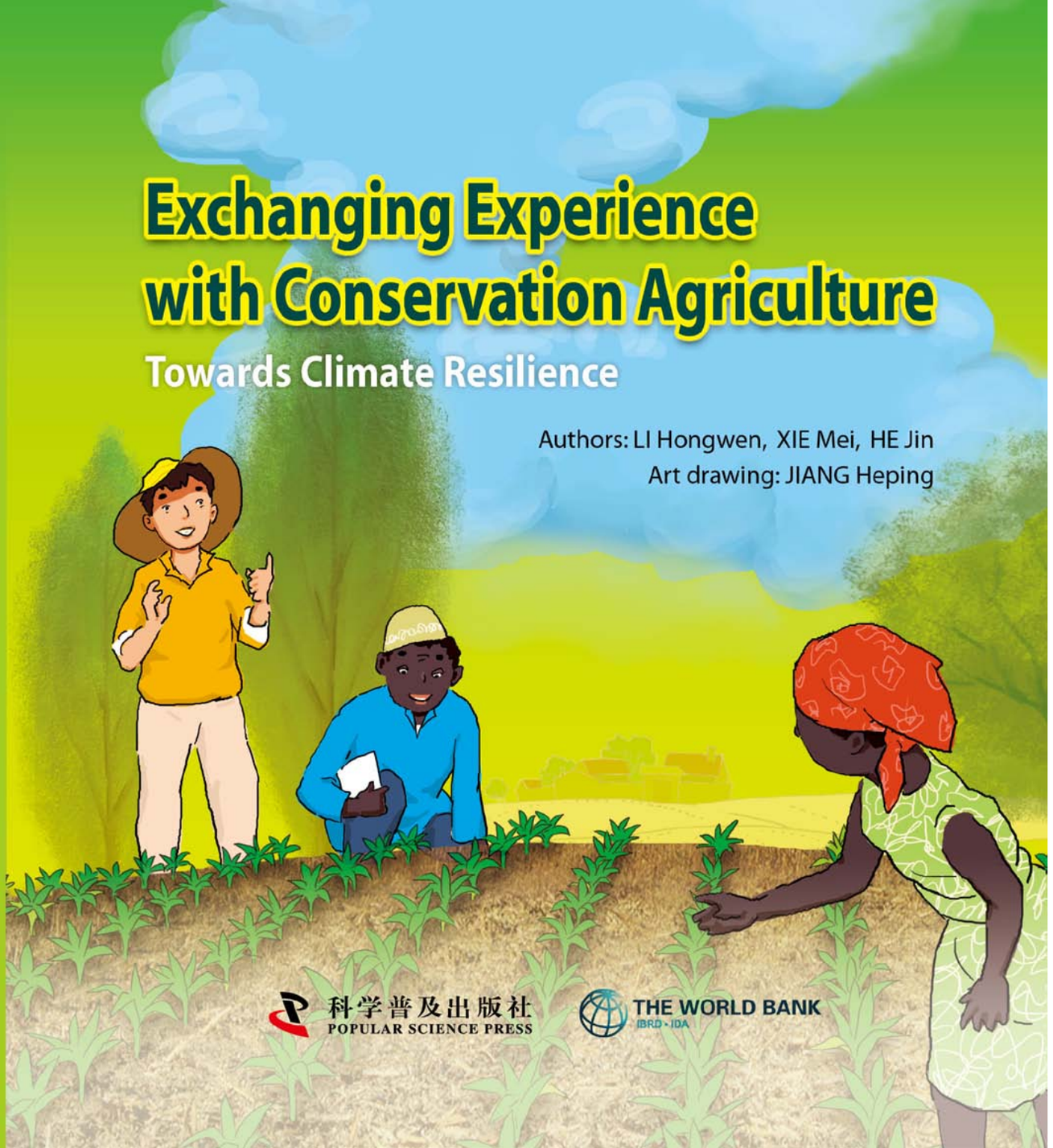

Exchanging Experience with Conservation Agriculture

Towards Climate Resilience

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The conservation agriculture technology won four national scientific and technological awards in China, and is among the key areas of technological innovation in agriculture that the government is promoting domestically.

Exchanging Experience with Conservation Agriculture
Towards Climate Resilience


Welcome south-south knowledge sharing delegation
My name is Li Long. Welcome to my farm.
Thank you for inviting us!
It is our pleasure to meet you, Mr. Li.
I hear that you are having a bad drought. But I see that your crops are doing very well. What is your trick?
Well, my "trick" is conservation agriculture.

Conservation agriculture? I've heard about it. It's reported to be a common practice now in the USA and Brazil, and is spreading within Latin America and to Central Asia.

Did you say "conservation agriculture"? I've seen it in Zambia. Tell us more about it.

1.No plow, no till

2. Cover the soil

3. Rotate crops from year to year

It is a new way of growing crops that saves labor and makes the land healthy. Three important things….

How have you benefited from this new way of farming?

In a lot of ways! First, less soil erosion in my field. Remember point 1, "Don't plow"? Plowed fields without vegetation cover get easily eroded by wind and water.

Erosion by wind

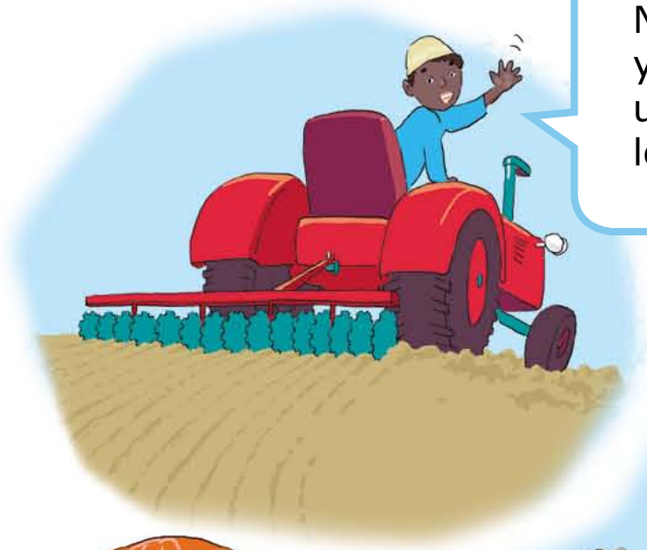
Erosion by water

Soil erosion is a big problem in our region ….

