



CSAM



Practice of Conservation Agriculture of Nanjing Research Institute for Agricultural Mechanization (NRIAM)

Presented by

Chen Cong

E-mail: chenchong520206@163.com

*Regional Workshop on the Role of Mechanization in Strengthening Smallholders' Resilience through Conservation Agriculture in Asia and the Pacific
18-20 April 2018, Phnom Penh, Cambodia*





topic outline

- 1 Brief Introduction of NRIAM
- 2 Practice of Conservation Agriculture of NRIAM



1 Brief Introduction of NRIAM

- Nanjing Research Institute for Agricultural Mechanization (NRIAM), Ministry of Agriculture, P. R. China.
- Established in 1957.
- A public national research institute in agricultural engineering.



1 Brief Introduction of NRIAM

- **Mainly responsible for**
 - Technological innovation of agricultural equipment;
 - Quality testing;
 - Education training;
 - Etc.



1 Brief Introduction of NRIAM

➤ **During the early time from the establishment**

- Developed the **first** rice transplanter in the world;
- Achievement in machinery for crop protection, charge plough paddy field, walking tractor, rotary cultivator and threshing machine;
- Carried out a large number of agricultural mechanization mode and policy research;
- Set standards of agricultural quality and machinery operation

1 Brief Introduction of NRIAM

- **At present, NRIAM has extended the scope to further research field ...**
 - Machinery for food crops;
 - Machinery for economic crops;
 - Facility equipment and engineering in agriculture;
 - Crop protection and environment engineering technology;



1 Brief Introduction of NRIAM

- **At present, NRIAM has extended the scope to further research field ...**
- Agricultural products processing engineering technology;
- Agricultural resources development engineering technology;
- Agricultural machinery quality test and control technology;
- Agricultural mechanization policy and technology model.

2 Practice of Conservation Agriculture

- Rice transplanter with stubble cutter for stubble fields.
- We made a modification to the hand transplanter, added a stubble cutter roller between the wheel and planting parts. The new transplanter can plant rice seedlings directly Without cultivation after harvesting wheat.



2 Practice of Conservation Agriculture

- The growth of rice planted by the machine.



Pictures showed that the survival rate of rice was not reduced, the tillering and yield was not affected.



2 Practice of Conservation Agriculture

- Effect contrast with ordinary transplanter.
- Reduce 4 mechanical operations
- Reduce irrigation 2 times and save 30% water
- Reduce the use of herbicides
- Reduce soil erosion and harmful gas emission
- Reduce operation costs by 1800 yuan/hectare



2 Practice of Conservation Agriculture

- no-till planter under full straw mulching based on “clean area planting”
- 3 major technical problems of the traditional way of no-till seeding exist:
 - soil-buried parts of machine are blocked with grass, which can't guarantee the smooth operation;
 - the seeds may be planted on the straw, causing the seeds are above the soil and not into the soil;
 - soil-covering is unreliable, causing the seeds are not covered by soil.

2 Practice of Conservation Agriculture

- no-till planter under full straw mulching based on “clean area planting”
- Firstly, smash the straw on the surface of the fields which would be seeded, then pick up and collect them, and spread backwards after loading;
- Secondly, finish stubble cutting and seed-bed preparation before the straw fell down, and finish fertilization and seeding work in "cleaned area";
- Finally, the smashed straw was evenly covered on the fields after planting, and the whole process, including crushing the wheat straw, cleaning the field, fertilizing, and covering the seed bed with straw, was all finished in relatively "cleaned area".

2 Practice of Conservation Agriculture

- no-till planter under full straw mulching based on “clean area planting”



peanut



wheat



corn

We made field tests , results showed that the average length of straw was 115 mm after work, the uniformity ratio of straw mulching was 83%, the average depth of sowing and fertilizing was 46 and 59 mm respectively, the qualified rate was 98% and 89% respectively.

2 Practice of Conservation Agriculture

- ▶ minimum-till planter



This machine has the functions of ploughing and sowing together, the tillage group and the planter are distributed on the same parallel lines.

2 Practice of Conservation Agriculture

- ▶ straw shredding and returning machine



This machine is used to cut up straw and mix straw with soil, it can effectively reduce the burning of straw and increase the organic matter in soil, improve the soil structure, make crop grow more stalmart.

2 Practice of Conservation Agriculture

- Self-propelled multi-purpose tillage machine



This machine is designed to cope with the complex conditions of farmland in the mountainous area. Use of cartridge design, can be replaced within a few minutes to achieve a multi-purpose machines, reduce cost of purchasing machines for small holder farmers.



thanks

