

# Pack 110, Item 9

Type: Interview

January 2019

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**The benefits of conservation agriculture**

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Notes to broadcaster

Conservation agriculture is an approach to farming that aims to produce high yields and reduce production costs, while maintaining and improving soil fertility and conserving water.

Conservation agriculture is based on three principles or practices:

1. Little or no tillage so that the soil is minimally disturbed.
2. Keeping the soil permanently covered.
3. Crop rotation and intercropping, also called crop association.

This script focuses on how minimum tillage can benefit farmers and minimize soil erosion.

This script is based on actual interviews. You could use this script as inspiration to research and write a script on a similar topic in your area. Or you might choose to produce this script on your station, using voice actors to represent the speakers.

You could also use this script as research material or as inspiration for creating your own programming on the benefits of practicing conservation agriculture. Talk to farmers, agricultural officers, and other experts. You might ask them:

* What kind of farming problems could conservation agriculture solve in our area?
* How can frequent tilling affect the soil quality and structure?
* How can farmers who practice minimum tillage manage weeds and pests?

Apart from speaking directly to farmers and other experts, you could use these questions as the basis for a phone-in or text-in program.

The estimated running time for this item, with signature tune, intro, and extro, is 20 minutes

Signature tune

**HOST A:** Hello! Welcome to your farmer program! Today’s topic is all about conservation agriculture and the benefits of minimum tillage.

Farmers in Ethiopia tend to till their land repeatedly as they are sure it increases yield. They believe that reduced tillage stops them from taking full advantage of their farmland. In fact, if you were to ask an Ethiopian farmer who tills their land not once, not twice, but up to five to six times for most crops and eight times for teff why he or she doesn’t embrace reduced tillage, the reply might be: “It’s bad enough that I benefit little from repeated tilling, much less practicing reduced or zero tillage.”

However, this practice of repeated tillage can cause serious land degradation. Today, we will be telling you exactly how it degrades land and how you can save your soil and the environment and improve your farming with minimum tillage.

**Host B:** That’s right. But before we get into how conservation agriculture and minimum tillage are useful, we’ll talk about what exactly it is.

**HOST A:** Conservation agriculture is a farming approach that farmers can use to address the negative impacts of soil degradation. Through conservation agriculture, farmers can change or adjust how they farm to take maximum advantage of the sometimes little and erratic rain and other water available for crops—which is even worse these days because of climate change.

**Host B:** There are three major principles of conservation agriculture. The first is minimizing tillage or soil disturbance; the second is ensuring that the soil is permanently covered; and the third is mixing and rotating crops.

**HOST A:** For today’s program, we will be focusing on minimum tillage. How can practicing minimum soil disturbance or minimum tillage benefit farmers and the environment?

**Host B:** Well, minimum tillage has several benefits. One of the major advantages is helping to minimize soil erosion. Practising minimum tillage and leaving crop residues on the surface of the soil reduces erosion by water and wind. Depending on the amount of residues present on the soil surface, soil erosion can be reduced by up to 90% compared to a repeatedly tilled field.

**HOST A:** That’s right! Farmers who practice conservation agriculture and minimum tillage often leave crop residues on the surface permanently. This improves soil fertility through maintaining or increasing the amount of organic matter in the soil. By increasing the aggregation of soil particles, reduced tillage makes it easier for plants to establish strong roots.

Besides protecting the soil from erosion, minimum tillage can reduce labour and the costs associated with conventional tillage. It can save time, too. If you only have to make one trip for planting compared to two or more tillage operations, that means fewer hours in the field.

**Host B:** Those sound like significant advantages. But can you elaborate on some of the technical terms you used? For instance, what does the “aggregation of soil particles” mean?

**Host A:** Well, soil aggregates are groups of soil particles that bind to each other more strongly than to surrounding particles. When soil particles are more aggregated, they are more resistant to erosion and compaction and are better at holding water in the soil.

 Before moving on to talk about the challenges of adopting reduced tillage here in Ethiopia, I think we should clarify the difference between reduced tillage and minimum tillage. When we say “reduced tillage,” we mean decreasing the frequency of tillage, for instance from four to five to one to three. But “minimum tillage,” also called zero tillage, means not tilling the field at all. In Ethiopia, minimum tillage is especially used for crops such as maize, sorghum, and haricot bean. When you use minimum tillage, you make shallow furrows or you use a ripping tool, and then you direct seed through the crop residues on the soil surface and add fertilizer around the surface of the soil near the plant.

**Host B:** Keep it locked to your farmer program for more useful information about conservation agriculture.

Remember that you too can be part of the conversation by sharing your ideas with our listeners! How has practicing reduced or minimum tillage worked for you? Call or text the radio station at [CONTACT DETAIL] and we’ll be sure to include your comments in our next program. We will also be accepting your calls right at the end of the show, so feel free to pick up that phone and dial [CONTACT DETAIL]

**HOST A:** We’re looking forward to hearing from you!

Before we take a short break, here’s a quick recap of what we’ve been talking about in today’s program. We’ve been listing the various benefits of practicing reduced or minimum tillage. These advantages include reducing labour, saving time, improving or maintaining soil fertility, and protecting soil from erosion. Right after the short break, we’ll talk about the challenges of promoting reduced and minimum tillage in Ethiopia.