Yes, you often see earth-colored water running off farm lands.

I heard about the "Great Dust Bowl" of the last century in the US. That was because of plowing large fields year after year. To address this problem, the US started no-till.

We also have bad dust storm problems, and they affect cities too. Soil erosion used to be my headache. That was partially why I decided to stop plowing.



No plow? How do you sow seeds? I use a disc plow to loosen the soil ….

Not even an animal-drawn plow?

Plowing creates a hard plough pan

Plowing reduces water infiltration and moisture holding

Plowing disturbs soil organisms

Actually, we say: "The deeper you plow, the more you lose!"

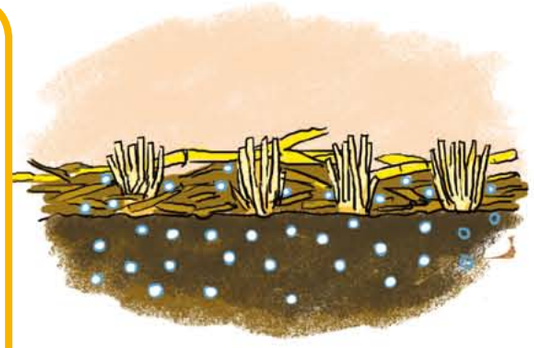
Plowing exposes organic matter, releases greenhouse gases

Li Long, in our region, when heavy tropical rains hit bare soil, the runoff washes away topsoil. Can conservation agriculture help?

Yes! Remember the second point of conservation agriculture?

"Cover the field"

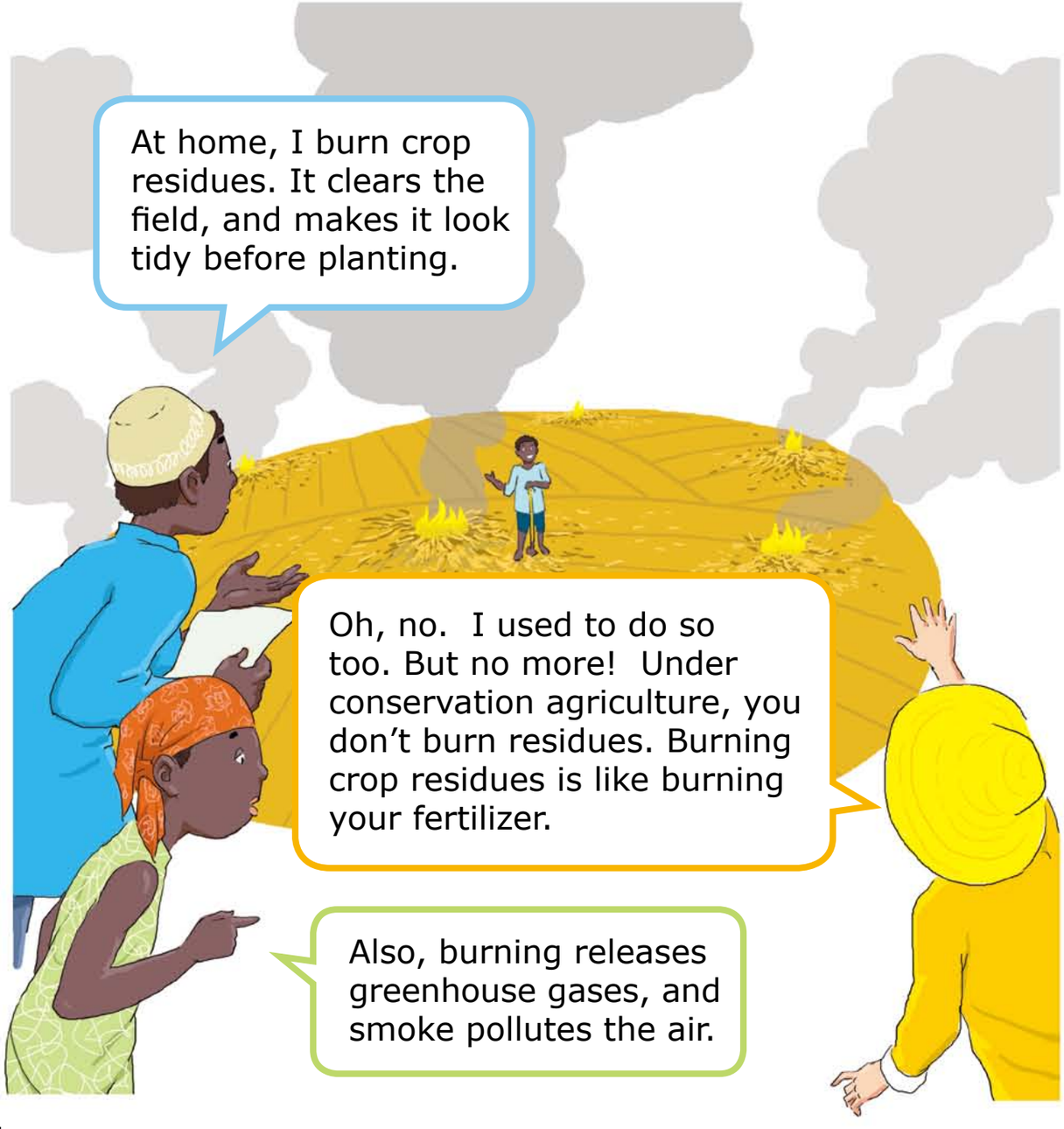
Right, Amos.
Under conservation agriculture, I leave crop residues in the field to cover bare soil after harvesting. So, runoff and evaporation are both reduced.

