

Fertilizer Application

Example : Major chemical fertilizers and the content of elements

Name	Chemical formula	Content of elements (%)
Nitrogen fertilizer (N)		
Ammonium sulfate	(NH ₄) ₂ SO ₄	21(N) - 24(S)
Urea	CO(NH ₂) ₂	46(N)
Ammonium chloride	NH ₄ Cl	26(N)
Phosphorus fertilizer (P)		
Single superphosphate		18~20(P ₂ O ₅) - 18(Ca) - 12(S)
Triple superphosphate		45(P ₂ O ₅) - 14(Ca) - 10(S)
Potassium fertilizer (K)		
Potassium chloride	KCl	60(K ₂ O)
Potassium sulfate	K ₂ SO ₄	53(K ₂ O) - 18(S)
Compound fertilizer (NPK)		
14-14-14		14(N) - 14(P ₂ O ₅) - 14(K ₂ O)
12-12-12		12(N) - 12(P ₂ O ₅) - 12(K ₂ O)

Fertilization in Demonstration Farms and Trial Field in 2013

1. Demonstration Farms

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)

2. Trial Field

87.6-47.6-0 kg NPK kg/ha (36.8-20.0-0 kg NPK kg/fed)

Fertilizer	Before sowing	3 weeks DAS (21 DAS)	7 weeks DAS (51 DAS)
S.S.P (0-20-0)	250kg/ha (100kg/fed)	0	0
Urea (46-0-0)	0	100kg/ha (40kg/fed)	100kg/ha (40kg/fed)



More effective, practical and economical fertilization such as type, time, amount, etc. will be provided through field trial and experiences on field activity.

③ Proper Sowing Operation



1. Adjustment of tractor and seed drill machine for land condition is indispensable operation.
2. It is very important for machine operator to check soil condition before sowing and to modify driving/sowing technique based on soil condition. **No need to hurry !**



**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 !



Sowing Operation



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

(2) Seed rate (optimum: 40kg/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 low yield !



Sowing Operation



Sowing space is narrow, not suitable for weeding !
Weeding is difficult and 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.

Implement sowing operation properly !

**After sowing,
it was rain or irrigation was started**

Higher and lower places occurred in the field



Submerged water impede seedling emergence

No Rice



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

Winter season : Before starting low temperature

➔ October

*** More accurate optimum time is under research especially for Northern part of Sudan.**



There is 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 one in middle of July.**

(1) Influence on rice growth by rainfall



It affected growth of rice plants.

Re-sowing 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

✘ **Damage by Birds** 
(Just before Maturity stage)




Serious damage ! **No damage !**
Practical and Effective measures must be taken !

★ Re-sowing is important operation for reducing missing hills to obtain good yield

Finish it short time ! 

To implement appropriate management, re-sowing must be completed within 2 weeks after germination of 1st sowing



Need fertilizer and water ! **No need fertilizer and water !**