



Conservation Agriculture

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Because of conservation agriculture.

It's a drought year again, why your crops grow so well?





What is Conservation Agriculture?



In Brief, conservation agriculture is that technology with minimal soil disturbance, permanent soil cover and crop rotations.

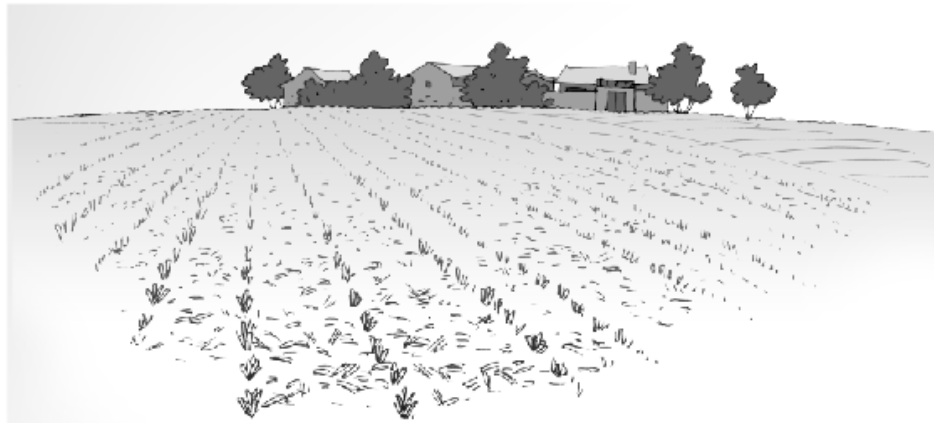
Is that a lazy man
farming?

It can save water and protect soil,
decrease work times, reduce the cost,
increase yield.



Straw residue cover

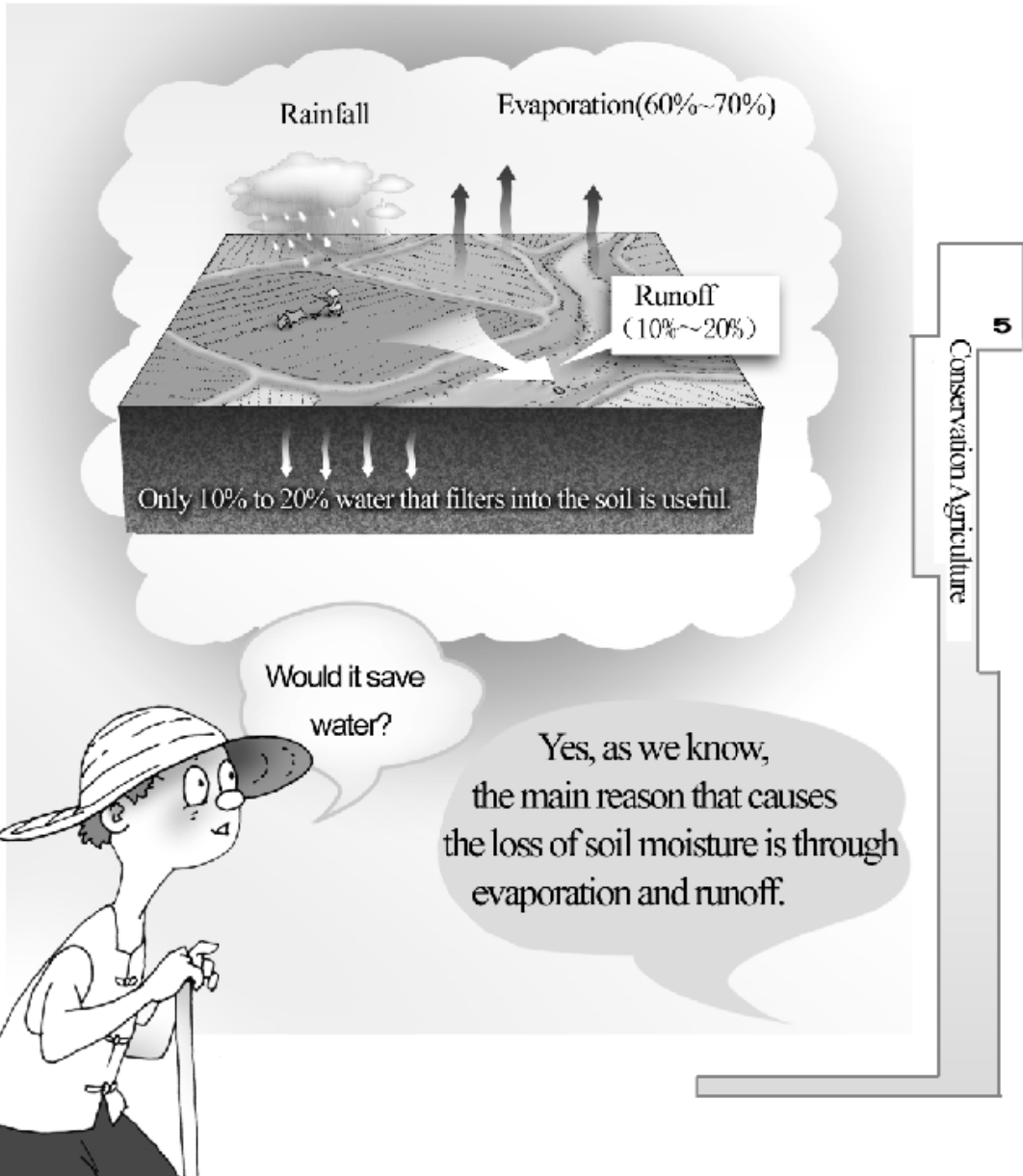




Oh? Is that so good?
Why it can save water?

Straw and stubble cover
on the field, no plowing





Straw cover can reduce evaporation and protect soil erosion.



Yes, water will evaporate when surface soil is exposed to direct sunlight..



The more water infiltrated into soil,
the more water can be stored.
Then how about protecting the soil?

Soil erosions include
wind erosion and
water erosion.

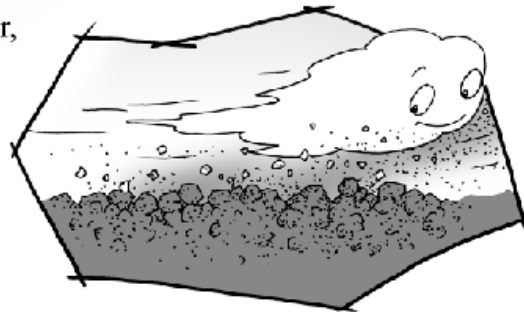


Wind erosion is caused by wind.

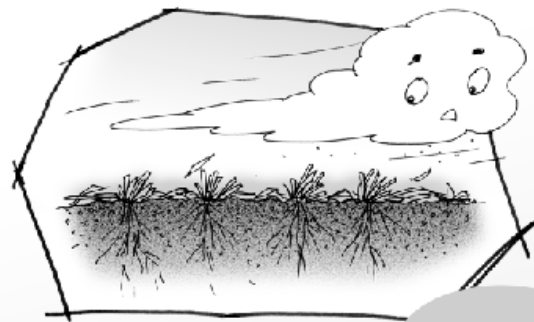
Bare soil without stubble cover, is easy to be eroded which will intensify dust storm.

If the soil is not plowed and covered with stubble,

surface wind speed can be reduced, reinforce soil and increase soil moisture content, which will effectively decrease the amount of soil dust blown from the farmland.



Plowed field



Conservation agriculture field

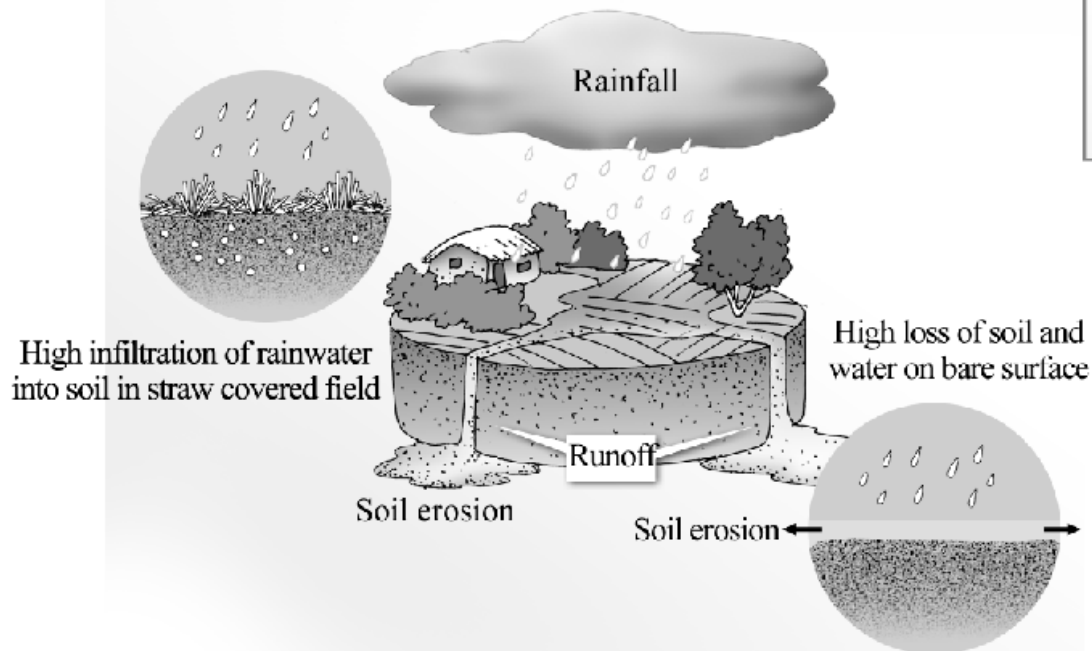
Would you please explain further?