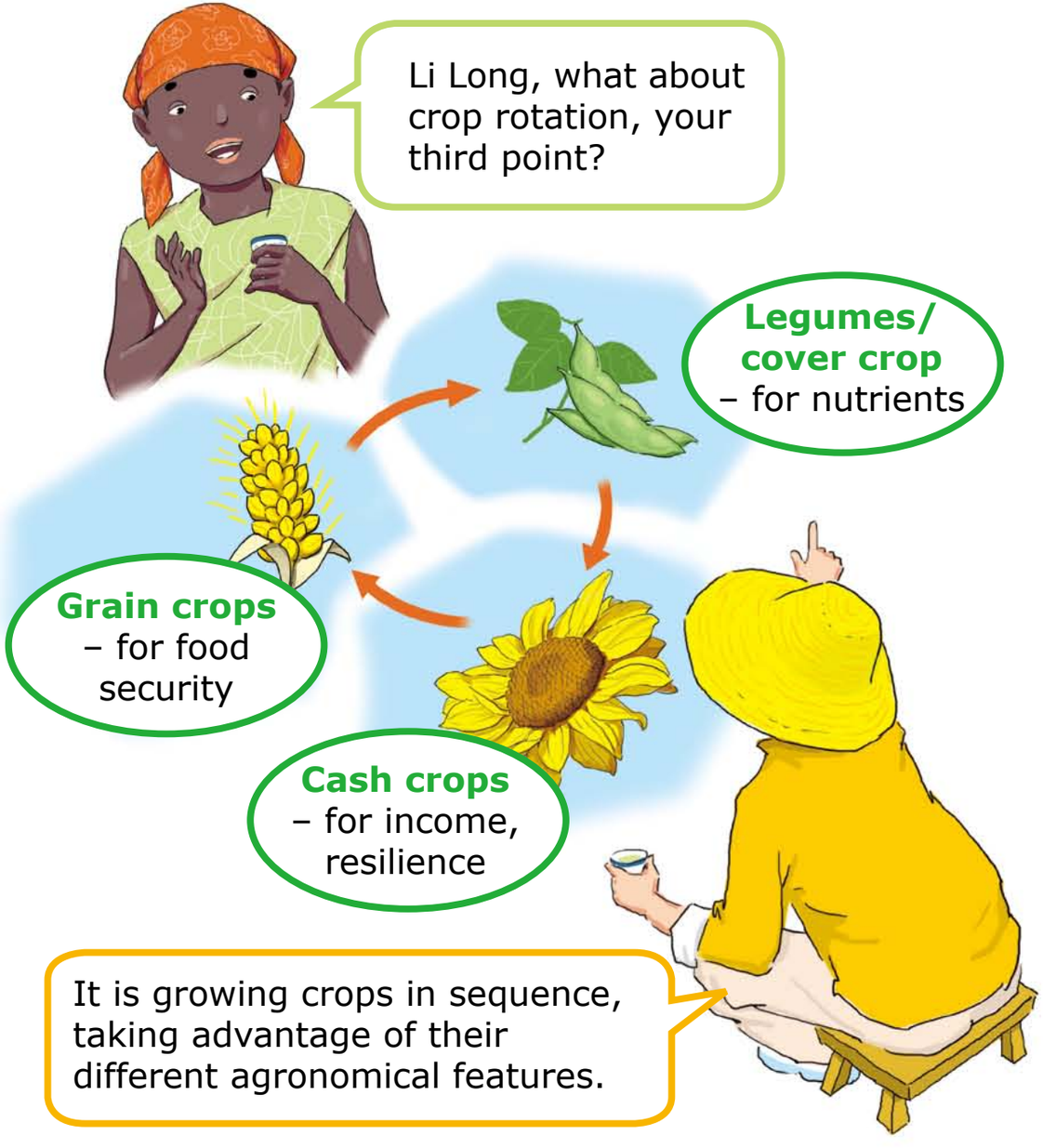


I see … more moisture is kept in the soil for crops to grow. It helps during dry spells or droughts.

… and when soil is covered with residues, the surface wind speed is slowed down.

… it reduces soil blown from farmland too.


At home, I burn crop residues. It clears the field, and makes it look tidy before planting.
Oh, no. I used to do so too. But no more! Under conservation agriculture, you don't burn residues. Burning crop residues is like burning your fertilizer.
Also, burning releases greenhouse gases, and smoke pollutes the air.

