jun 30 Jun 1 Jul 3 Aug 15,16 Sep	13 Jun 10 Aug	15 Jun 11 Aug	21 Jun 6 Aug

Monitoring Team Observation

- Implementation of Action Plan is matching with Action Plan schedule
- Extensionists made great effort to supervise agricultural operations and to transfer upland rice cultivation techniques to farmer
- Field record (Extensionists utilize diary)
- New farmer in Gezira made great effort to know and apply upland rice cultivation techniques
- Transportation for extensionists to visit the field is one of main problems

31/05/2015
Field visit (monitoring) conducted in Almahlaj, Sennar.

15/06/2015
Action Plan Meeting in Northern SMoA.

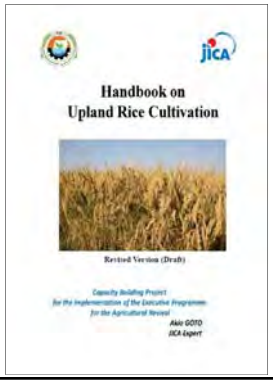
21/06/2015
Field visit (monitoring) conducted in Elfardos, White Nile State.

10/08/2015
Monitoring Meeting in River Nile SMoA.

26/08/2015
Field visit (monitoring) conducted in Wad Sawi, Gezira State.

15/09/2015
Field visit (monitoring) conducted in Shuwak, Gedaref State.

Activity 6. Finalizing a Handbook (ongoing)



Indicators to evaluate the progress of Output 2

Objectively Verifiable Indicators	Achievement by indicators
The NRDS draft is formulated.	Achieved by February 2014.
A structure to implement and review (monitoring and evaluating progress and reflecting evaluation results to the next plan) the NRDS is recommended.	Achieved by February 2014.
Annual action plans for rice development (analysis, planning, monitoring & evaluation, technical development, seed production, and extension) is formulated.	Achieved by February 2014.
A practical/technical handbook on upland rice cultivation is prepared.	1st revised draft version was formulated and is planned to be finalized by the end of the Project based on the Project activity in 2015 and result of field experiment by ARC, etc.
Quality of rice seed is improved.	Achieved by February 2014.
More than 80% of training participants are qualified as trainers on appropriate rice cultivation technique.	The assessment will be conducted after harvest to measure the indicator for achievement.
More than 60% of farmers who grew upland rice in demonstration farms show a willingness to grow rice again.	Achieved by February 2014.

Output 2 Achievements measured in indicators

2.4 A practical/technical handbook on upland rice cultivation is prepared

- 1st revised draft version was formulated and is planned to be finalized by the end of the Project based on the Project activity in 2015 and result of field experiment by ARC, etc.

2.6 More than 80% of training participants are qualified as trainers on appropriate rice cultivation technique.

- The assessment of capacity of extensionists will be conducted after harvest to measure the indicator for achievement.

Plan of the Project Activity from October 2015 to March 2016

1) Development of Upland Rice Cultivation Technique

- Analyzing collected data of Field Trial
- Post-Harvest Technology (Accelerating Rice Processing Technology, Rice quality analysis（Data Base), Test-run of Paddy Seed Cleaning and Grading Machine, etc.)
- Cooperation with ARC (Equipment for research)
- Finalizing a Handbook

2) Training for Extensionists

- Harvest and Yield Survey in each Demo Farm
- Annual Evaluation Meeting and plan for next season

3) Other Activities

- Field Day
  - Gedaref State (2 Nov)
  - Gezira State (3 Nov)
  - Sennar State (To be decided)
- Workshop for Summarization of the year (January 2016)

Report on Terminal Evaluation

Outstanding Issues

- **Coordination between Federal MoAF (NRP) & State MoAs**
- **Development of Upland Rice (Activity on National Rice Council, etc.)**

Others

1. GENETIC IMPROVEMENT

Activity 1.1 Grain yield and quality Performance of some upland rice genotypes under irrigated conditions of the Sudan

Testing sites: Kosti and Rahad

MINISTRY OF AGRICULTURE AND FORESTRY
AGRICULTURAL RESEARCH CORPORATION
RICE RESEARCH PROGRAM

Rice Research Activities
(2015)

Prof. Ahmed A. Elsiddig
National Rice Research Coordinator

1. GENETIC IMPROVEMENT

Activity 1.3 Maintenance and seed multiplication of released rice varieties

Varieties: Kosti 1, Kosti 2, Wakra and Umgar
Testing site: Medani

1. GENETIC IMPROVEMENT

Activity 1.2 Breeding for superior upland rice varieties suitable to different environmental conditions of the Sudan

Testing site: Kosti

3. AGRONOMY

Activity 3.1 Effect of seed rate and row spacing on growth, yield and yield components of aerobic rice under irrigated conditions

Testing sites: Medani and Kosti

2. MECHANIZATION

Activity 2.1 Effect of different sowing methods on yield and yield components of newly released aerobic rice varieties

testing site: Medani

4. WATER MANAGEMENT

Activity 4.1 Irrigation without moisture stress with continuous soil moisture monitoring (Crop water requirement)

Testing site: Medani

3. AGRONOMY

Activity 3.2 Response of aerobic rice varieties to planting date under irrigated conditions

Testing sites: Medani and Kosti

5. PLANT NUTRITION

Activity 5.1 Response of irrigated upland rice to nitrogen and phosphorus fertilization under irrigated soil conditions

Testing sites: Medani and Kosti

4. WATER MANAGEMENT

Activity 4.2 Irrigation scheduling of rice crop

Testing site: Medani

6. WEED CONTROL

Chemical weed control in irrigated rice

Testing site: Medani

5. PLANT NUTRITION

Activity 5.2 Zn-Phosphorus interaction effect on rice grain yield and quality under irrigated conditions

Testing site: Medani

Capacity Building Project for the Implementation of "the Executive Programme for the Agricultural Revival"

Joint Terminal Evaluation

27 October, 2015

独立行政法人 国際協力機構

OBJECTIVES (1)

1. Review inputs and implementation management of the Project
2. Assess progress and achievements of the Project, that are measured by Outputs, Project Purpose and Overall Goal defined in the Project Design Matrix (PDM)
3. Evaluate the Project from the viewpoints of five criteria (Relevance, Effectiveness, Efficiency, Impact and Sustainability)
4. Make recommendations for the Project, and gain lessons learned that can be applied to other projects

1

OBJECTIVES (2)

1. Primarily focus on extended period (Mar 2014 – Mar 2016)

   REMAINING OUTPUT INDICATORS
   2-4 A practical/technical handbook on upland rice cultivation is prepared.
   2-6 More than 80% of training participants in Gezira State, and two of trained participants respectively in five States excluding Gezira State, are qualified as trainers on appropriate rice cultivation technique.

2. Revisits Outputs achieved in the original duration from the viewpoint of sustainability

2

EVALUATION ACTIVITIES

Period: 11 – 27 October, 2015
Methods: Questionnaire, interviews and field visits (visited all six target States)

Joint Evaluation Team

Mr. Mohieldin Ail Mohamed Bakheet	National Rice Coordinator
Prof. Ahmed Abdelgadir Elsiddig	National Rice Research Coordinator
Ms. Fatima Rahma	Director, Bilateral Cooperation, International Cooperation Directorate
Mr. Houssain El Shareef	JICA Desk, Bilateral Cooperation, International Cooperation Directorate
Mr. Shigeru Otake	Senior Representative, JICA Sudan
Mr. Kozo Ito	Advisor to DG, Rural Development Dept. JICA HQ
Mr. Masahiro Shiomi	Project Formulation Advisor, JICA Sudan
Mr. Mitsuo Nishiya	Evaluaton & Analysis Consultant

3

INPUTS

	Original Period (4 years)	Extended Period (2 years)
Japanese Experts	14	6
Overseas Training	224	154
Equipment	USD 0.9 million	USD 0.06 million
Local Cost Japan	SDG 3.4 million	SDG 2.1 million
Local Cost Sudan	SDG 1.7 million	SDG 1.0 million

Sudanese Counterpart (as in October, 2015)
Management: 24
Researchers: 11
Extension Officers: 120

4

Confirmation of Achievement (1)

Output 2: Planning, implementation, monitoring & evaluation for promotion of rice production are enhanced.