Yes!

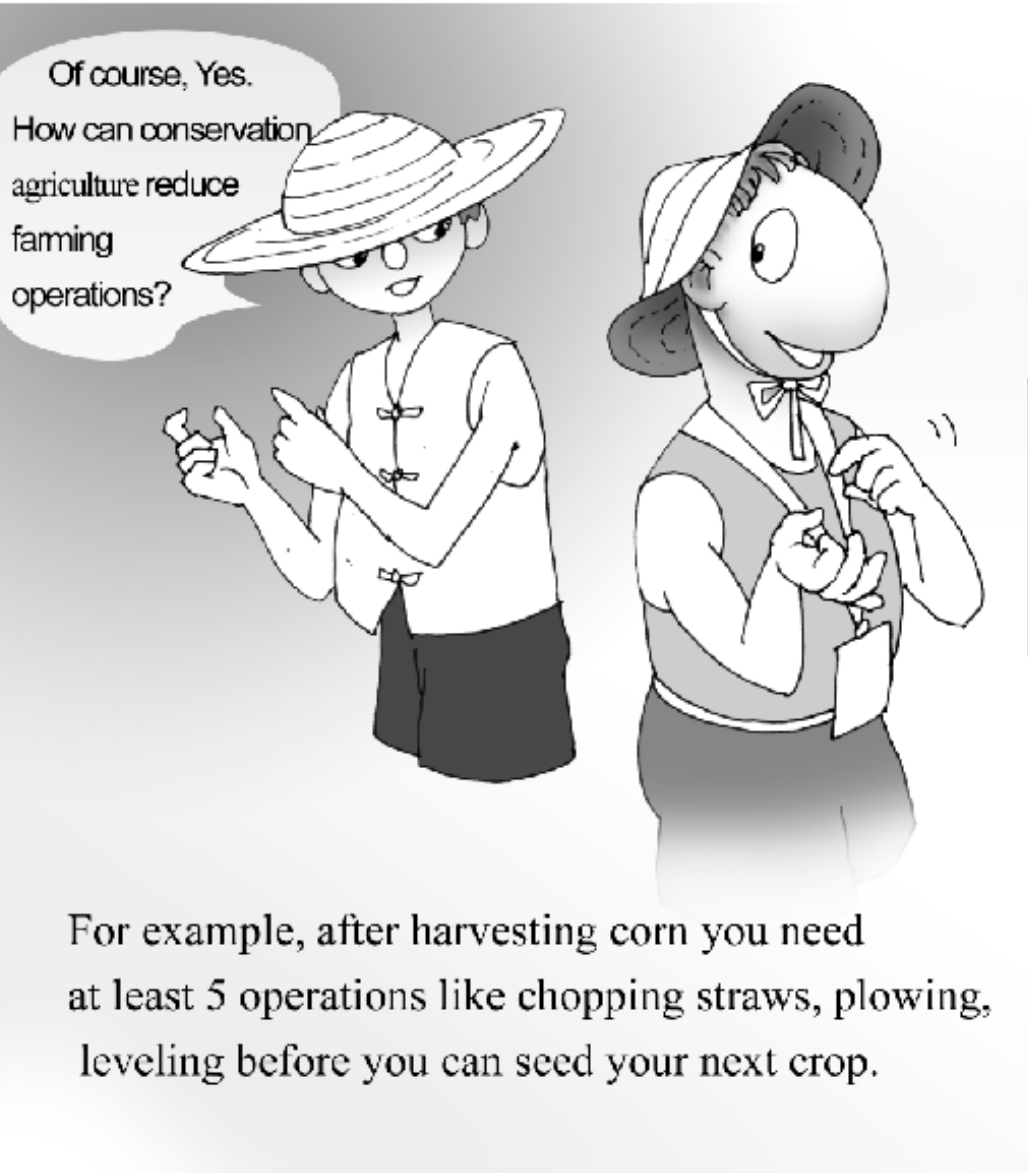
Water erosion occurs when the rainwater carries the surface soil with it. In no tillage field with straw cover can hold rainwater into soil, and reduce runoff, that's why it can reduce water erosion.



Surface soil is soft and fertile so by reducing water and wind erosion, it will undoubtedly preserve soil fertility, right?

Yes. Another advantage is that straw returning to soil can enhance soil fertility, do you agree?



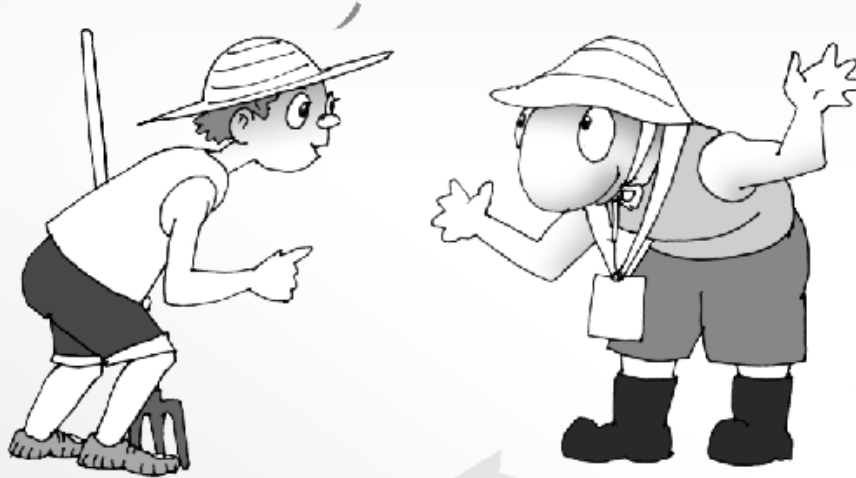


I do not plow after harvest. I chop straws if there are too dense and spray herbicide or use machine to weed. Direct seeding is done with no-till seeder. I can finish my seeding with at most 3 operations, 2 operations less than you.

Yes, how about you?



Reducing number of operations also reduces the cost of plowing, which is understandable, but can it ensure the yield?

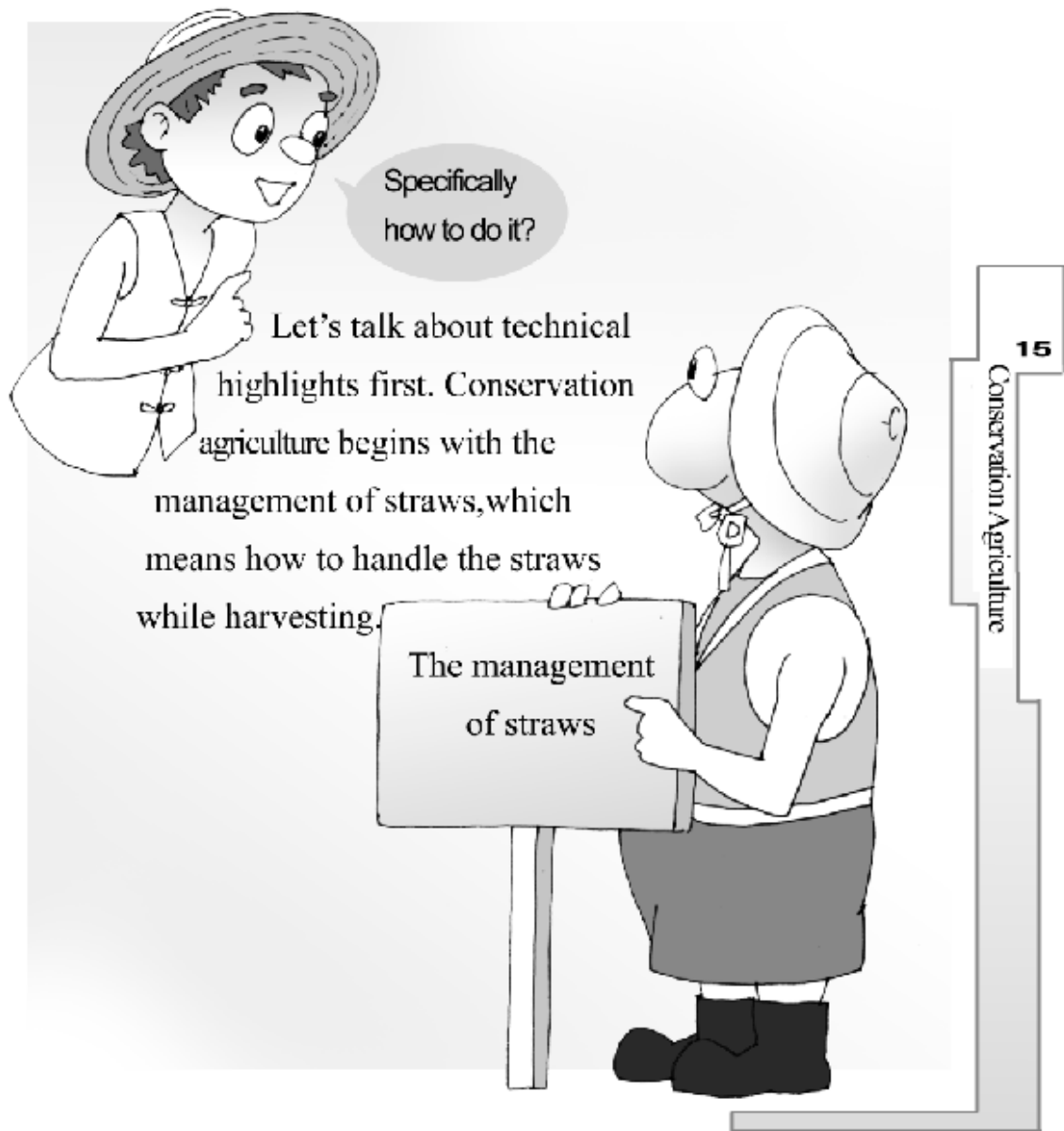


Yes. Soil moisture and fertility increases and with good quality seeder it will definitely ensure the yield.