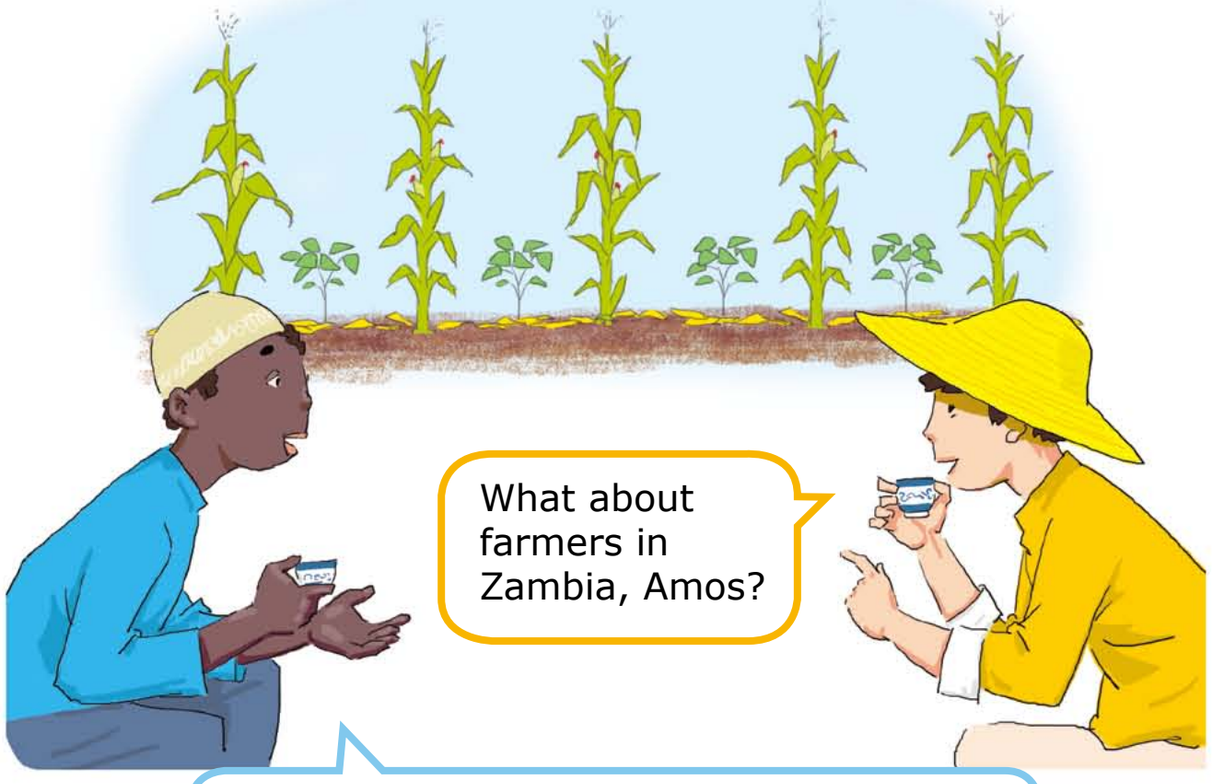

Li Long, what about crop rotation, your third point?
Legumes/ cover crop – for nutrients
Grain crops – for food security
Cash crops – for income, resilience
It is growing crops in sequence, taking advantage of their different agronomical features.

For me, after wheat harvest, I directly seed maize with no-till. Sometimes, I add a legume crop to improve soil nutrients and control pests.

Combine Harvester

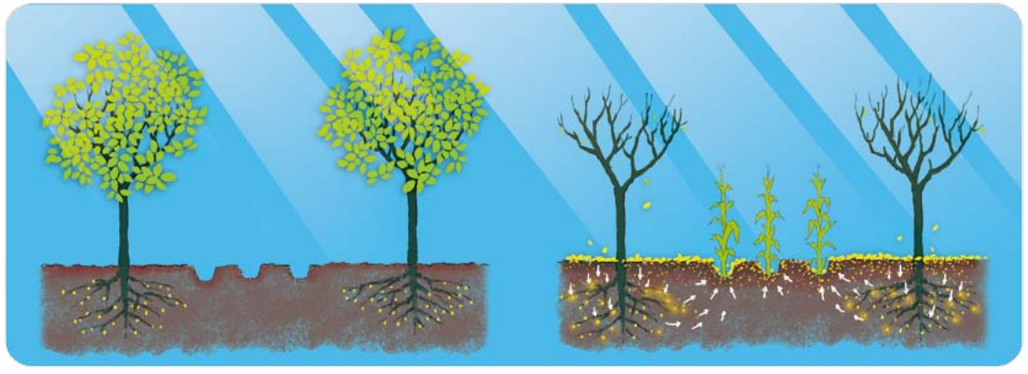
Chopping

Direct seeding

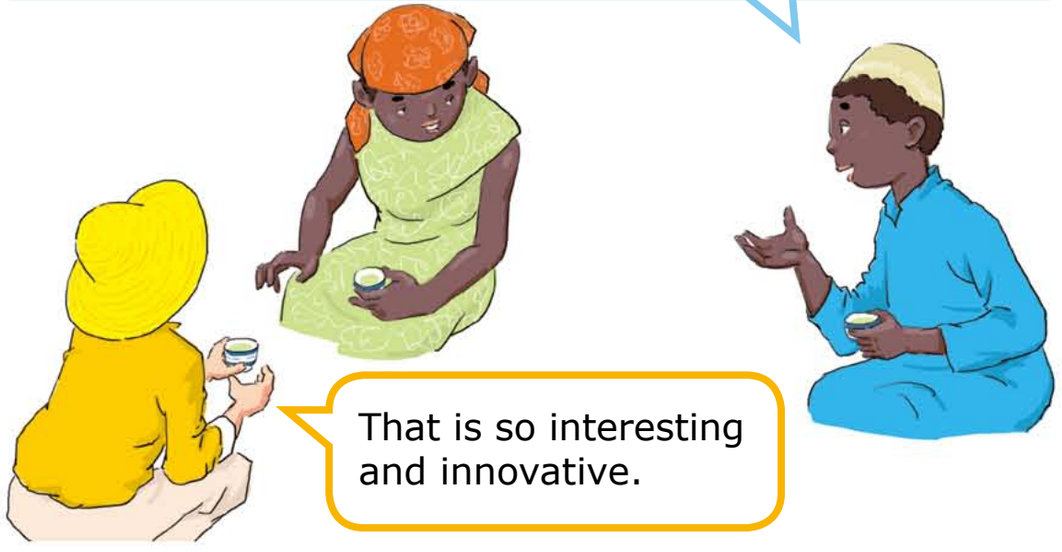


What about farmers in Zambia, Amos?

Some farmers grow a cereal crop, followed by a cash crop like cotton…then, a legume crop, such as beans. In Africa, farmers often use crop association through intercropping rather than crop rotation.

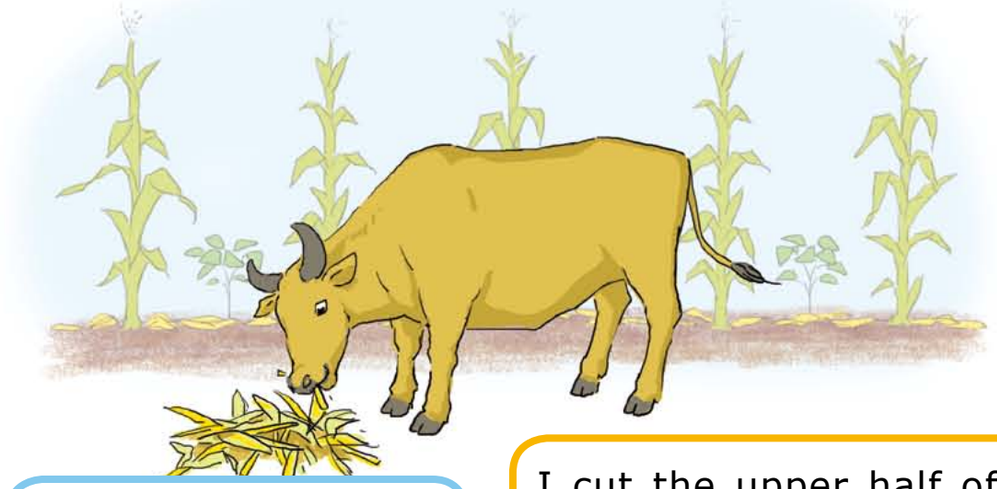


Some innovative farmers practice agroforestry, using faidherbia trees in croplands. They call them fertilizer trees, whose nitrogen-rich leaves drop on the ground during the cropping season, enriching soil, and making crops stronger.