Indicator	Achievement
2-4: A practical/technical handbook on upland rice cultivation is prepared.	• Handbook on Upland Rice Cultivation was modified after the 2014 season. • It will be refined and finalized by the end of the Project.
2-6:More than 80% of training participants in Gezira State, and two of trained participants respectively in five States excluding Gezira State, are qualified as trainers on appropriate rice cultivation technique.	• Success rate of 76 % in Gezira State • Achieved in the other 4 States • Expected to be achieved by the end of the Project.

5

Confirmation of Achievement (2)

Project Purpose: Planning, implementation, monitoring & evaluation for promotion of rice production are enhanced.

Indicator	Achievement
1: By the end of the project period, 60% of the staff members of the Federal Ministry of Agriculture, and core staff of State Ministries of Agriculture and other organizations concerned, involved in the Project Activities, demonstrate improvements in action planning, implementation, monitoring & evaluation relating to the "Executive Programme for the Agricultural Revival".	• Satisfactory • FMoA: Formulated annual upland rice development plan in 2015 and 5-year agriculture development plan • SMoA: Capacity of the rice extension officers will reach a satisfactory level • SMoA: Preparation of action plans on the demonstration farms and record keeping using the Diary
2: By the end of the project period, 80% of the staff of the Federal Ministry of Agriculture, and core staff of State Ministries of Agriculture and other organizations concerned, who received training, show improvement in the score of the self capacity evaluation.	• Satisfactory • All extension officers answered that they have improved their capacity in self-evaluation in 2014.

6

Evaluation Results by 5 Criteria

Relevance (High)	• Sudanese needs & policy, Japanese ODA policy, Project approach
Effectiveness (High)	• Achievement of Project Purpose • Proper implementation (no serious obstacles)
Efficiency (Relatively High)	• Inputs by Japanese & Sudanese side • Project management (…political continuity)
Impact (Positive)	• Overall Goal • Exchange visit, farmers' interest, media
Sustainability (Moderate)	• Policy, Institutional & Financial aspects: good • Technical aspect: good (for introduction stage) • Output 1 (achieved, but not sustained)

7

Note: Technical Sustainability

- The Project has performed well to start upland rice production (capacity development & rice cultivation techniques) at an introduction stage.
- Further technical investigation and continuous trainings, especially in land leveling and weed control, are necessary to shift it to expansion stage. Seed production system needs to be established.

8

SUSTAINABILITY OF ACHIEVED OUTPUTS in the original period

OUTPUT 1 (human resource development & organizational capacity development)

Management System: not established

Procedures from Capacity Assessment and Need Assessment to the completion of training: not applied

Implementation Manual: not used

9

SUSTAINABILITY OF ACHIEVED OUTPUTS in the original period

OUTPUT 2 (promotion of rice production)

NRDS: valid

Structure to Implement and Review NRDS: Rice Sector Forum discontinued

Annual Action Plans for Rice Development : on-going

Quality of Rice Seeds: on-going

Willingness of Farmers to Grow Rice: kept high

RECOMMENDATIONS (by the end of Project)

Experts and counterpart

- Prepare latest Technical Handbook
  Only for Rice Units and ARC for now.
  Release approval by Technology Committee, based on scientific research, is required before distributing to farmers.
- Complete capacity assessment

FMoA & SMoAs

- Approve budgets for next year(s)

11

RECOMMENDATIONS (for sustainability)

FMoA
- Reactivate Rice Sector Development Forum
- Review and re-apply OUTPUT 1 achievements

FMoA & SMoAs
- Provide technical support for private sector
- Allocate and disburse sufficient budget

FMoA & ARC
- Conduct research and officially release Technical Handbook
- Test and approve selective herbicides

12

RECOMMENDATIONS (for sustainability)

SMoAs
- Fully utilize rice milling machines
- Train seed-producing farmers thoroughly to remove off-types to keep purity of rice seeds
- Conduct in-country training for extension officers by leader officers
- Encourage extension officers to continue refining their knowledge and skills by using field record diary

13

RECOMMENDATIONS (for further rice promotion)

FMoA
- Strengthen capacity of National Rice Project
- Encourage private sector to be involved actively
- Strengthen the existing system for technology transfer and extension by establishing a Center of Excellence

ARC
- Conduct research and development on rice in all targeted States

ARC, FMoA & SMoAs
- Strengthen the existing systems for maintaining varieties and propagating pure rice seeds

RECOMMENDATIONS (for further rice promotion)

FMoA & SMoAs
- Open commercial trade opportunities and channels for rice producers
- Form farmer cooperatives specialized in rice
- Ensure proper storage and post-harvest processing services are available
- Continue searching, testing and introducing agricultural machineries suitable to rice farming in Sudan

SMoAs
- Expand / revive extension network

15

別添19

MINUTES OF THE MEETING
12th JOINT COORDINATING COMMITTEE MEETING
BETWEEN
MINISTRY OF AGRICULTURE & FORESTRY
AND
THE PROJECT TEAM
FOR THE CAPACITY BUILDING PROJECT FOR THE IMPLEMENTATION OF THE EXECUTIVE PROGRAMME FOR AGRICULTURAL REVIVAL

12th Joint Coordinating Committee (hereinafter referred to as "JCC") Meeting was held on 19 January 2016 hosted by the Ministry of Agriculture and Forestry (Hereinafter referred to as "MoAF") and the Project Team for "Capacity Building Project for the Implementation of the Executive Programme for Agricultural Revival" (hereinafter referred to as "the Project") at Churchill Ballroom in Grand Holiday Villa. The major topics were progress of the Project activities in the latter half of the Project Year-6, the achievement of the Project and recommendations. As a result of the discussion, JCC members had a mutual understanding on these topics.

Khartoum, Sudan, 19 January 2016

Republic Of Sudan
Ministry Of Agriculture & Irrigation
Date:.....
Internation Cooperation Directorate
General Director Office
28/1/16

Dr. Adel Yousif Eltayib Babiker
Director General
International Cooperation Directorate
Ministry of Agriculture & Forestry
Republic of the Sudan

Mr. Osamu Nakagaki
Chief Advisor
Capacity Building Project for the Implementation of the Executive Programme for the Agricultural Revival

witnessed by

Mr. Seiichi Koike
Resident Representative
Sudan Office
Japan International Cooperation Agency

ATTACHMENT

Introduction

The chairman, Dr. Adel Yousif (Director General, International Cooperation Directorate, MoAF), welcomed all participants and opened the 12th JCC meeting. After the members introduced themselves, Dr. Adel explained the agenda of the meeting. The Project started the presentation of the progress of the Project Activity in the latter half of the year-6 as follows:

1. Progress of the Project Activities from October 2015 to January 2016

1.1 Field Trial and Post-Harvest

Mr. Takamasa Ando (Rice Cultivation Expert of the Project) presented 3 field trials such as Seed Rate x Plant Spacing Trial (Two-factor experiment), Nitrogen Source Trial and Organic Fertilizer Trial (Nitrogen). He explained the result of 3 trials. Then he showed a result of post-harvest activity.