Farming cost reduction
with better yield will undoubtedly
increase the income!



Yes!



Specifically
how to do it?

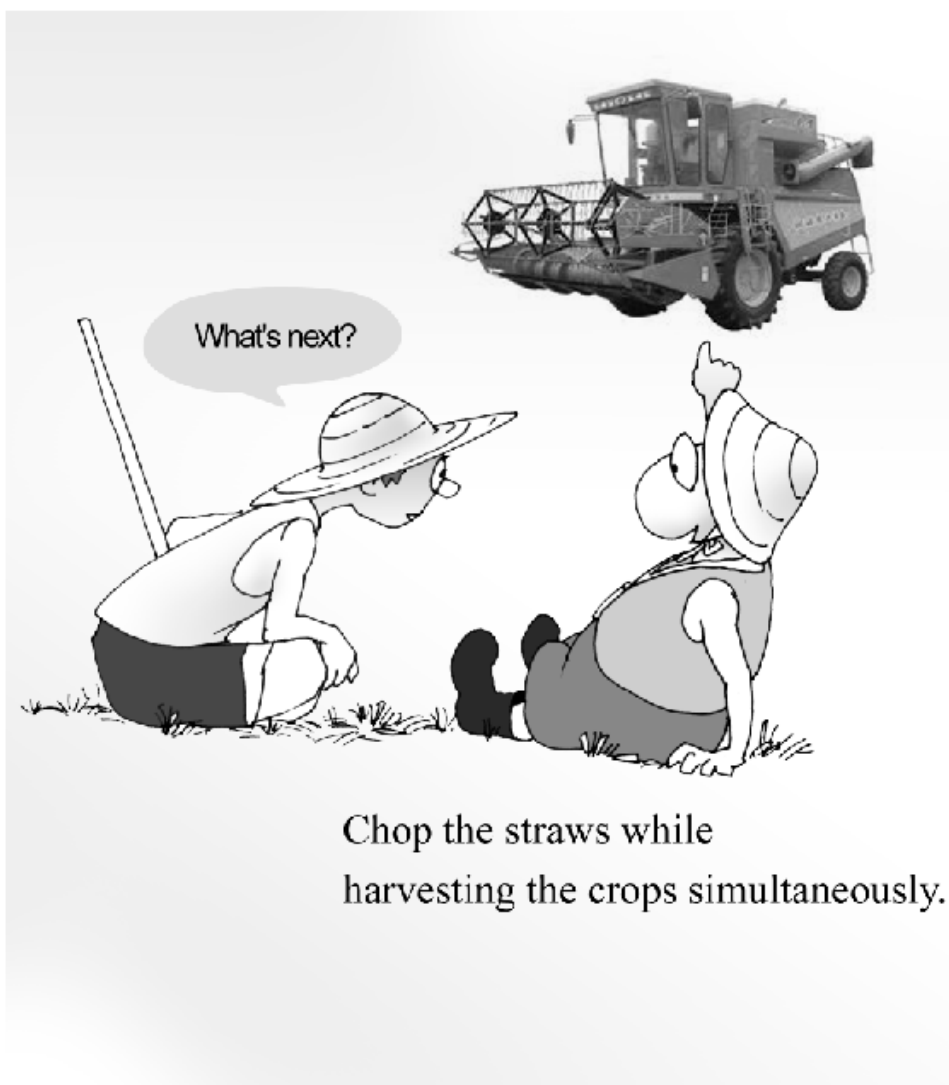
Let's talk about technical highlights first. Conservation agriculture begins with the management of straws, which means how to handle the straws while harvesting.

The management
of straws



Ensure the quantity of straws and distribute them uniformly in the field which will ease the next operations.



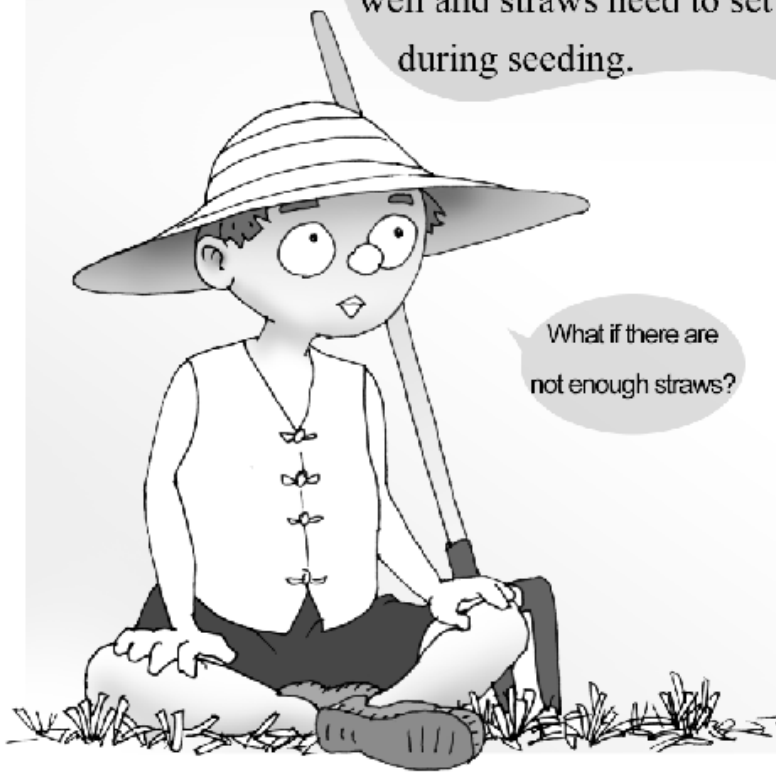


Use straw chopper if the harvester is not equipped with chopping mechanism, right?

yeah, yeah....



Lower yield means less straws in the previous crop. No need to chop the straws if the no tillage seeder works well and straws need to set aside during seeding.



To protect soil and save water,
it's better to crush them before seeding.

It sounds easier
but what to do with the
thick corn stalks. Should
we crush them?



Is there any required quantity of straws?

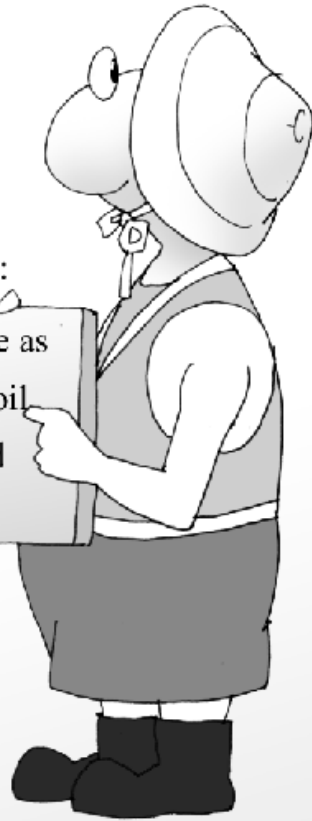
The more, the better, only if you can ensure the seeding quality.