Li Long, this is all wonderful. Now let us get to specifics. What do you advise me to begin with if I want to do conservation agriculture?

Well, you should begin at harvest. Either you harvest your crops manually or by machine, leave 20 cm height of residue on the ground.



What if we need crop residues to feed livestock? How do you manage it?

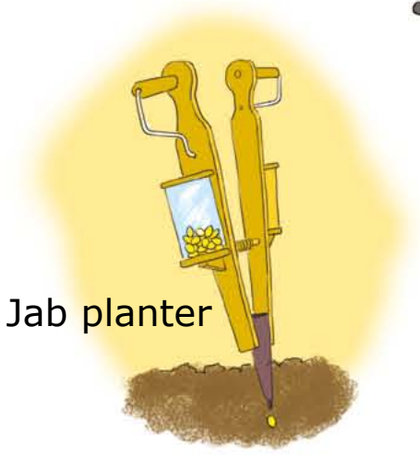
I cut the upper half of my maize crop for livestock, leaving the lower half on the ground. I also started to grow a fodder crop this year.

How much residue should I leave in the field?

The more, the better. If you don't have enough, you should at least cover 30% of the field. Distribute the residues evenly.

Does conservation agriculture require special seeds?

No. I use undamaged seeds with a high germination rate. I pre-mix them with chemicals against pests and diseases.

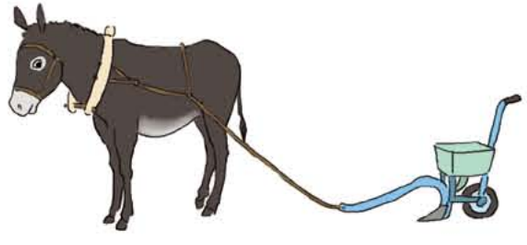


Jab planter

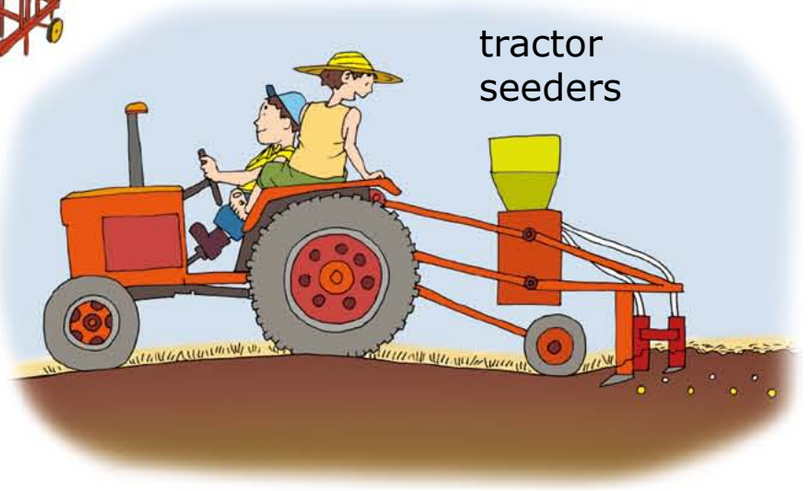
Bike planter

Li Seeder

How do you seed if you don't plow? Wouldn't the ground be too hard to sow?