1.2 Cooperation with ARC Research Activity

Mr. Ando continued to explain the cooperation with ARC research activity. In the latter half of the year-6, the Project conducted technical follow-up from Egypt in collaboration with EICA (Egyptian International Center for Agriculture) and RRTC (Rice Research and Training Center). Dr. Tamer, a researcher of RRTC, discussed rice research with ARC researchers in November 2015.

1.3 Training for Extensionists in Country and Abroad

Mr. Akio Goto (Deputy Chief Advisor / Rice Cultivation Expert) presented training activity for extensionists.

<Training in Sudan>

Japanese experts conducted OJT for extensionists in the cultivation field. Mr. Osamu Tokumoto (Harvest and Post-harvest Processing Expert of the Project) visited 6 states to train extensionists and held a seminar in Gezira State to discuss on the post-harvest technique.

<Training in Uganda>

The Project conducted 1 advanced course for 12 extensionists for 12 days in the first half of the year-6.

<Training in Egypt>

The Project conducted 3 technical courses for a total of 36 extensionists, Observation Programme for 9 High Officials and Technical Exchange for 8 ARC researchers in the first half of the year-6. The Project arranged follow-up visit from Egypt from 31 October to 6 November. The Project guided the Egyptian mission to some demo sites and coordinated an interview with extensionists who participated in training in Japan. The mission understood well the situation of upland rice in Sudan to make better training programme.

<Training in Japan>

The Project provided 7 courses for 8 participants from MoA in the year-6.

In the end, Mr. Goto stressed the importance of application of skills and knowledge which participants gained from the training, in their work place.

1.4 - Demonstration Farms

Mr. Ando presented the yield result of 5 demonstration farms and 5 seed production / demonstration farms in Gezira State. One farm obtained 7.9 t/ha. It is amazing result. A total of 6 farms marked more than 3 t/ha and the average yield of 10 farms also exceeded 3.6 t/ha. After Gezira State, Mr. Goto presented the yield result of demonstration farms in other 5 states (14 sites, 24.5 feddans). He also

showed issues and lessons learnt of all sites with pictures.

1.5 - Monitoring & Evaluation

Dr. Hassan Ali Elobied (National Consultant of the Project) explained the purpose of the system of Monitoring & Evaluation and summary of the activity. He also explained observations gained from the activity.

After his presentation, Mr. Goto mentioned the progress of revising the handbook on Upland Rice Cultivation. It was finalized and will be printed.
[The contents of their presentation is as per attached as appendix III.]

2. Achievement of Project Purpose

Mr. Goto explained the indicators of Output 2 and the Project Purpose. There are 2 remaining indicators to be filled to achieve Output 2. As for Indicator 2.4 (A practical/technical handbook on upland rice cultivation is prepared), the handbook is finalized. As for Indicator 2.6 (More than 80% of training participants in Gezira State, and two of trained participants respectively in five States excluding Gezira State, are qualified as trainers on appropriate rice cultivation technique), 88% of extensionists in Gezira State (a total of 22 extensionists) are qualified. In other 5 states, more than 2 extensionists in each state (Sennar: 16, Gedaref: 7, River Nile: 3, Northern: 7, White Nile: 7) are qualified. In conclusion, Output 2 is achieved.

The Project Purpose has 2 indicators. As for Indicator 1 (By the end of the project period, 60% of the staff members of the Federal Ministry of Agriculture, and core staff of State Ministries of Agriculture and other organizations concerned, involved in the Project Activities, demonstrate improvements in action planning, implementation, monitoring & evaluation relating to the “Executive Programme for the Agricultural Revival”), 69.2% of extensionists in 6 states marked the target level of improvement. As for Indicator 2 (By the end of the project period, 80% of the staff of the Federal Ministry of Agriculture, all extensionists (100%) showed improvement in the score of the self capacity evaluation. In conclusion, the Project Purpose is achieved.

After the presentation from the Project finished, JCC members had an open discussion about the progress and the achievement.

At first, Dr. Adel made a comment on the presentation;
Gezira State has accumulated a lot of experiences on upland rice cultivation. For the sustainability of upland rice cultivation, farmer is important for the new crop. We missed the impact of the Japanese technologies and the effect of different fertilizer application on the quality of rice.

Dr. Baha Eldeen Ahmed (Minister of Sennar State MoA) made a comment;
Sennar State MoA concluded that rice is so much promised crop. Sennar State SMoA will expand this experience of the Project to farmers to adopt rice.

Mr. Elamien Hassan Elamien (DG, PAE, MoAF) made a comment;
We accumulated 6 years effort. MoAF should link the effort to next strategy of rice production. There are several issues such as site selection, farmer selection, climate differences (south area has better result than north area), number of extensionists in one site (too many), pure seed production, etc.

Mr. Osamu Nakagaki (Chief Advisor of the Project) replied to Mr. Elamien's comment;
As for climate differences between south and north, before taking consideration about the climate differences, Gezira and White Nile State has 6 years experience and other states has 4 years experience.
As for the number of extensionists, the Project suggested at least 5 extensionists to be assigned to 1 site because they working together with farmers, they should learn through actual cultivation process and one of them could be a leader (ToT).
As for seed production, this issue should come in the first place. Getting pure seed is seriously critical issue.

Mr. Mohieldin Ali Mohamed (National Rice Coordinator, NRP, MoAF) made a comment;
Sustainability is well secured. In Sudan, we have water resources, soil, and now we have human resources which the Project developed. There are financial problems (in this season, no budget was allocated from MoAF to 6 states). Next season should be different from previous season. Thank you, JICA for 6 years for 6 states. Now we have gained rice technology.

Mr. Hag Attwa Tag Elsir (DG, River Nile State MoA)
Area was small because it was training for extensionists. Logistic was poor, for example transportation for supervision to the sites. In our demo farm case, productivity is low. 1 kg rice is more than 50SDG. We have to look after the economical aspect. The involvement of the research station in River Nile State was necessary for the Project.

3. Recommendations
Mr. Nakagaki explained a recommendation for sustainability of upland rice promotion and development;
All 6 states improved their situation year by year. In order to sustain upland rice production, the most important thing to set up is systematic approach. NRDS (National Rice Development Strategy) is nationally authorized but it is not utilized fully. Activation of National Rice Council is important.
Another point, more close coordination between Federal MoAF and State MoAs is necessary, in terms of financial issue, etc., to secure the sustainability.
Federal Minister recognized that rice is second strategic crop. Sudanese government shows political will.

Dr. Adel made a comment;
As for the coordination between Federal MoAF and State MoAs, ownership of states (not only from federal) is important. Extensionists, researchers, research stations, etc., they all have to have ownership. MoAF considers rice is one of the strategic crops. We need more technology from outside to develop more on the rice sector. National Rice Council should be activated.

Mr. Elamien made a comment;
We need committee in National Rice Council for all value chain. We have issues on coordination between federal and states, extension, capacity development, post-harvest and marketing. Farmer should be organized for further development of rice production in Sudan. We need task team to revise NRDS.

At the end of the meeting, Dr. Adel summarized the meeting and closed it.