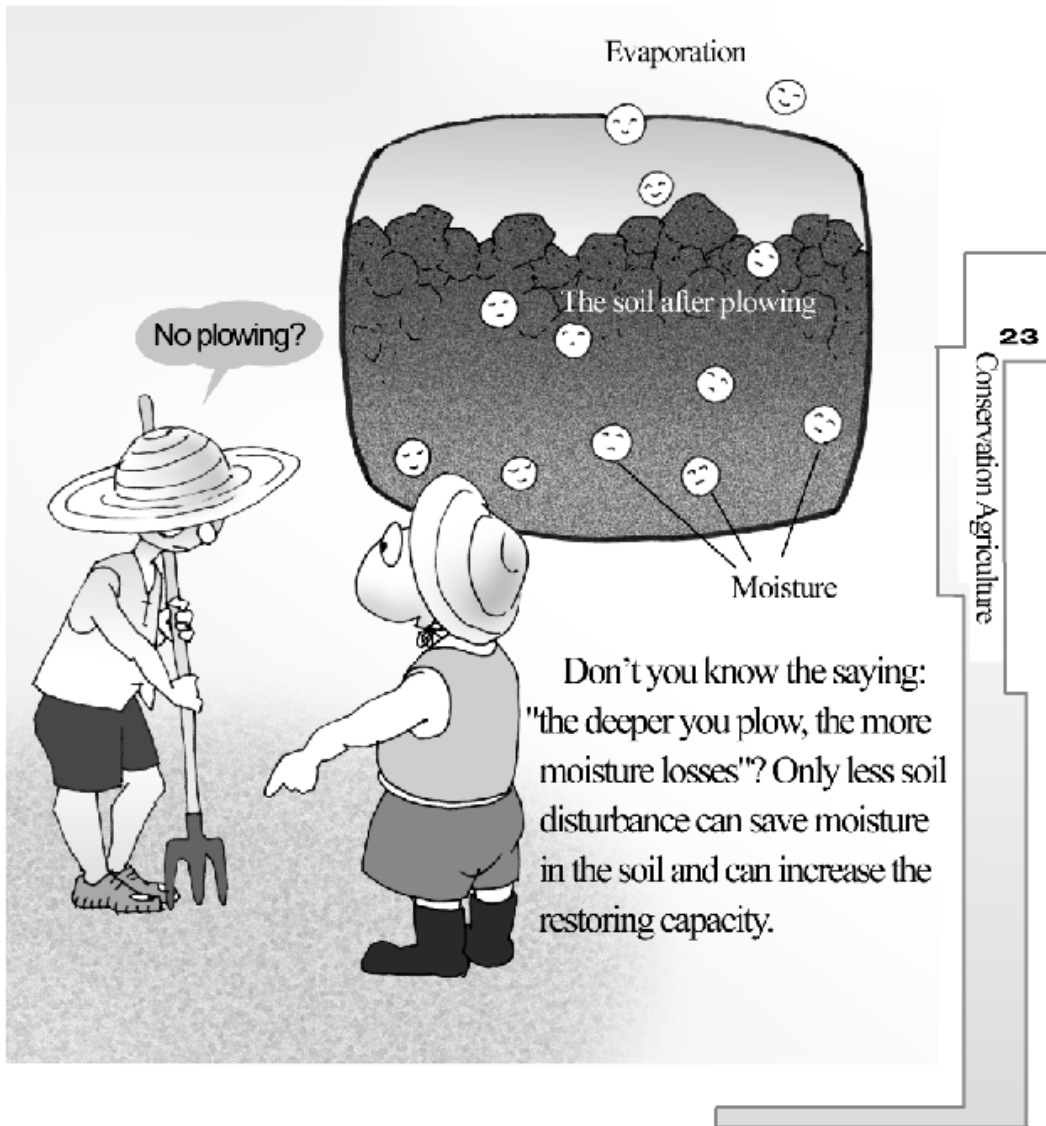


Now I got the meaning
of straw management.
What else should I know?

The second important point is:

Avoiding tillage as
possible, less soil
disturbance and
no plowing.





Less soil disturbance,
less operations,
save money, right?

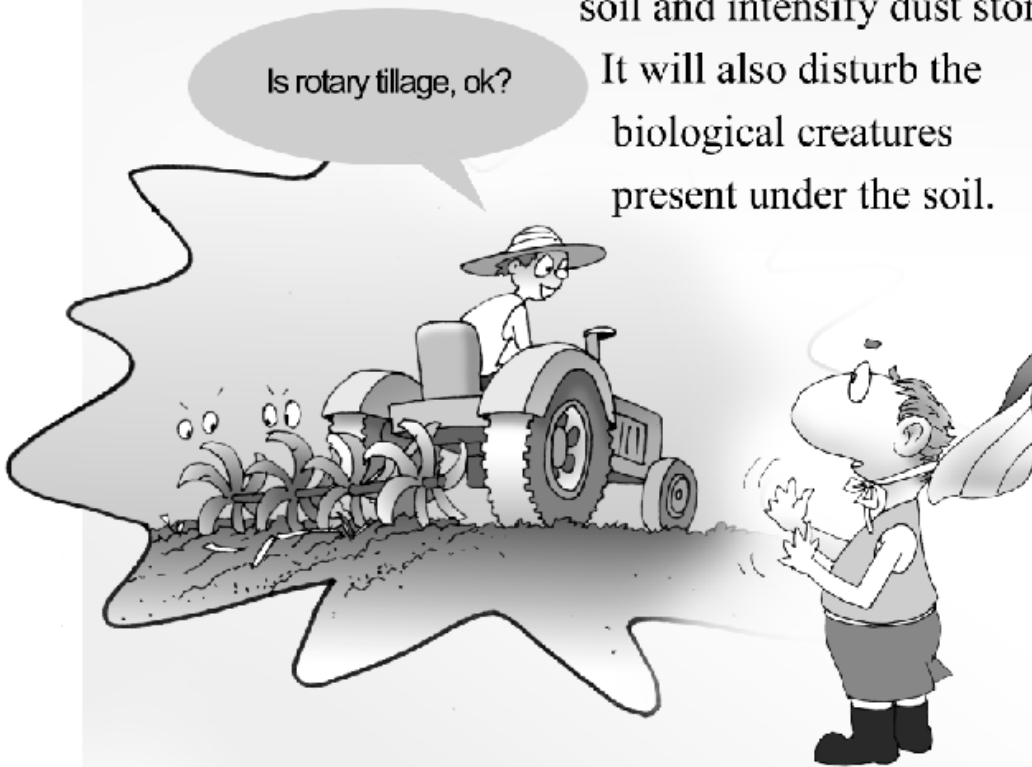


Yes!

Better not to use rotary tillage.
It will pulverize the surface
soil and intensify dust storm.

It will also disturb the
biological creatures
present under the soil.

Is rotary tillage, ok?



Mould board plow tillage

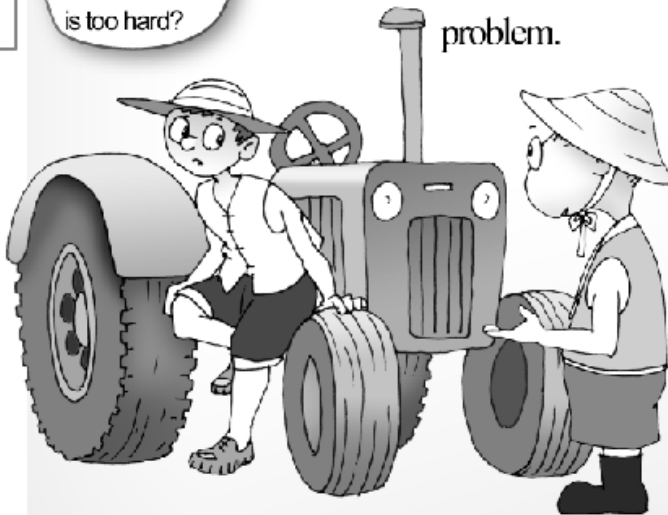


Sub-soiling instead of plowing



Do not plow and do not rotary tillage! How about if the soil is too hard?

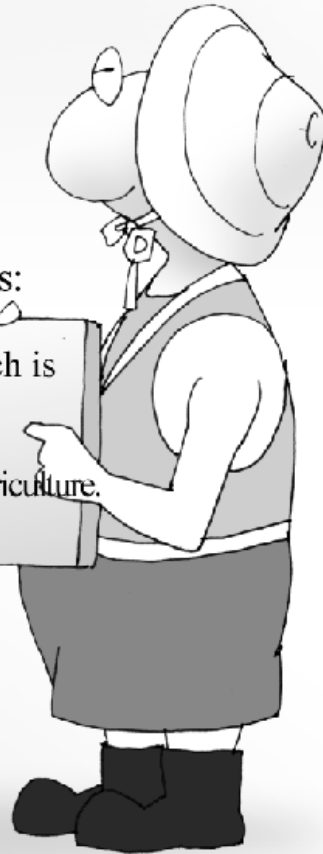
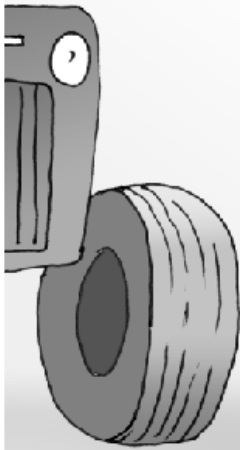
You can do sub-soiling instead of plowing, and be done when there is a soil compaction problem.



I understand.
So, what's the third point?

The third important point is:

No tillage, which is
the key of
conservation agriculture.



While seeding, fertilizer can be done simultaneously with no tillage seeder.

How to fertilize
in no tillage field?





Generally, good quality
no tillage seeder won't block.



But does the straw
block the machine?

Is it possible to make furrow
in no tillage straw covered
field?

Yes, it is.
Our no till seeder can.



Does the fertilizer
damage the seed?



No, the seeder drops
the seed and fertilizer
in different depths.



Oh, it is not as easy as I thought!



Yes, so that no-till seeding is the key.

What else to pay attention?