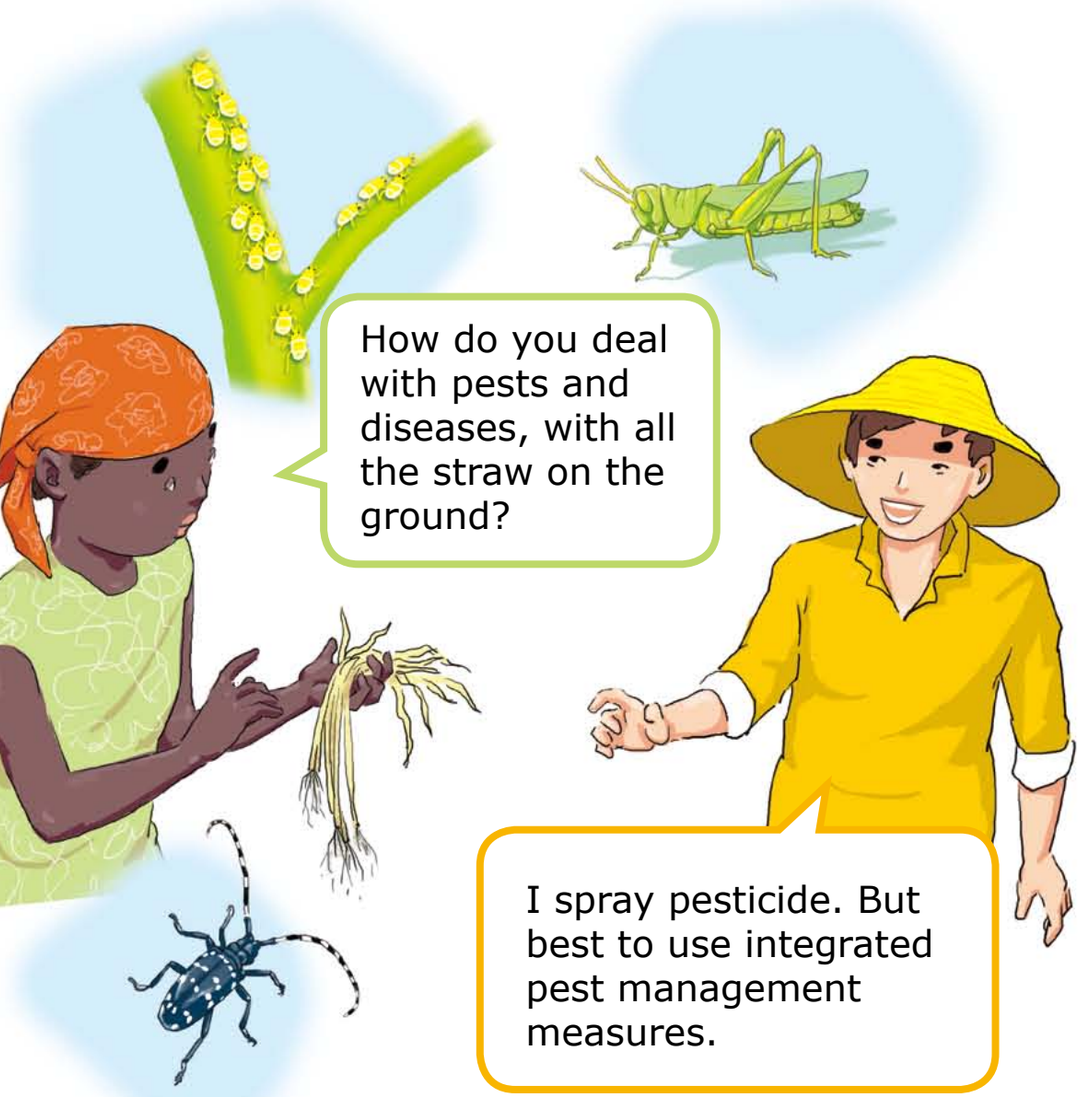


Walking tractor seeders



tractor seeders

You can use no-till seeders like these. Over time, mulching makes the soil soft to work with.


How do you deal with pests and diseases, with all the straw on the ground?
I spray pesticide. But best to use integrated pest management measures.


How do you control weeds if you don't plow?
You can weed by hand, herbicide or machine. You should control weeds before they set seed, so weeds become less of a problem over time.

I hear conservation agriculture could increase manual labor input. But you said it reduced labor input. How?

I used to do four operations. Now I do only two. Big savings!

4. Seeding

3. Leveling, pressing

2. Plow

1. Harvest & chopping

Conservation agriculture stores carbon in soils, and reduces GHG emissions. It is climate-smart.

We farmers can be climate-smart. Healthy land and sustained production make us better prepared for climate change.

Absolutely!

Li Long, was it easy for you to switch to conservation agriculture ?

Village meeting

Farmers touring

It has been a learning process. I learnt it from these sources….

Radio, TV


Benefits of CA
Hmmm… It is best to talk to our extension officer, Ms. Jiang Ying.
Li Long, how does government support conservation agriculture?
Pleased to meet you. Now, China has 6 million ha under conservation agriculture. Our government has supported it in 4 ways ….
1. Demonstration in areas with potential to scale up
2. Incentives to the private sector for manufacturing affordable machinery
3. Subsidy on CA machinery
4. Research and training

Can you explain more about machinery?

First look at this seeder, specially designed for no-till. It does everything in one operation. It has also anti-blocking, stubble breaking, and depth control functions.

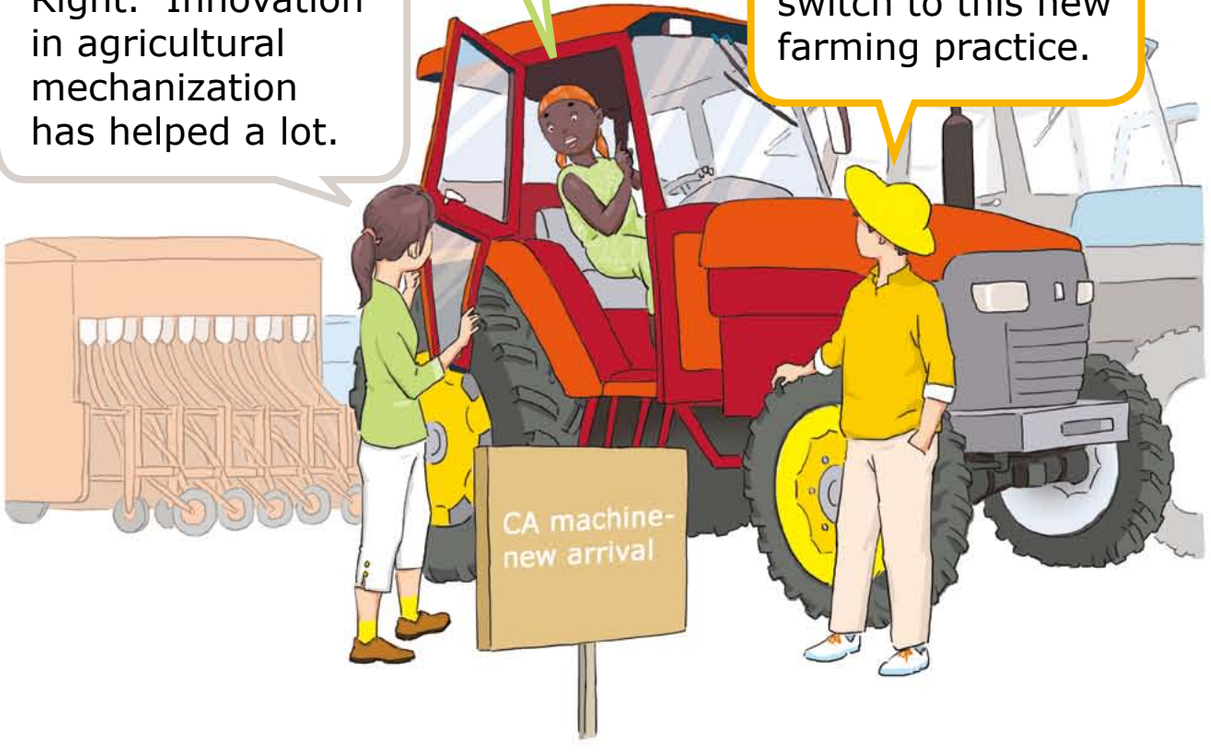
This tractor mounted chisel ripper opens shallow planting furrows.