APPENDIX

APPENDIX I. List of Participants

APPENDIX II. Agenda

APPENDIX III. Presentation documents

بسم الله الرحمن الرحيم

12th JCC Meeting for Capacity Building Project
9:30 hrs-19th January, 2016
Grand Holiday Villa (Churchill Ballroom), Khartoum

Attendance Sheet

NO	Name	Organization
1.	Dr. Adel Yousif Eltaib	DG, IC – MoAF
2.	Mr. Elamien Hassan Elamien	DG, PAE – MoAF
3.	Mr. Ibrahim Hassan Abuzied	DG, TTEA – MoAF
4.	Ms. Salma Yousef Shalawani	IC – MoAF
5.	Ms. Nada Ibrahim Mohamed	IC – MoAF
6.	Mr. Hussain A. Elsharief	Bilateral Cooperation Department, IC – MoAF
7.	Mr. Zin Aldbdin Mohammed	TU – MoAF
8.	Mr. Mohieldin Ali Mohamed	National Rice Coordinator, NRP – MoAF
9.	Mr. Yasir Hassein Mohamed	NRP – MoAF
10.	Prof. Ahmed A. Elsiddig	National Rice Research Coordinator, ARC – MoAF
11.	Dr. Baha Eldeen Ahmed	Minister - Sennar SMoA
12.	Mr. Gamal Abd Elatif Elkhalifa	Head of rice unit - Sennar SMoA

13.	Mr. Alhadi Fadul Abdallah	Leader extensionist - Sennar SMoA
14.	Mr. Elzein Mohammed Hamid	Leader extensionist - Sennar SMoA
15.	Mr. Elhindi Omer Elmadani	Leader extensionist - Sennar SMoA
16.	Ms. Afraa Abdalla Emam	Extensionist - Sennar SMoA
17.	Mr. Babikir Ahmed	Extensionist - Sennar SMoA
18.	Dr. Saif Aldean Hassan Aboud	DG - Gezira SMoA
19.	Mr. Ahmed Elamin Abas	Manager of promising crops - Gezira SMoA
20.	Mr. Abdelmonuim Magzoub	Head of rice unit - Gezira SMoA
21.	Mr. Ahmed Mohamed Yousif	DG - White Nile SMoA
22.	Mr. Khalid Saeed Ibrahim	Head of rice unit - White Nile SMoA
23.	Ms. Nafiesa Noah Mohamed	DG - Gedaref SMoA
24.	Mr. Elhussein Elsafi Ali	Head of rice unit - Gedaref SMoA
25.	Mr. Hag Attwa Tag Elsir	DG – River Nile SMoA
26.	Mr. Saleh Abdo Saeed	Director of Technology Transfer - River Nile SMoA
27.	Ms. Hagir Mohamed	Head of rice unit - River Nile SMoA
28.	Mr. Osman Galal Osman Satti	Head of rice unit - Northern SMoA
29.	Mr. Elsayed Mohamed Abdoon	Co-Manager - Northern SMoA

30.	Mr. Ahmed Hamid Mohmoud	Ministry of International Cooperation	
31.	Mr. Koji Hase	Embassy of Japan	
32.	Mr. Seiichi Koike	Resident Representative - JICA Sudan Office	
33.	Ms. Mikako Yajima	JICA Sudan Office	
34.	Mr. Mohamed Elmugtaba	JICA Sudan Office	
35.	Mr. Osamu Nakagaki	JICA project	
36.	Mr. Akio Goto	JICA project	
37.	Mr. Takamasa Ando	JICA project	
38.	Mr. Takeshi Matsuda	JICA project	
39.	Dr. Hassan Elobied	JICA project	
40.	Ms. Nadia Mohammed	JICA project	

12th Joint Coordination Committee (JCC) Meeting

Capacity Building Project for the Implementation of "the Executive Programme for the Agricultural Revival"

AGENDA

Venue: Grand Holiday Villa (Churchill Ballroom)

9:30 hrs – 19th January, 2015 (Tuesday)

1. **Progress of the Project Activity from October 2015 to January 2016**

   1) Experiment Site
   2) ARC Research Activity
   3) Training in Country and Abroad
   4) Demonstration Site
   5) Monitoring & Evaluation Activity

2. **Achievement of the Project Purpose**

3. **Recommendations**
   - Sustain Upland Rice Promotion and Development

4. **Others**

12th Joint Coordination Committee Meeting
19th January 2016

Capacity Building Project for the Implementation of the Executive Programme for the Agricultural Revival

March 2010 - March 2016

AGENDA

- **Progress of the Project Activity from October 2015 to January 2016**
  - 1) Experiment Site
  - 2) ARC Research Activity
  - 3) Training in Country and Abroad
  - 4) Demonstration Site
  - 5) Monitoring & Evaluation Activity
- **Achievement of the Project Purpose**
- **Outstanding Issues**
  - Sustain Upland Rice Promotion and Development
- **Others**

Project activities in Year 6
(October 2015 – January 2016)

Output 2

- **Planning, implementing, monitoring & development of appropriate cultivation technique for promotion of rice production are enhanced.**

Main Objective for 2 years extension period

During 2 years expansion, until March 2016, the Project focuses on …..

1) **Development of Upland Rice Cultivation Technique**
   - Field Trial
   - Post-harvest Technique
   - Cooperation with ARC Research Activity
2) **Training for Extensionists**
   - Training course in Uganda, Egypt, Japan
   - Training through Demo Farm Management

Output 2 - Activities

1. Field Trial and Post-harvest
- To develop appropriate upland rice cultivation techniques

2. ARC Research Activity
- To collaborate with ARC in developing rice cultivation technique

3. Training in Country and Abroad
- To train extensionists and farmers on appropriate rice cultivation techniques

4. Demonstration Farms
- To promote upland rice cultivation to farmers' fields

5. Monitoring & Evaluation
- To train extensionists on management skill utilizing Action Plan and Diary

Activity 1.1 – Plan for FY 2015

Field Trial

- Development of appropriate upland rice cultivation techniques
- Plant Spacing × Seed Rate Trial, Nitrogen Source Trial, Organic Fertilizer Trial
- Field of MoA Gezira State

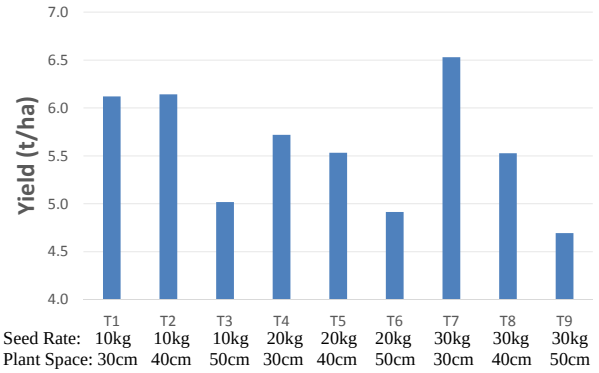
Rice Cultivation Trial in Gezira

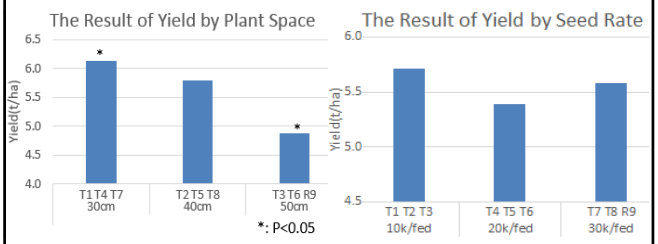
- Seed Rate ×Plant Spacing Trial （Two-factor）
- Nitrogen Source Trial
- Organic Fertilizer Trial

Seed Rate ×Plant Spacing Trial

Treatment
T-1 24kg/ha (10 kg/fed) & Space 30 cm
T-2 24kg/ha (10 kg/fed) & Space 40 cm
T-3 24kg/ha (10 kg/fed) & Space 50 cm
T-4 48kg/ha (20 kg/fed) & Space 30 cm
T-5 48kg/ha (20 kg/fed) & Space 40cm
T-6 48kg/ha (20 kg/fed) & Space 50 cm
T-7 72kg/ha (30 kg/fed) & Space 30 cm
T-8 72kg/ha (30 kg/fed) & Space 40 cm
T-9 72kg/ha (30 kg/fed) & Space 50cm