The last key point:

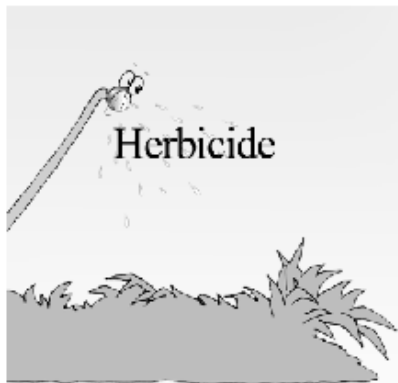
weed and pest control.



Yeah, without plowing and rotary till, what to do if the plant catches diseases?

Mix chemicals with seeds to control pest, or spray in accordance with specific conditions.





Weeding by machine



Artificial weeding



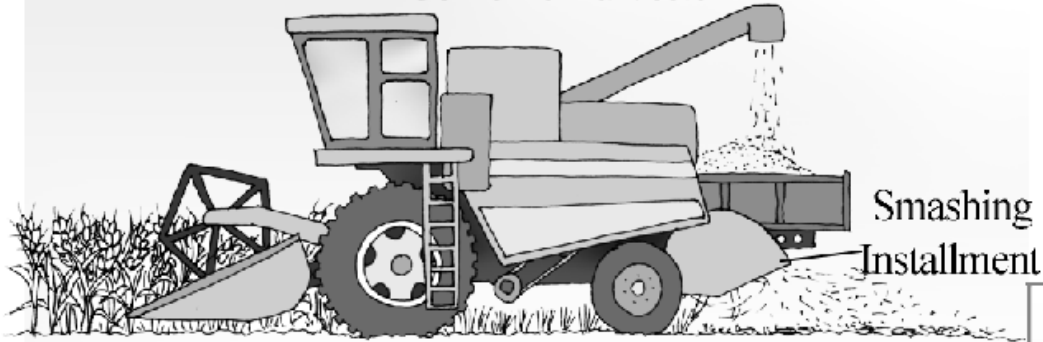
Three methods to resolve weed disease: spraying herbicide, weeding by machine and labor.

Conservation agriculture seems easy. Then what should I do to seed wheat?

Ok, Let's talk about seeding winter wheat by conservation agriculture.



Combine Harvester



Smashing
Installation

37

Conservation Agriculture

So, have to start from
harvest, right?



Right! Combine harvester
chops the straws and distribute
evenly on the soil surface.

The spreader can be equipped in harvester to ensure the even distribution of straw.

What if the harvester doesn't have the chopper?



How to do without
combine harvester?

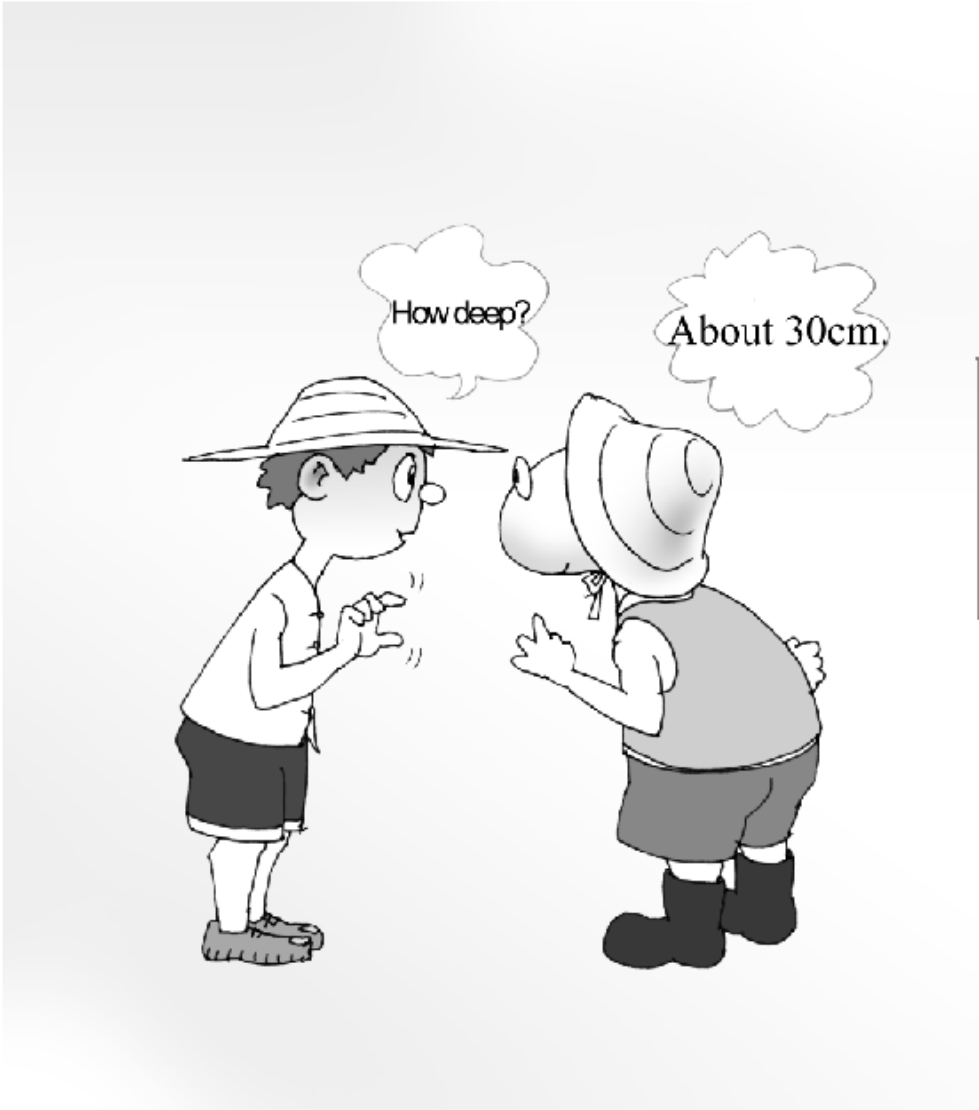


Leave the residue
after harvesting.

Do the sub-soiling when
there is a soil compaction problem.

Second step





How to use the chemicals to control the weeds?

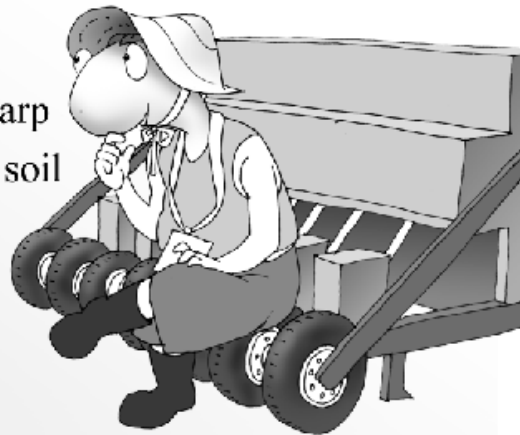
Choose the right herbicide, and spray it when it is needed.





How to control
weeds by
machine?

Use shallow knives or sharp
sweeps to till the surface soil
before seeding.



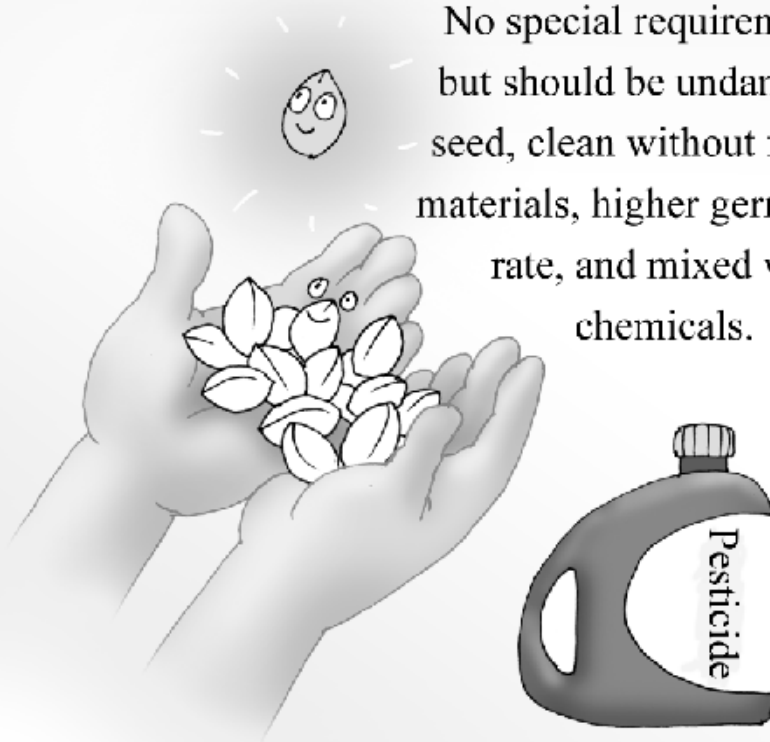
Right! This is a key point of conservation agriculture.