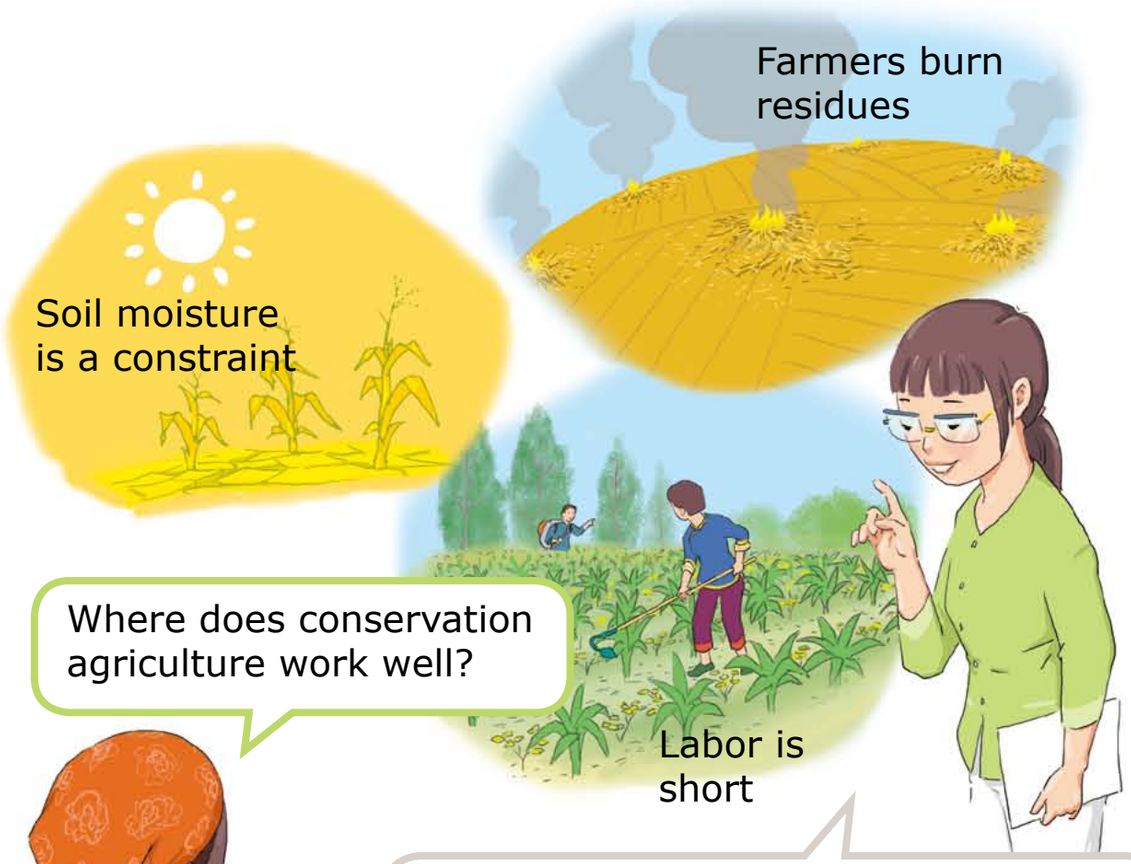
This is a combine harvester with residue chopper. It spreads straw evenly on the fields as it harvests.

It seems that the scaling up of conservation agriculture in China benefited a lot from innovative mechanization, right?

Right. Innovation in agricultural mechanization has helped a lot.

Indeed, it is a key for me to switch to this new farming practice.