The Result of Yield



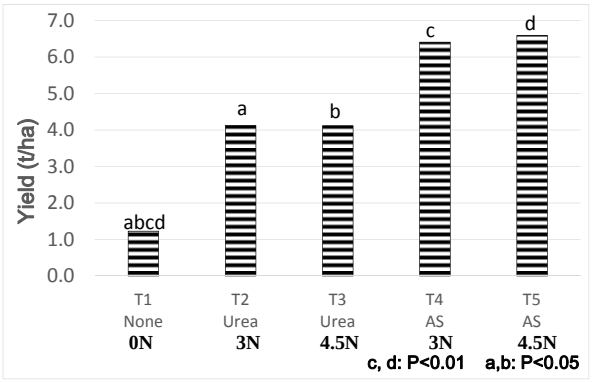


Optimum Pant Space: 30cm
Optimum Seed Rate: 10kg/fed

Nitrogen Source Trial

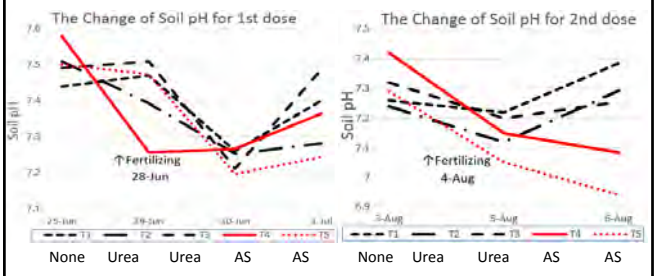
Treatment 1N=43.8kg/fed
T-1: 0.0 N kg/fed (control)
T-2: 3.0 N kg/fed (7.14 N kg/ha) (Urea)
T-3: 4.5 N kg/fed (10.71 N kg/ha) (Urea)
T-4: 3.0 N kg/fed (7.14 N kg/ha) (AS)
T-5: 4.5 N kg/fed (10.71 N kg/ha) (AS)
AS: Ammonium Sulphate
Fertilizers are divided into 3 doses.

The Result of Yield



Optimum Condition: T4 (AS 3.0N kg/fed)

The Change of Soil pH



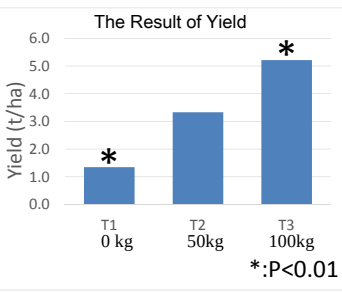
Organic Fertilizer Trial

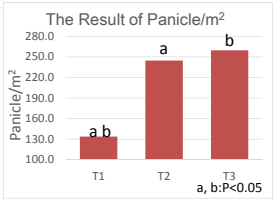
Treatment 1 plot=9m^2

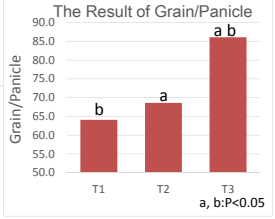
T-1: 0 kg/plot (control)
T-2: 50kg/plot
T-3: 100kg/plot

No basal-dressing is applied.
Only Urea is applied as top-dressing at two doses.
Cattle Manure is used as Organic Fertilizer.

The Result of The Trial

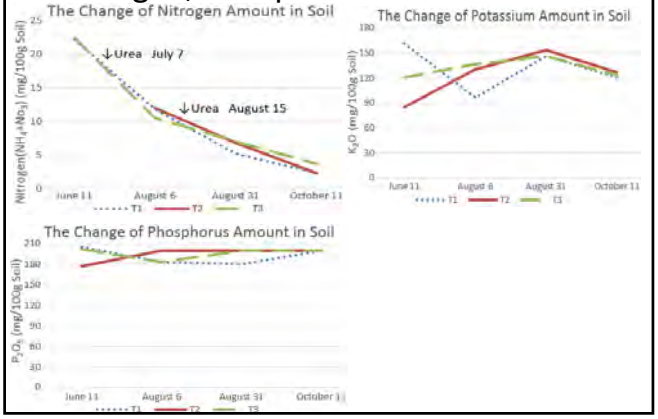


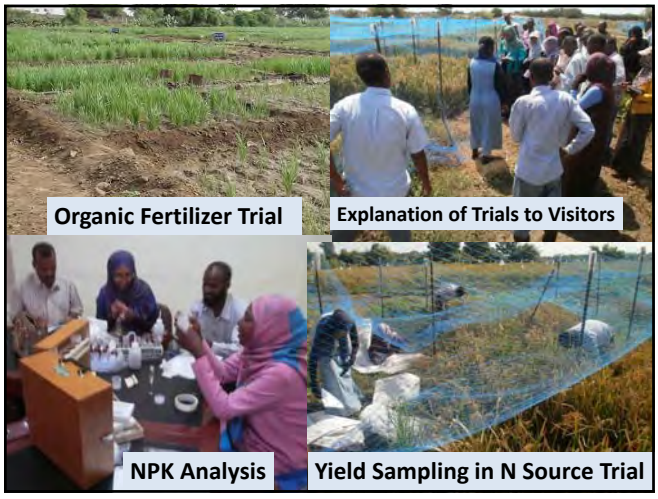




Optimum Condition: T3 (100 kg/plot)

The Change of Nitrogen, Phosphorus and Potassium





Activity 1.2 – Post-Harvest Processing

Location	No. of RMU	State	Rehabilitation	Assembling	3 Phase Installation	Electric Connection	Test Run
Dongola	2	Northern	✔	✔	✔	×	✔
Atbara	1	River Nile	✔	✔	✔	✔	✔
Damer	1		×	✔	×	×	×
Shawak	1	Gedaref	✔	✔	×	×	✔
Al Fau	1		✔	✔	×	×	✔
Kassab	1	Sennar	✔	✔	×	×	✔
Wad Hashim	1		✔	✔	×	×	✔
Fadasi	2	Gezira	✔	✔	✔	✔	✔
Hasahisa	2		✔	✔	✔	✔	✔
Hosh	2		✔	✔	✔	✔	✔
Hy-abudalla	2		✔	✔	×	×	×
Rahad 44	2		✔	✔	×	×	×
UmBarona	1		✔	✔	×	×	×
Funjab	1		✔	✔	×	×	×
Kosti	1	White Nile	✔	✔	✔	✔	✔
Duem	1		✔	✔	✔	✔	✔

: Available of Training after Electricity issue is concluded
: Issue of Electricity

The Result of Quality Analysis in Gezira

Year	Moisture Content	
	Nerica-4	
	Paddy	Brown Rice
2013	14.0%	10.4%
2014	13.2%	10.9%
2015	18.4%	12.1%

Year	Cracked Kernel (Brown Rice)	
	Nerica-4	Other Variety
2013	56.1%	-
2014	68.9%	-
2015	30.1%	-

Year	Hardness	
	Nerica-4	Other Variety
2013	87.1	-
2014	77.4	-
2015	72.1	-

Activity 2 - Plan for FY 2015

Cooperation with ARC Research Activity

- ARC Research Activity
- Technical Advice and Seminar by Dr. Ikeda

Technical Follow-up from Egypt

Researcher of RRTC (Rice Research and Training Center) visited ARC HQ and discussed.

3 November 2015

Activity 3.1 – Plan for FY 2015

Training in Sudan

- Training as OJT for extensionists and farmers
- W/S :
  ① Before sowing
  ② Mid of season
  ③ Harvesting time

Activity 3.1 - Training in Sudan (1)

OJT on field preparation at experimental field by JICA Expert (May)

OJT on Crop cut yield survey by JICA Expert (Sep.)