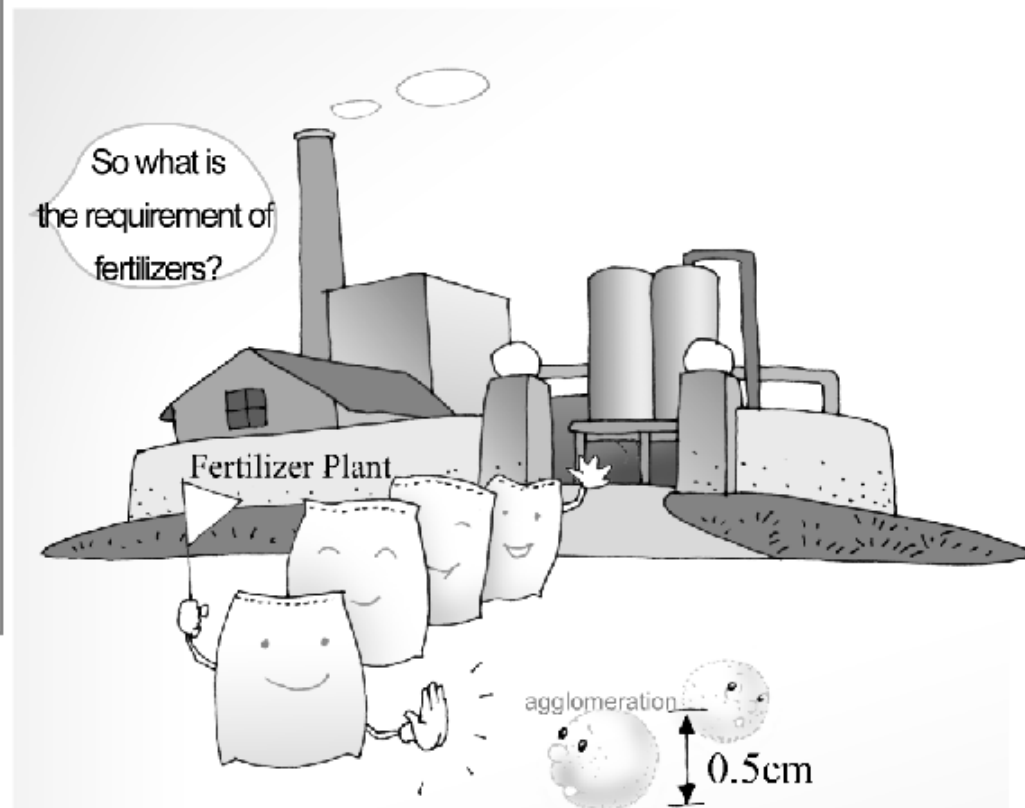
So, the next step is seeding?



So what is the requirement
of seed?

No special requirements,
but should be undamaged
seed, clean without foreign
materials, higher germination
rate, and mixed with
chemicals.





Quality fertilizers, locally available.
Granule fertilizer as it is applied by
machine. In addition, cluster larger
than 0.5cm is not permitted.



Yes! The management is similar after seeding except weed control when needed.



Is it finished after seeding?

Can you tell me also
how to seed maize with
conservation agriculture?



The management begins
from the harvest with cutting
and chopping the stover by
machine or manually.





Three methods to treat the stover after harvest.

First, chop the stover and distribute evenly on the soil surface.

Chopping by labor makes a better harvest.





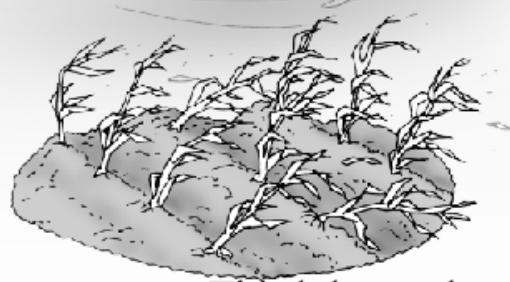
In the windy areas during autumn and winter, use high standing stover to protect the soil.

Second, flatten the stover by roller and use it as the soil cover.

Notice: Do it when the stover is little wet after harvest and laid on the surface. It could be done by labor or suitable machine with a tractor.



Winter Wind



So what is the third point?

Third, leave the stover upstanding. It is common in the areas with frequent heavy wind.



Is there any other requirements?

Seeds and fertilizers are both important, and the requirement is the same as wheat.



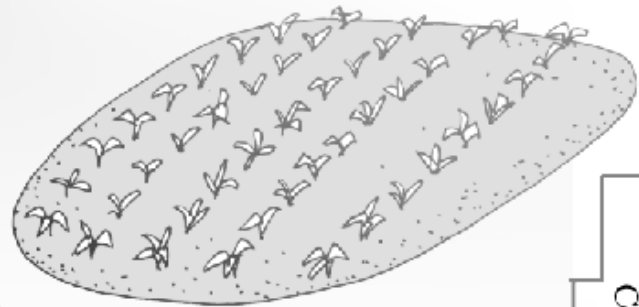
It will save lots
of work!

Yes, it will!





Are there any special requirements for the maize management?



No.

Other managements such as chopping, rolling, additional fertilizer, weed and pest control can be applied according to the requirements.

I think it is not difficult!



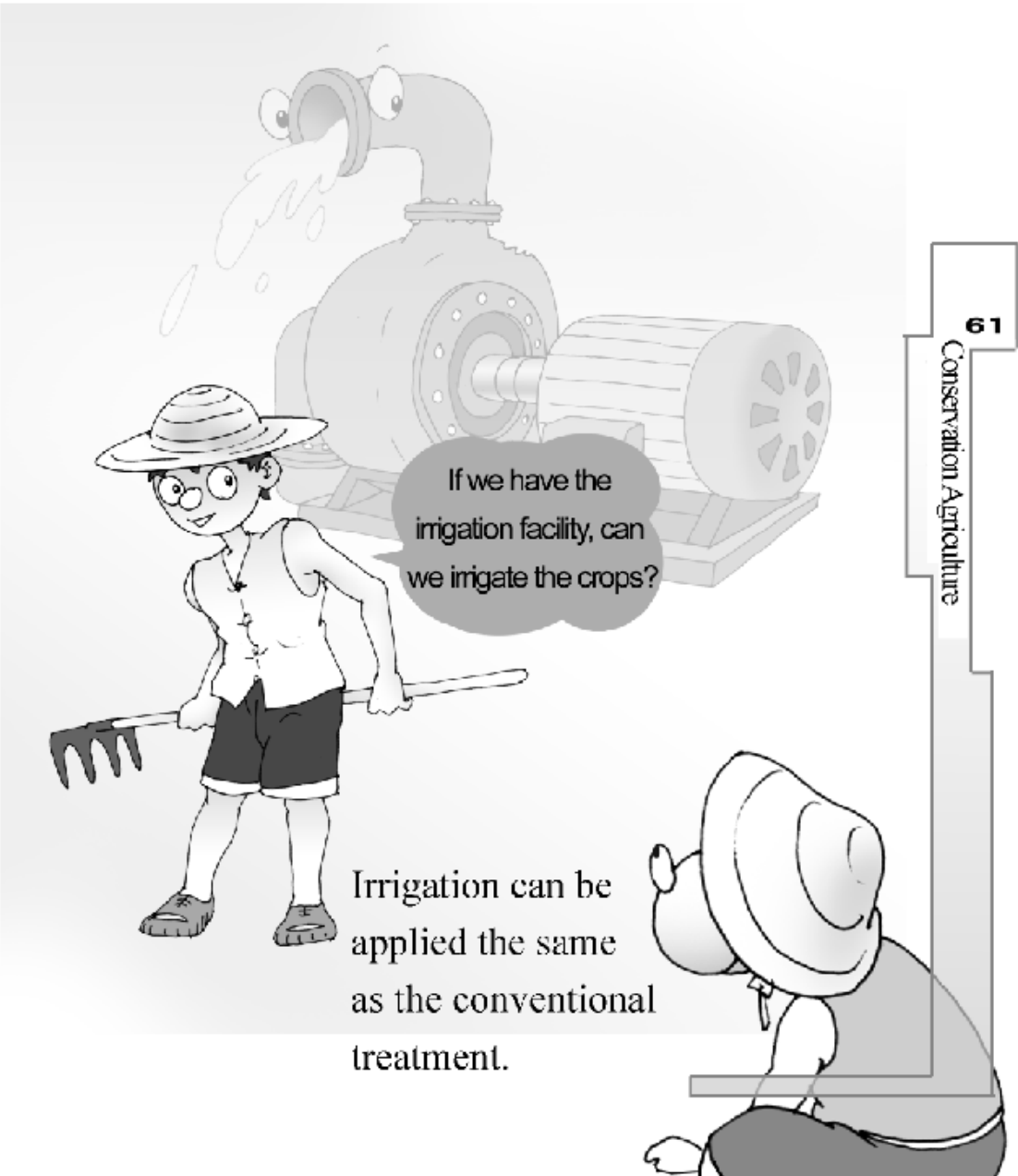
Spring maize can also be seeded using ridge tillage. The best way for using this kind of tillage is keeping the original ridge to eliminate the tillage, and direct seeding on the beds.



How about the
seeding of other crops?
Are they the same with the
wheat and maize?

