

Introduction of CA Techniques in DPR Korea



**International Seminar on Enhancing
Extension of Conservation Agriculture**

Techniques in Asia and Pacific

25. October. 2007

An aerial photograph of a large, green island with a complex coastline. The island is surrounded by blue water. The terrain is hilly and forested. The text is overlaid on the right side of the image.

23M. Population

2M ha. Arable land

580,000ha of paddy

600,000ha of non-paddy

Disadvantage of agricultural practice In DPRK.

- Continuous decrease of soil fertility
*(low humus contents and available soil nutrients,
Severe soil loss caused by heavy rains in summer)*
- Lack of agricultural materials
*(Low inputs of organic and inorganic materials
comparative with target yields, fuels and etc.)*
- More time and working schedules to prepare
field for double crop system.

CA experimental activities in DPRK

- Test on the CA in DPRK was started in 3 farms since 2003 with support of FAO TCP project
- We have a considerable experiences and increased our technical capacity for full adoption to our condition.
- We expanded CA practice into 22 farms under FAO rehabilitation project.

No till- Rice transplanting after wheat (*Komhung farm*)



20.06.2007 15:13

Direct seeding of Rice



CA in paddy (Winter wheat sowing after rice harvest)

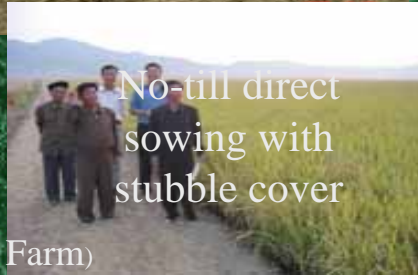


Winter wheat direct seeding on
the same day of rice harvesting
(Ryuso Farm)



No-till

(Posan Farm)



No-till direct
sowing with
stubble cover

Potato growing under no till cover condition at Yaksu farm



- 2m wide ridge
- Put potato seed under rice stubble covered
- Keeping rice and potato straw with no-till
- Rice transplanting on mid of June

Soybean seeding after wheat on sloppy land



2007-11-06

Good germination of soybean with wheat
stubble retention

22 07 2007 18 18



Wheat seeding after maize harvest (Ryongchon Farm, Hwangju County)

2008 9 28

CA demonstration plot in Ryongchon Farm, Hwangju County

보호농법
정밀시범포전

| | |
|------|--------|
| 면적 | 3점보 |
| 품종 | 맥한 |
| 파종일자 | 9월 27일 |
| 8작업반 | 4분포 |

Wheat direct seeding
with maize stubble retention

2005 10 21

Intercropping ; Maize – Soybean after Wheat



최소갈이시험포

앞고구 : 밀, 보리, 양파

뒤고구 : 콩

외경 폭도 : 50 cm

파종 양자 : 2004년 6월 24일

홍천농업유망사업



GMCC(hairy vetch) for seeding

(it can harvest 20~30t/ha.of green matter before seeding)

Keeping optimum times and dose of herb.application

Seeding at beginning of Oct.to resist severe winter cold.

Harvesting at end of May for good next crops.

Crotalaria Juncea



*GMCC varieties selection
to fit DPRK climate*

A wide-angle photograph of a vast agricultural field filled with young maize plants. The plants are arranged in neat, parallel rows that stretch far into the distance. The ground between the rows is covered with a layer of dark brown, decomposing crop residue, likely from a previous harvest, which is characteristic of a no-till farming system. The maize plants themselves are vibrant green, with long, pointed leaves and emerging tassels. In the background, a thin line of trees and a hazy horizon under a pale sky are visible. The overall scene depicts a well-maintained, modern agricultural landscape.

No-till direct seeding in maize single crop field

(Songmun Farm, Samsok District)

Result of CA trial

- Improved soil fertility and 50-60% reduction of wind erosion and rainfall
- 10-15% increase of yield
- 15-25% of saving of production cost

Improved of soil fertility through the stubble decomposition



Soil improvement in upland field (2003 ~2005)

| site | Cultivation type | OMC (%) | Nutrients(mg/100g) | | | Soil Cover |
|-----------------|---------------------|---------|---------------------|------|------|---------------------------|
| | | | N | P2O5 | K2O | |
| Song Mun farm | Traditional | 1.5 | 6.5 | 12.5 | 15.7 | No-cover |
| | Maize residue cover | 1.8 | 8.7 | 15.7 | 16.8 | Maize residue cover 6t/ha |
| | GM-Maize | 1.7 | 8.5 | 16.5 | 16.3 | GM 5t/ha |
| Ryong Chon farm | Traditional | 1.7 | 7.8 | 15.0 | 13.0 | No-cover |
| | Maize residue cover | 1.9 | 9.5 | 16.7 | 14.4 | Maize residue cover 5t/ha |
| Jung San farm | Traditional | 1.5 | 5.7 | 8.8 | 20.0 | No-cover |
| | GM-Maize | 1.8 | 7.5 | 10.5 | 21.1 | GM 7t/ha |