Activity 3.1 - Training in Sudan (2)

Training and Technical advice by Mr. Tokumoto on Postharvest Techniques

Seminar on Postharvest and Quality control Technology

Activity 3.2 – Plan and result for FY 2015

Training in Uganda

- Advance course (12Days: 13-24 July 2015, 12 extensionists)

Activity 3.3 – Plan and result for FY 2015

Training in Egypt

- Weed Control (2weeks: 22 Aug – 5 Sep, 13 extensionists)
- Water Management (2weeks: 22 Aug – 5 Sep, 15 extensionists)
- Post-harvest (2weeks: 22 Aug - 5 Sep, 8 extensionists)

Activity 3.3 – Plan and result for FY 2015

Special Programme in Egypt

- Observation Programme for High Officials (1 week)
  - ⇨ 04 - 10 Sep 2015
  - ⇨ 9 high officials
- Technical Exchange for ARC researchers (1 week)
  - ⇨ 04 - 10 Sep 2015
  - ⇨ 8 researchers

Follow-up Visit from Egypt

(31 Oct – 6 Nov 2015)

Interview with participants

Attend Rice Field Day

- Better understanding of situation of upland rice in Sudan for better training program in future

Activity 3.4 - Training in Japan (1)

1) Development of Agricultural Cooperative and Improvement of Management Capacity	• Abdalla Mohammed Ali Eljenay - Technology Transfer and Extension Administration, Federal MoAF • 10 May - 18 Jul 2015
2) Agricultural Extension Planning and Management	• Sania Alseemat Fadulalmola - Technology Transfer and Extension Administration, Federal MoAF • 5 Jul - 5 Sep 2015
3) Development of core Agricultural Researchers for Rice Promotion in Sub- Saharan Africa	• Amna Ahmed Abdalla - Agricultural Research Corporation, Federal MoAF • 9 Jul - 13 Aug 2015
4) Appropriate Management of Land and Water Resources for Sustainable Agriculture in Arid/Semi-arid Regions	• Alhadi Fadul Abdallah Yagoub - Rice Promotion Unit, Sennar State MoA • 2 Aug - 25 Dec 2015

Activity 3.4 - Training in Japan (2)

5) Post-harvest Rice Processing for English Speaking African Countries	• Khalid Abdallah Ahemad - Rice Promotion Unit, Gedaref State MoA • 12 Aug - 27 Sep 2015
6) Promotion of African Rice Development through strengthening coordination between CARD and CAADP for Sub-Sahara African Countries (A)	• Mohieldin Ali Mohamed Bakheet - National Rice Coordinator, National Rice Project, Federal MoAF • Ahmed Abdelgadir Elsiddig - National Rice Research Coordinator, Agricultural Research Corporation, Federal MoAF • 16 - 27 Aug 2015
7) Farmer-Led Extension Method (B)	• Almoghira Mohyaldian Ibrahim Bushara - Rice Promotion Unit, Sennar State MoA • 5 Jan – 6 Feb 2016

Post training

- Monitoring & evaluation of the trainees

Trainees complete the training and formulate action plan

Trainees' organization is responsible for follow up trainees by proper methods (e.g. periodical reports, presentation etc.)

Non-trainees' (extensionists farmers) receive knowledge & skills from trainees

Activity 4 – Plan for FY 2015

Demonstration Farms

- Introducing upland rice cultivation to farmers' fields
  - Gezira State (demo) (5 sites) (Seed/demo) (5 sites)
  - Sennar State (3 sites)
  - Gedaref State (4 sites)
  - River Nile State (3 sites)
  - Northern State (2 sites)
  - White Nile State (2 sites)
  - **Total : 24 sites in 6 States**

Demonstration Farms, Gezira in 2015

Demo Site	Locality	Area (Fed)	No. of Extensionist	Sowing	Harvest
Wad Bahai	Hasahisa	2.0	3	11/07/2015	10/11/2015
Shibairab	South Gezira	2.0	1	30/06/2015	22/10/2015
Abdelrahman	Hasahisa	2.0	1	07/07/2015	27/10/2015
Wad Alasha	South Gezira	2.0	1	25/06/2015	25/10/2015
Frejab	Hasahisa	2.0	1	10/07/2013	3/12/2015
Sowriba*	South Gezira	2.0	2	23/06/2015	-
TOTAL		12.0	9		

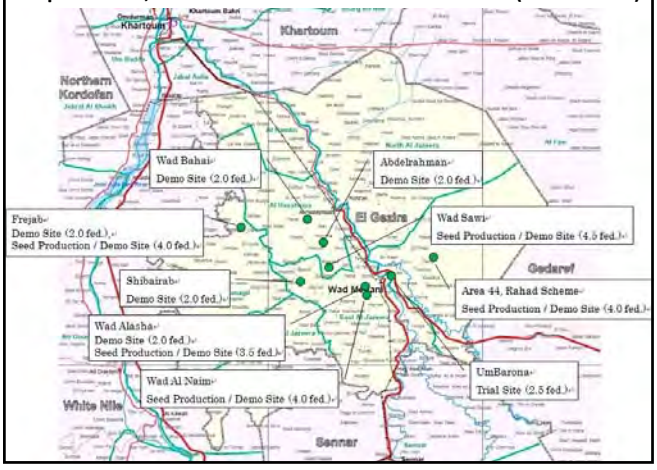
*Sowriba was cancelled because most of the seeds were eaten by bird after sowing.

Seed Production and Demonstration Farms, Gezira in 2015

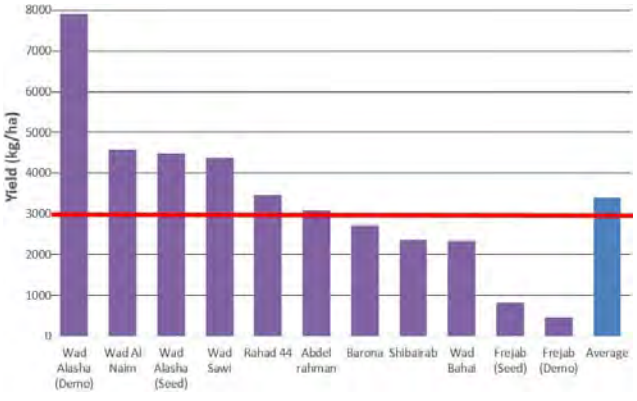
Demo Site	Locality	Area (Fed)	No. of Extensionist	Sowing	Harvest Date
Area 44, Block 9 (Rahad Scheme)	Um Algora	4.0	3	17-21/ 07/2015	5/11/2015
Wad Sawi	Hasahisa	4.5	2	03-04/ 07/2015	28-29/ 10/2015
Frejab	Hasahisa	4.0	1	10/07/2015	3/12/2015
Wad Al Naim	South Gezira	4.0	1	25/06/2015	21-22/ 10/2015
Wad Alasha	South Gezira	3.5	1	27/06/2015	26-27/ 10/2015
UmBarona*	Wad Medani	1.0	-	22/06/2015	19-20/ 10/2015
TOTAL		21.0	8		

*UmBarona is not demonstration farm.