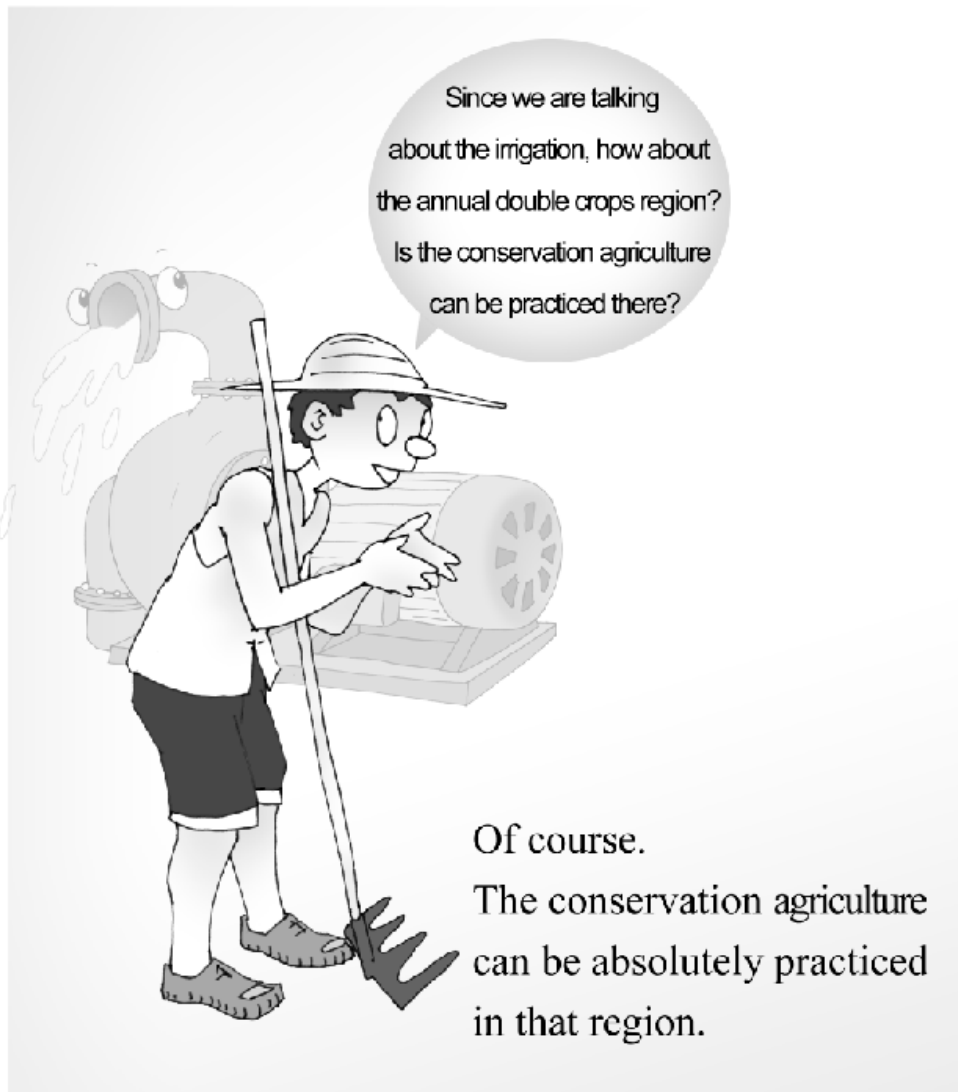
Almost the same. Most of them
can be seeded with conservation
agriculture, such as rice, bean,
and millet.





If we have the irrigation facility, can we irrigate the crops?

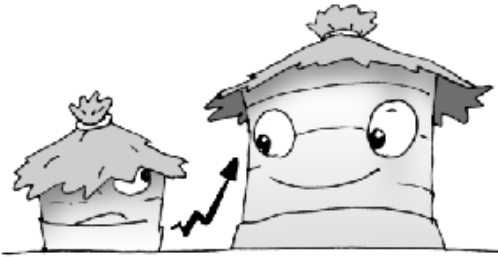
Irrigation can be applied the same as the conventional treatment.



In the wheat-maize rotation crops a year field, direct seeding of maize by no tillage or strip-tillage after harvesting winter wheat and direct seeding wheat by no tillage after harvesting summer maize.

So, how to do it?



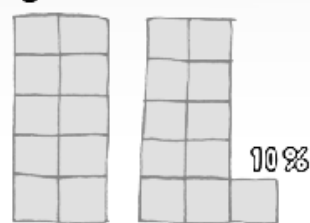


So, what will happen to the yield if the two crops a year are both seeded without plowing?



There is nothing to be worry about. The productivity can be assured and the benefits can be even better.

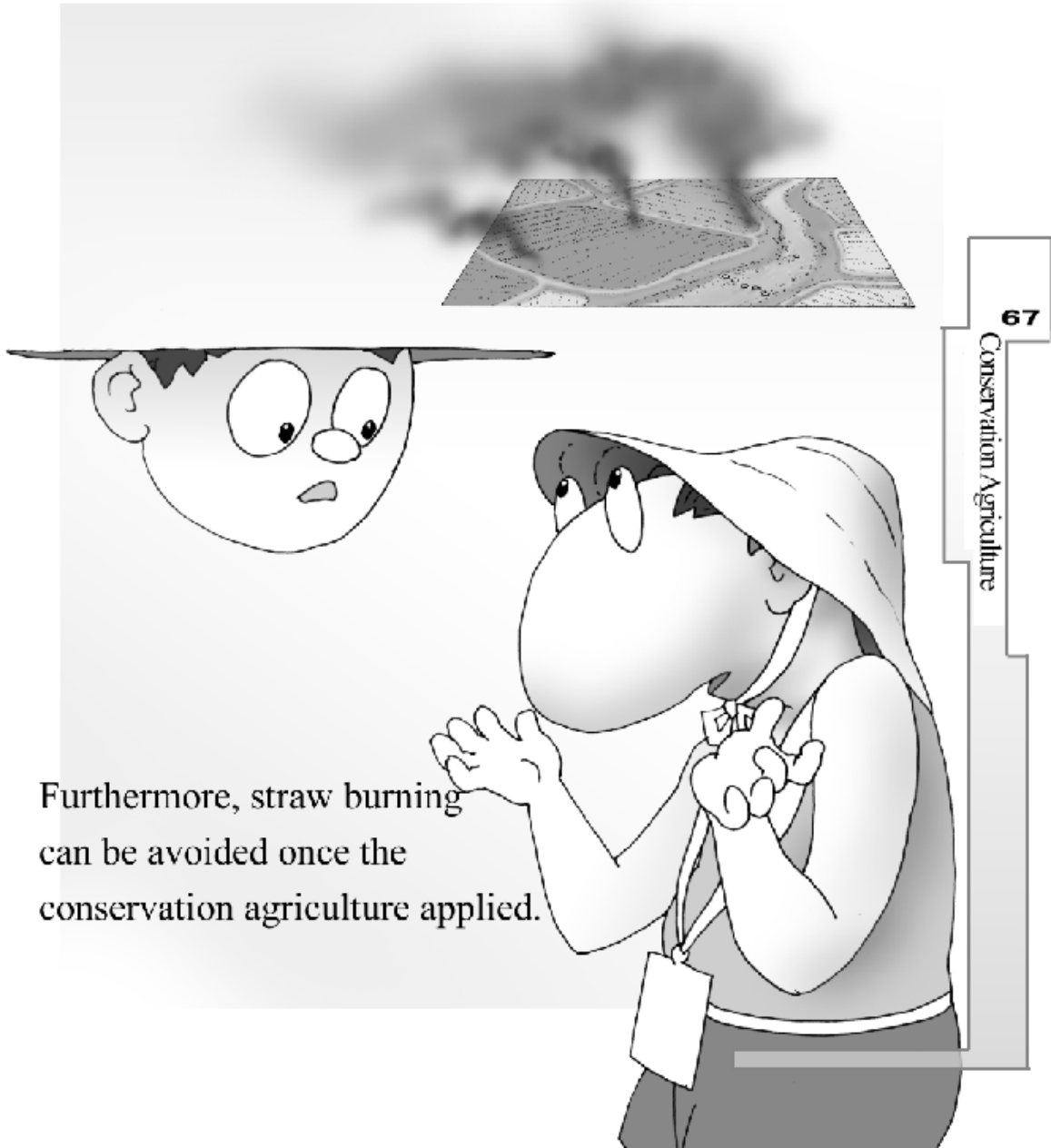
Input and yield are both high in annual double cropping areas. Some fields even get the yield of 15t/ha, which we called “Ton-grain field”.



Please tell me some,
I want to know it.

If the conservation agriculture was practiced, the labor and time could be saved, input could be reduced, therefore, efficiency could be increased.