Soil erosion decrease on sloppy land

Washing up of sloping land(m³/ha.)

| plot | index | | |
|------|----------------|------|------|
| | m ³ | Dif. | % |
| TA | 155 | - | 0 |
| CA | 75.2 | 79.8 | 48.5 |

110mm .14.5 Sukchon

Soil loses by washing up

| plot | index | | |
|------|-------|------|------|
| | T/ha | Dif. | % |
| TA | 35.0 | - | 0 |
| CA | 5.0 | 30.0 | 70.0 |



Improved physical characteristics in upland soil

Soil Moisture

| | |
|-------------|------------------|
| B.S; | (TA)18.5% |
| | (CA)22.5% |
| A.S: | (TA)25.1% |
| | (CA)27.5% |

Soil density(g/cm^3)

| | |
|----------------------|------------------|
| Wheat-Soybean | (TA) 1.34 |
| | (CA) 1.33 |
| Maize cover | (TA) 1.34 |
| | (CA) 1.34 |

Improved soil bulk density of CA plot

| Soil types | Method | bulk density(g/m ³) | | | |
|------------|--------|---------------------------------|-------|----------|-------|
| | | Be.S | Aft.S | mid Jul. | Aft.H |
| Paddy | TA | 1.28 | 1.02 | 1.20 | 1.31 |
| | CA | 1.26 | 1.08 | 1.21 | 1.30 |
| Non-P | TA | 1.24 | 1.18 | 1.23 | 1.33 |
| | CA | 1.20 | 1.20 | 1.15 | 1.20 |

Songmun farm.Samsok. 5cmlayer 2006

Number of useful soil animals has increased

Good stubble cover

● Number of earthworm, spider, frogs increased

Songmun; CA-236, TA-36
Ryongchon; CA-194, TA24
Jungsan; CA-76, TA-28

IPM



Increase of yield

Trials shows that yield in CA is 10-15% more than traditional farming

10 % increase of rice and maize yield.

30 % increase in soybean production.

CA effectiveness to TA (rice yield. kg/ha)

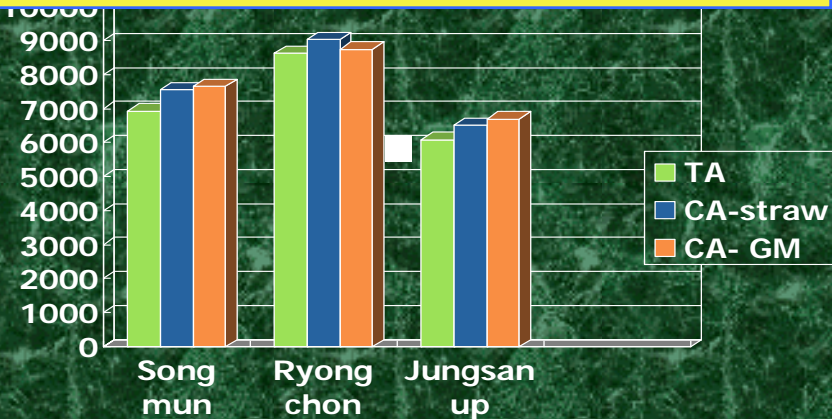
| | | |
|--------------------------------------|--------------------------|-------------|
| Single crop (rice) | CA (Direct Seeding) | 7910 |
| | TA (Rice transplanting) | 7620 |
| Double crops (wheat;rice) | CA (No-till rice trans.) | 4920 |
| | TA (Rice transplanting) | 4170 |

* No-till rice trans.+ S.(4t/ha of wheat straw after wheat)

No- till direct seeding



Yield(maize) increase in 3 project farms.



Maize field in Songmun Farm

• 2005.7.7



• 2005.8.19



CA

TA

Ryongchon Farm



Nineteenth of August



Fifth of October



Economic benefit of CA compared with TA

| | | Fuel (Kg/ha) | labor(person/ha) |
|---------|----|--------------|------------------|
| Paddy; | TA | 72 | 339 |
| | CA | 28 | 179 |
| Upland; | TA | 35 | 195 |
| | CA | 19 | 91 |

CA machinery

Maize planter



Rice/wheat seeder



Small-maize, soybean planter



Animal traction planter



harvesters



manual



ripper



Rice combine harvester




Maize harvester

Conclusion

CA ensures sustainable production resources on the basis of natural materials recycling.

- Increase of soil preservation capacity by residue cover and rational rotation system
- Improves of soil structure by biological strata such as crop roots, earthworms, etc
- Keep and Increase of nutrients in soil thanks to the crop residue cover and *GMCC*

CA contributes to high agricultural production and economic benefits .

- Yield increase 
- Save much labor, time and fuel
- Soil and environmental protection.

Harmonious with nature and bio- ecosystem.

*Thank you for your
attention*

보호농법
의미서원
과목명: 9월 27일
8차업선 4분포

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