Map of Demo, Seed Production and Trial Site in 2015 (Gezira State)



Yield in Demonstration Sites and Seed Production Sites in Gezira State in 2015



Packing and Transport in Wad Alasha→

←Threshing by farmer in Shibairab

Yield Sampling in Wad Sawi→

"Extension Day" in Wad Bahai→

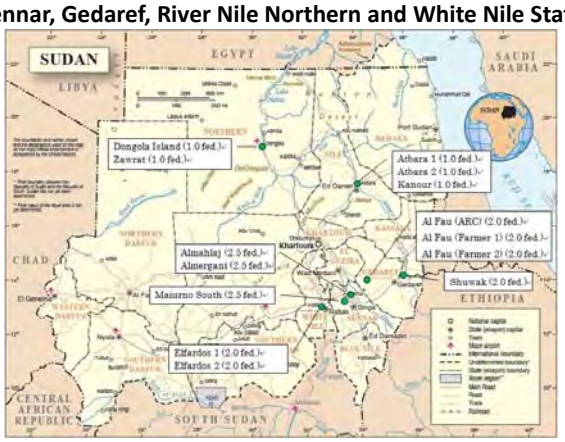
←Japanese Combine Harvester

"Field Day" in Rahad 44→

Demonstration Farms in other States

State	Site	Area (Fed)	No. of Extensionist	Sowing	Sowing method	Sowing Space
Sennar	Maiurno South	2.5	14	27/06/2015	Seed Driller	30cm
	Almahlaj	2.5	7	22/06/2015	Seed Driller	30cm
	Almergani	2.5	6	21/06/2015	Seed Driller	30cm
Gedaref	Al Fau (ARC)	2.0	5	18/06/2015	Seed Driller	30cm
	Al Fau (Farmer 1)	2.0		02/07/2015	Seed Driller	30cm
	Al Fau (Farmer 2)	2.0		25/06/2015	Seed Driller	30cm
	Shuwak(Ministry)	2.0	4	14-16/06/2015	Hand	30cm
River Nile	Atbara 1	1.0	4	15/06/2015	Seed Driller	30cm
	Atbara 2	1.0	4	15/06/2015	Seed Driller	30cm
	Kanour	1.0	5	16/06/2015	Seed Driller	30cm
Northern	Dongola Island	1.0	9	26/07/2015	Seed Driller	24cm
	Zawrat	1.0		26/07/2015	Seed Driller	24cm
White Nile	Elfardos 1	2.0	7	24/06/2015	Seed Driller	30cm
	Elfardos 2	2.0	7	24/06/2015	Seed Driller	30cm
TOTAL		24.5	72			

Map of Demo and Seed Production Site 2015 (Sennar, Gedaref, River Nile Northern and White Nile State)



Yield Results of Demonstration Farms in other States

State	Site	Area (Fed)	Yield (By sampling) (kg/ha)	Yield (By sampling) (kg/fed)	Yield (Whole area) (kg/ha)	Yield (Whole area) (kg/fed)
Sennar	Maiurno South	2.5	3305	1388	602	253
	Almahlaj	2.5	3332	1399	735	309
	Almergani	2.5	4325	1817	1891	784
Gedaref	Al Fau (ARC)	2.0	4876	2048	1889	793
	Al Fau (Farmer) 1	2.0	4423	1858	1053	442
	Al Fau (Farmer) 2	2.0	5609	2356	3996	1678
	Shuwak (SMoA)	2.0	3523	1479	777	326
River Nile	Atbara 1	1.0	2448	1028	1912	803
	Atbara 2	1.0	2098	881	1189	500
	Kanour	1.0	N/A	N/A	N/A	N/A
Northern	Dongola Island	1.0	4861	2042	1949	819
	Zawrat	1.0	4608	1935	2481	1042
White Nile	Elfardos 1	2.0	3778	1587	918	385
	Elfardos 1	2.0	3286	1380	976	410
TOTAL		24.5				

Yield Results of Demonstration Farms in Sennar State

Site	Area (Fed)	Yield (By sampling) (kg/ha)	Yield (By sampling) (kg/fed)	Yield (Whole area) (kg/ha)	Yield (Whole area) (kg/fed)
Maiurno South	2.5	3305	1388	602	253
Alhahlaj	2.5	3332	1399	735	309
Almergani	2.5	4325	1817	1891	794
TOTAL/Ave.	7.5	3654.0	1534.7	1076.0	452.0

Lessons learnt for 2016 in Sennar State

- Site selection (water availability, soil fertility, etc.) based on criteria
- Land preparation at early time
  - → High quality of operation
  - → Avoid damage by rainfall
- Quality and timing of each operation
- Off-Type
- Possession of own Agricultural machineries

Maiurno South Site (11/11/2015)

137DAS

Problems

1. Site selection (soil fertility, etc.)
2. Quality of operations (Sowing, Plotting, Weeding, etc.)
3. Insufficient re-sowing
4. Off-type

Almahlaj Site (11/11/2015)

142DAS

Problems

1. Site selection (water availability, etc.)
2. Sowing operation (No seedling emergence)
3. Re-sowing at several time
4. Insufficient weed control
5. Off-type

Almergani Site (11/11/2015)

143DAS

Problems

1. Sowing operation
2. Re-sowing at high seeding rate
3. Off-type
4. Termites

Yield Results of Demonstration Farms in Gedaref State

Site	Area (Fed)	Yield (By sampling) (kg/ha)	Yield (By sampling) (kg/fed)	Yield (Whole area) (kg/ha)	Yield (Whole area) (kg/fed)
Al Fau (ARC)	2.0	4876	2048	1889	793
Al Fau (Farmer) 1	2.0	4423	1858	1053	442
Al Fau (Farmer) 2	2.0	5609	2356	3996	1678
Shuwak (SMoA)	2.0	3523	1479	777	326
TOTAL/Ave.	8.0	4607.8	1935.3	1928.8	809.8

Lessons learnt for 2016 in Gedaref State

- Site selection (farmer, water availability, soil fertility, etc.) based on criteria
- Land preparation at early time
  - → High quality of operation
  - → Avoid damage by rainfall
- Quality and timing of each operation
- Off-Type
- Number and assignment of Extensionists

Al Fau (ARC field) Site (31/10/2015)

135DAS

Problems

1. Site selection (soil fertility, etc.)
2. Sowing and plotting operation
3. Termites (water management)
4. Insufficient weed control
5. Off-type

Al Fau (Farmer field) 1 Site (31/10/2015)

121DAS

Problems

1. Site(= farmer) selection
2. Poor operation (plotting, weeding, water management, etc.)
3. Termites (water management)
4. Off-type

Al Fau (Farmer field) 2 Site (31/10/2015)

128DAS

Problems

1. Upgrading level of each operation
2. Water management esp. from panicle initiation to heading stage
3. Off-type

Shuwak Site (11/10/2015)

117DAS

Problems

1. Non-uniform growth (Poor and Lodging place)
2. Serious damage by termites
3. Sowing at high seeding rate
4. Weed control (esp. perennial glass)
5. Off-type

Yield Results of Demonstration Farms in River Nile State

Site	Area (Fed)	Yield (By sampling) (kg/ha)	Yield (By sampling) (kg/fed)	Yield (Whole area) (kg/ha)	Yield (Whole area) (kg/fed)
Atbara 1	1.0	2448	1028	1912	803
Atbara 2	1.0	2098	881	1189	500
Kanour	1.0	N/A	N/A	N/A	N/A
TOTAL/Ave.	3.0	2273.0	954.5	1550.5	651.5

Lessons learnt for 2016 in River Nile State

- Site selection (water availability, etc) based on criteria
- Sowing operation without missing hills
- Sowing time to avoid high temperature
- Quality and timing of each operation (esp. water management)
- Damage by birds
- Off-Type

Atbara 1 Site (22/10/2015)

129DAS

Problems

1. Sowing operation
2. Water management
3. Damage by birds
4. Insufficient weed control
5. Off-type

Atbara 2 Site (22/10/2015)

129DAS

Problems

1. Sowing operation
2. Insufficient re-sowing and weeding
3. Water management
4. Damage by birds
5. Off-type

Kanour Site (12/09/2015)