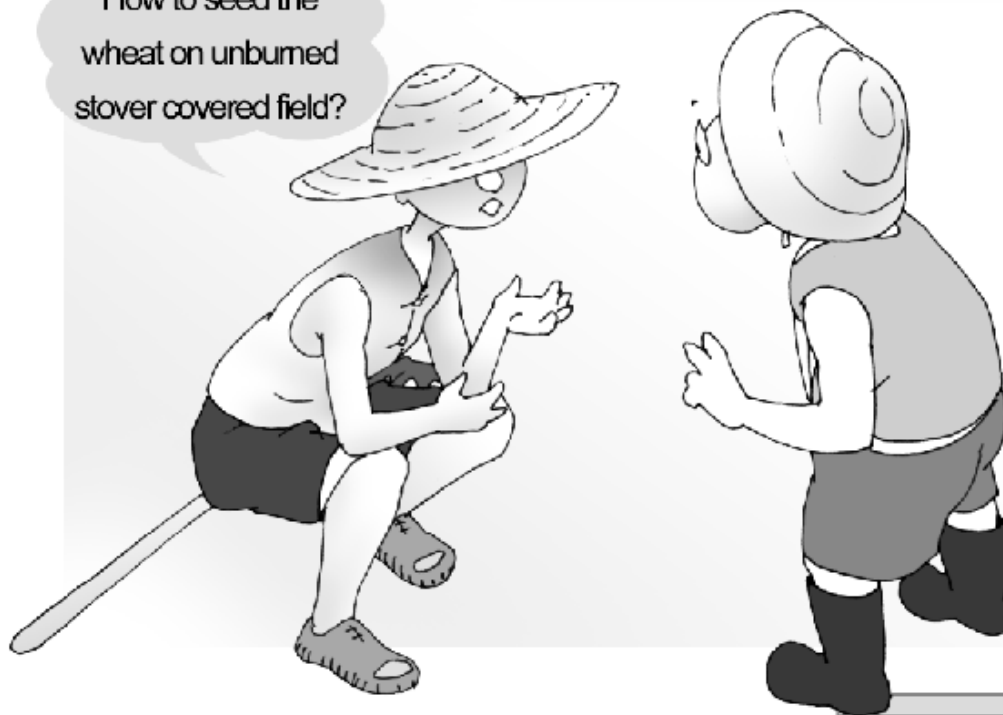
Furthermore, straw burning can be avoided once the conservation agriculture applied.

I totally agree with you! Smog produced by the straw burning will pollute the environment, affect the daily traffic, and is also loss of resources. It should be completely prohibited!



For example, In Shaanxi province along the Great wall, the spring maize plants residue on the treatment field are being used in sandy area. In this treatment, the maize is harvested manually, and 0~30cm residue is remained on the field to conserve the soil. Next year in spring, direct seeding is done.

How to seed the wheat on unburned stover covered field?



Yes! That's why we choose the conservation agriculture now, in which the straw was chopped after harvesting the crop and conservation agriculture can be done.

It was really difficult practicing traditional agriculture in comparison with the conservation agriculture.



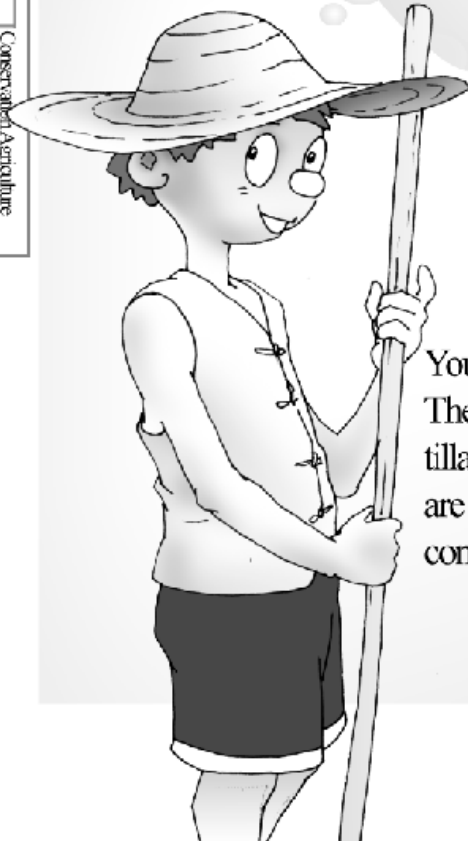
Therefore, it is much easier for sowing with conservation agriculture.



Right!



As you said, the conservation agriculture is indeed a good system. In my opinion, no tillage seeder is very important in practicing conservation agriculture.



You are right!
The technology of developing no tillage seeder and other equipments are important in realizing the conservation agriculture.

Please introduce the technology of conservation agriculture equipments in details. I'm interested in this kind of machine.

Sure. Let's talk about the no tillage seeder.



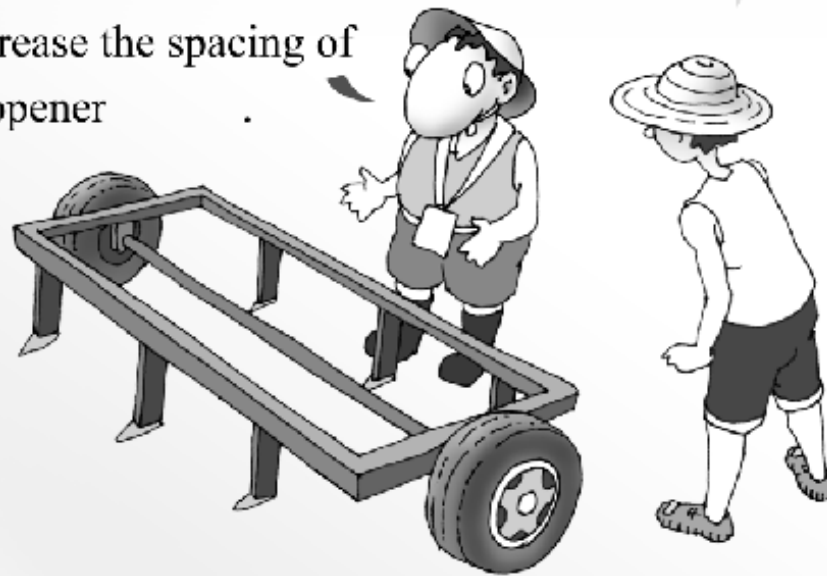
No tillage seeder can open the seeding and fertilizing zone, soil covering and pressing. Furthermore, it needs to have the special ability of anti-blocking, stubblebreaking, seed and fertilizer separation, and depth controlling.

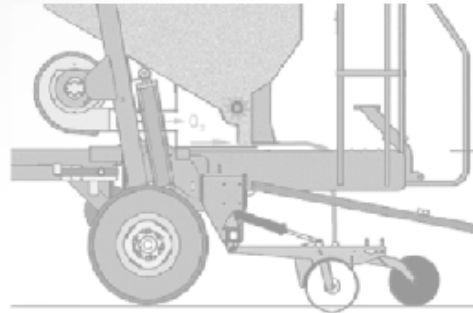
No tillage seeding is difficult.



We have several technologies. The first method is applied with double-frame structure to increase the spacing of the opener

Straw clearing and anti-blocking are the basic requirements of no tillage seeding. But how to realize the two functions in no-till seeder?





It is really simple and practical method to realize anti-blocking, but I'm afraid that the anti-blocking ability is limited.



That's why we use this technology on the no tillage winter wheat seeder which is broadly practiced in one crop a year region. The second method is applying disc opener to achieve strip-chopping and stubble-cutting.

Disc opener? Maybe it can realize anti-blocking function when it is rolling.



But it needs huge weight to penetrate the soil. Disc anti-blocking method is widely used in the world.

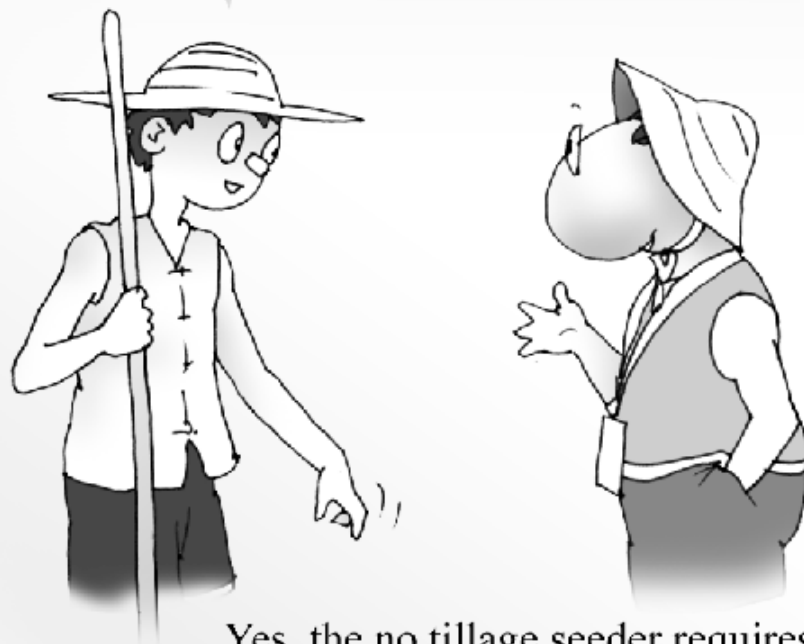


Is there any other anti-blocking method?

There are also other power driven anti-blocking technologies, such as strip-rotating, strip-chopping, straight knife anti-blocking and power-disc anti-blocking, etc.



So the stubble breaking and soil penetrating refers to the opener penetration on the no tillage field, is there any special requirements?



Yes, the no tillage seeder requires high ability of the opener to penetrate the soil, especially when the no tillage field is hard.

Thanks for your information about conservation agriculture. I will use this method and will also introduce it to my friends and relatives.



It is my pleasure!
Wish you for better benefits
from conservation agriculture.