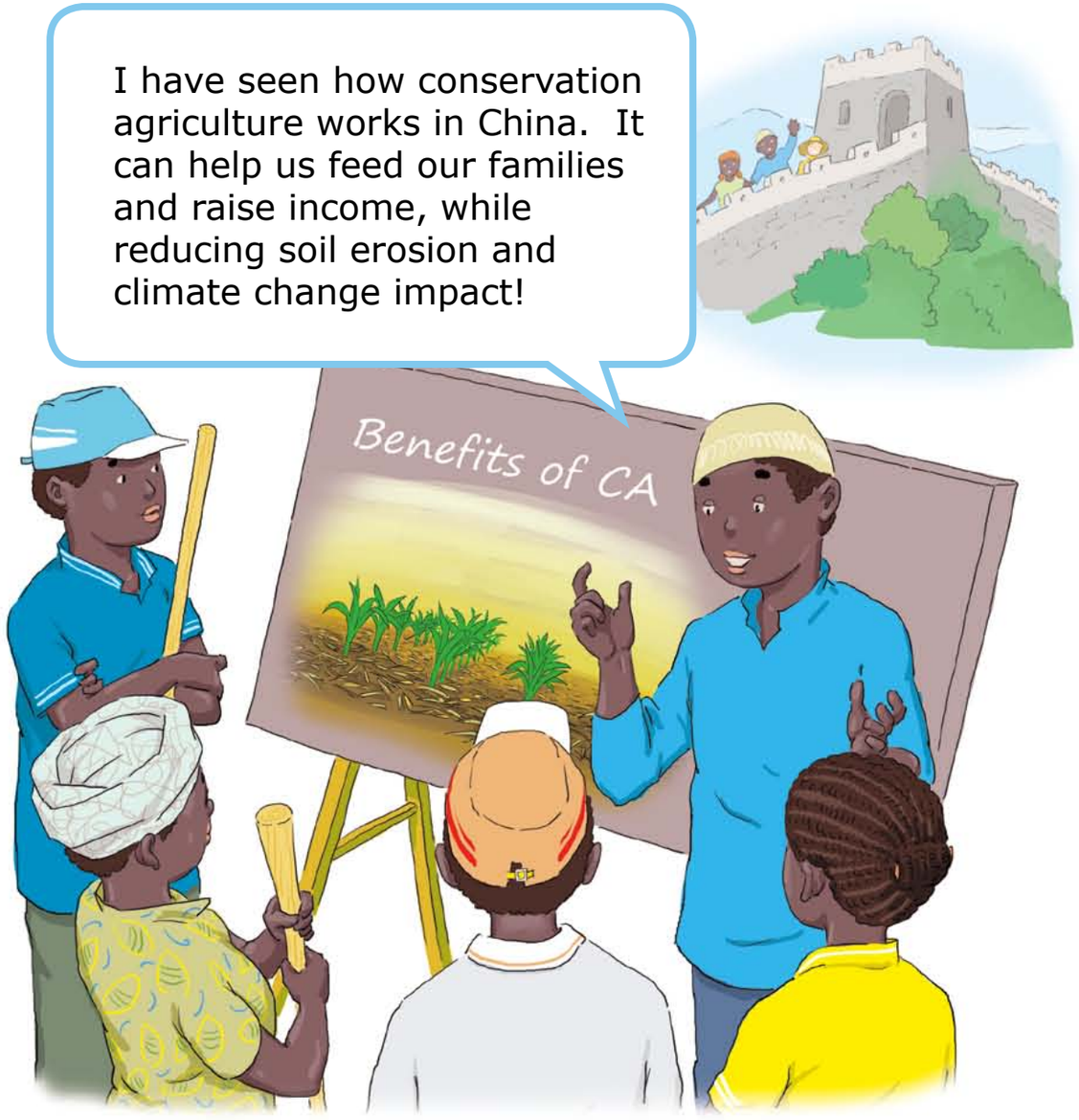




Where does conservation agriculture work well?

Here, we found that it works more effectively in regions where 1. Soil moisture is a constraint. 2. Farmers have surplus residues or burn them to clean ground. 3. Labor is short.

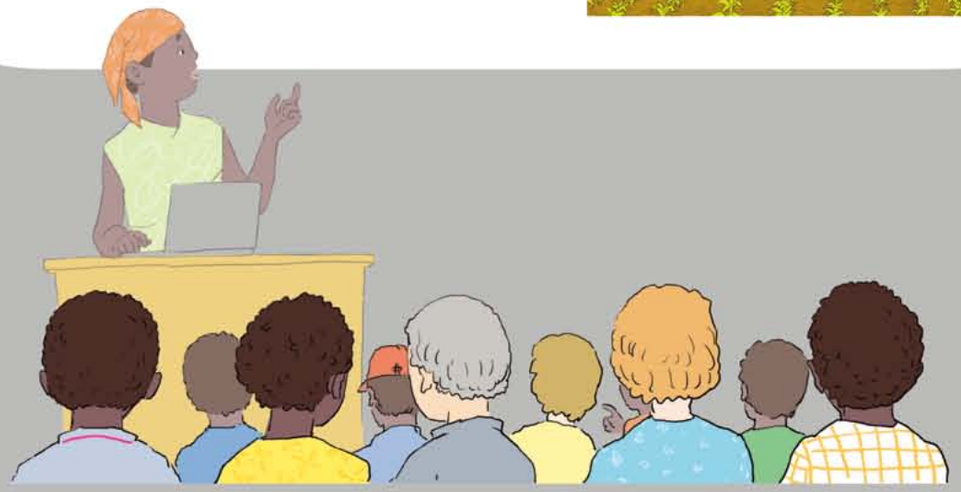

edge sharing delegation
Seeing is believing. I will share what I learnt with our farmers. Thank you, Li.
Today has been wonderful.
I hope one day I can visit your countries. Please join us for dinner, taste our local food produced by conservation agriculture!


I have seen how conservation agriculture works in China. It can help us feed our families and raise income, while reducing soil erosion and climate change impact!
Benefits of CA

Dear colleagues,

Conservation agriculture can help address issues of productivity, land degradation and climate resilience.
Our government should support extension, farmer learning and agricultural mechanization.

Conservation agriculture pays – I have seen it in China.



Photos relating to conservation agriculture

Photo: LI Hongwen

China – No-till wheat seeder in maize residue field

Photo: LI Hongwen

China – No-till maize seeder in wheat residue field

Photo: LI Hongwen

China – Two row no-till maize seeder

Photo: LI Hongwen

China – No-till direct seeder driven by two-wheel tractor

Photo: LI Hongwen

China – No-till maize seeder with herbicide sprayers

Photo: LI Yan

China – Jab planter

Photo: LI Yan

China – Li Seeder

Photo: LI Hongwen

China – After rain, no logging in CA field

Photo: LI Hongwen

China – Comparison of crop growth

Photo: LI Hongwen

China – No-till maize field after the first crop (left).
Second maize crop in the same field (right)

Photo: Peter Kuria

Kenya – Maize intercropping
with dolichos lablab

Photo: Peter Kuria

Kenya – Pigeon pea
after the maize harvest

Photo: LI Hongwen

China – No-till sowed wheat
in the maize residue field

Photo: XIE Mei

Zambia – Faidherbia trees
in maize field (GART)

Photo: Patrice Djamen

Burkina Faso – Millet
intercropping with cowpea

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This wonderful booklet offers hands-on, practical advice for farmers and extension workers interested in using conservation agriculture techniques to boost crop yields, soil quality and water retention. These practices represent some of the many ways we can become more 'climate smart', which is essential if we are to sustainably produce more food on less land to feed our growing planet.

–Juergen Voegele, Senior Director, Agriculture Global Practices, World Bank

Conservation Agriculture: a modern farming practice with ancient Chinese philosophy.

– Ke Bingsheng, President, China Agricultural University

Smart use of land resources can turn agriculture around from being part of the problem to being part of the climate change solution.

– Saidi Mkomwa, Executive Secretary, African Conservation Tillage Network

Sharing of experience between practitioners through South-South exchanges is an effective way to learn from mistakes of the past and scale up successes to meet climate change challenges.

– Neeraj Prasad, Manager, Climate Change Knowledge, World Bank

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