88DAS

Problems

1. Site selection (esp. water availability)
2. Water management
3. Off-type

Yield Results of Demonstration Farms in Northern State

Site	Area (Fed)	Yield (By sampling) (kg/ha)	Yield (By sampling) (kg/fed)	Yield (Whole area) (kg/ha)	Yield (Whole area) (kg/fed)
Dongola Island	1.0	4861	2042	1949	819
Zawrat	1.0	4608	1935	2481	1042
TOTAL/Ave.	2.0	4734.5	1988.5	2215.0	930.5

Lessons learnt for 2016 in Northern State

- Site (= farmer) selection based on criteria
- Quality and timing of each operation (esp. weed control)
- Damage by birds
- Proper water management
- Off-Type

Dongola Island Site (21/10/2015)

87DAS

Problems

1. Site (= farmer) selection
2. Insufficient weed control
3. Damage by birds
4. Water management
5. Off-type

Zawrat Site (21/10/2015)

87DAS

Problems

1. Site selection (Soil fertility, etc.)
2. Re-sowing
3. Weed control
4. Water management
5. Off-type

Yield Results of Demonstration Farms in White Nile State

Site	Area (Fed)	Yield (By sampling) (kg/ha)	Yield (By sampling) (kg/fed)	Yield (Whole area) (kg/ha)	Yield (Whole area) (kg/fed)
Elfardos 1	2.0	3778	1587	918	385
Elfardos 2	2.0	3286	1380	976	410
TOTAL/Ave.	4.0	3532.0	1483.5	947.0	397.5

Lessons learnt for 2016 in White Nile State

- Site selection (accessibility, soil characteristics, esp. water availability) based on criteria
- Off-type
- Quality and timing of each operation
- Damage by birds at sowing time
- Harvesting at proper time

Elfardos 1 and 2 Site (20/10/2015)

118DAS

Problems

1. Site selection (water availability, etc.)
2. Off-type
3. Damage by birds at sowing time
4. Improper weeding and water management
5. Late harvesting

The importance of pure seeds

Harvested NERICA 4 by panicle reaping

- Sennar : 86.5kg
- Gedaref : 98.8kg
- River Nile : 10.0kg
- Northern : 25.0kg
- White Nile : 25.1kg

Maiurno South

Shuwak

Atbara 1

Elfardos 1 (A)

Please utilize it for seed multiplication to increase pure seeds for your State !

Activity 5 - Plan for FY 2015

Monitoring & Evaluation

- Formulating Action Plan
- Utilizing Diary
- Regular (monthly) monitoring by the Project

Purpose of M&E System

- Monitoring is important management tool to track unit plan and to facilitate decision making at Field Level to achieve field target.

We monitor:

Inputs	Extensionists
	Farmers
Activities	Agricultural Operations
Outputs	Qualified Extensionists
	Rice

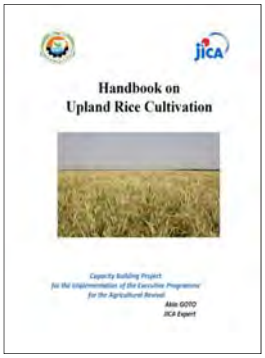
Summary of the activities implemented (Season 2015)

	Gezira SMoA	Sennar SMoA	Gedaref SMoA	River Nile SMoA	Northern SMoA	White Nile SMoA
Formulating Action Plan (AP)	19, 20 Apr	11, 12 Feb 6,7 Apr 20 Apr	10, 11 Mar 6 May	23, 24 Feb 27 Apr	25 Feb 28 Apr	15-17 Feb 22 Apr
Presentation of AP	28 May	1 Jun	3 Jun	14 Jun	15 Jun	22 Jun
Monitoring Activity	26, 27 May 23-25 Jun 28–30 Jul 27 Aug 5-8 Oct	31 May 28, 29 Jun 5 Aug 31 Aug 11, 12 Oct	2 Jun 30 Jun 1 Jul 3 Aug 15,16 Sep 13, 14 Oct	13 Jun 10 Aug	15 Jun 11 Aug	21 Jun 6 Aug
Evaluation	24 Nov	6 Dec	7 Dec	22 Nov	23 Dec	9 Dec

Monitoring Team Observations:

1. Commitment of extensionists to implement the action plans activities as scheduled.
2. Extensionist worked as one teams.
3. Good cooperation and coordination between extensionists and farmers in most of the fields, in terms of farmers following and implementing advices made by the extensionists.
4. Although there were many new farmers, but they made great efforts in terms of working on the fields and commitment to improved the implementation of Agric. operations.
5. Extensionists made great efforts to transfer upland rice techniques to the new farmers.
6. Extensionists utilized the accumulations of knowledge and skilled gained from different courses to manage the fields and achieved fields targets.
7. **Systematic Approach --- Ownership**

Activity 6. Finalizing a Handbook



Achievement of the Project Purpose

Indicators to evaluate the progress of Output 2

Objectively Verifiable Indicators	Achievement by indicators
The NRDS draft is formulated.	Achieved by February 2014.
A structure to implement and review (monitoring and evaluating progress and reflecting evaluation results to the next plan) the NRDS is recommended.	Achieved by February 2014.
Annual action plans for rice development (analysis, planning, monitoring & evaluation, technical development, seed production, and extension) is formulated.	Achieved by February 2014.
A practical/technical handbook on upland rice cultivation is prepared.	The Handbook was finalized at the end of the Project based on the Project activity in 2015, etc.
Quality of rice seed is improved.	Achieved by February 2014.
More than 80% of training participants are qualified as trainers on appropriate rice cultivation technique.	88% of extensionists are qualified in Gezira State. In other 5 States, more than 2 extensionists in each State are qualified as trainers on appropriate rice cultivation technique.
More than 60% of farmers who grew upland rice in demonstration farms show a willingness to grow rice again.	Achieved by February 2014.

Output 2 Achievements measured in indicators

2.4 A practical/technical handbook on upland rice cultivation is prepared

- The Handbook was finalized at the end of the Project based on the Project activity in 2015, etc.

2.6 More than 80% of training participants are qualified as trainers on appropriate rice cultivation technique.

- 88% of extensionists in Gezira State (22) are qualified. In other 5 States, more than 2 extensionists in each State (Sennar: 16, Gedaref: 7, River Nile: 3, Northern: 7, White Nile: 7)are qualified as trainers on appropriate rice cultivation technique.

Indicators to evaluate the Project Purpose

Project Purpose

Human and organizational capacity of the Ministry of Agriculture and the organizations concerned is strengthened to materialize "The Executive Programme for the Agricultural Revival."

Objectively Verifiable Indicators
By the end of the project period, **60% of the staff** members of the Federal Ministry of Agriculture, and core staff of State Ministries of Agriculture and other organizations concerned, involved in the Project Activities, **demonstrate improvements in action planning, implementation, monitoring & evaluation** relating to the "Executive Programme for the Agricultural Revival".
By the end of the project period, **80% of the staff** of the Federal Ministry of Agriculture, and core staff of State Ministries of Agriculture and other organizations concerned, who received training, **show improvement in the score of the self capacity evaluation**.

Project Purpose Achievements measured in indicators

60% of the staff of MoA, involved in the Project Activities, **demonstrate improvements in action planning, implementation, monitoring & evaluation**

- Achieved for staff of FMoAF by February 2014.
- **69.2 %** of extensionists in 6 SMoAs marked the target level.

80% of the staff of MoA, who received training, **show improvement in the score of the self capacity evaluation**.

- Achieved for staff of FMoAF by February 2014.
- All extensionists (**100%**) showed improvement in the score of the self capacity evaluation.

Recommendations

- **Sustain Upland Rice Promotion and Development**

Others