SHORT MUSICAL BREAK

**HOST A:** We are back for our program on how practicing minimum tillage can benefit farmers and the environment. As we mentioned, if you practice minimum tillage, you are bound to benefit by maintaining or improving the quality of the soil. But if you frequently till your soil, then the soil quality can be affected greatly.

**HOST B:** So how exactly does frequent tilling affect soil quality?

**HOST A:** Over several seasons, frequent tillage can generate serious soil problems. If there is no break from tillage, there can be serious damage to soil structure. Frequent tillage reduces the number of beneficial soil organisms. These organisms strongly contribute to soil fertility, structure, and quality. Frequent tillage can also reduce water infiltration and increase surface runoff.

**HOST B:** What exactly do you mean when you say “serious damage to soil structure?”

**HOST A:** Soil structure refers to the arrangement of the solid parts of the soil and of the spaces between them. It refers to how individual soil particles clump, bind together, and aggregate, resulting in the arrangement of soil particles and the spaces between them. Soil structure has a big influence on water and air movement in the soil, the activity of soil organisms, root growth, and seedling emergence. If you repeatedly till your land, then all these qualities of the soil can be negatively affected.

**HOST B:** And when frequent tillage is practiced over many seasons, the deterioration of soil quality becomes more severe. Hardpans may develop, strongly limiting root growth and reducing crop development and yield.

**HOST A:** Now let’s move on to what is being done to promote the practice of reduced tillage in Ethiopia.

**Host B:** Sure. In Ethiopia, reduced tillage is currently being promoted for small grains like teff and wheat. On the other hand, minimum tillage is for large-seeded crops. But, although reduced and minimum tillage have the kinds of benefits we mentioned earlier, it is a challenge to convince farmers in Ethiopia to commit to the practice.

**HOST A:** Some farmers understand that reduced tillage has a host of benefits. But other farmers are reluctant to try reduced tillage because of cultural reasons. For example, they may believe that a clean farm is synonymous with hard work and the opposite means laziness. They may also believe that weed infestation occurs if farmland is not regularly tilled.

**Host B:** Of course, weeds can be a big problem when you don’t till the land or till it as often, especially in the first few years. But there are ways to manage weeds.

**HOST A:** Farmers can use cultural methods of controlling weeds. For example, they can alter cropping patterns or practice crop rotations; alter planting or harvesting dates; plant different varieties; and use different kinds of practices to maintain soil fertility and plant health. All these practices make it difficult for weeds to thrive. Spot spraying or hand removal of an isolated weed infestation can prevent further spread of weeds. These methods generally require little time or capital investment.

**HOST B:** But weeds are not the only annoyances that farmers need to manage. How can a farmer who practices reduced tillage handle pests in his or her field?

**HOST A:** Just because you practice reduced tillage does not mean you are forced to let your farmland be infested with pests! You can manage insects by rotating crops. This has a particularly strong effect on insects that live in the soil and those with limited mobility. When you rotate crops, it means, for example, that you switch grass crops with broadleaf crops, annuals with perennials, and legumes with cereals. This method not only helps control weeds, but insect pests and diseases as well.

**HOST B:** Another way to manage pests and diseases while practicing reduced or minimum tillage is scouting, combined with anticipation of potential problems. It’s important to know how to identify different pests. Learning to identify new weeds, insects, and diseases will help you manage them.

**HOST A:** And of course we shouldn’t forget that selecting varieties that are resistant or tolerant to insects and diseases is also important.

**HOST B:** To practice reduced or minimum tillage, farmers often use machinery such as rippers, especially in the first year. Rippers create a deep furrow in the soil, but do not turn the soil over, unlike conventional ploughs. Conservation agriculture farmers often use direct seeders as well, especially if they have larger farms. But the unavailability of these kinds of equipment leads many small-scale farmers to use manual conservation agriculture systems such as planting basins that can be labour-intensive, at least in the first year.

**HOST A:** Right. One challenge is that the benefits of reduced tillage increase over time, and some farmers can be skeptical about long-term investments in conservation agriculture because of insecurity of land tenure.

**Host B:** The Ethiopian agricultural extension package recommends repeated tillage for various types of crops. For instance, the recommended frequency of tillage for teff is six to eight times. But, as we’ve explained, there is evidence that reduced tillage can benefit teff farmers.

**HOST A:** In Ethiopia, there are agriculture extension recommendations for tillage-based farming, but no clear agriculture extension recommendations for conservation agriculture and minimum tillage techniques. However, the country has policies and strategies—including the climate-resilient green economy strategy—that can help to promote reduced and minimum tillage.

**HOST B:** Yes, there are many benefits. Like we mentioned earlier, when a farmer practices reduced tillage, he or she will be saving time, money, and labour. As we also mentioned, reduced tillage encourages soil particle aggregation and prevents hardpans, both of which make it easier for plants to establish roots. It also increases the capacity of the soil to hold water and make it available for plants.

**HOST A:** Exactly! And reduced tillage is not only beneficial for the farmer but also for the environment. When farmers leave crop residues on the soil surface rather than ploughing them into the soil, the crop residues can support wildlife by providing shelter and food for small animals like birds. Crop residues left on the surface can improve air quality by reducing wind erosion, which decreases the amount of dust in the air. There are also reduced amounts of carbon dioxide released into the atmosphere because reduced tillage ties up more carbon in soil organic matter.

**Host B:** Here’s some facts about soil erosion: One study found that conventional tillage, with a minimum of three conventional tillage passes, led to an average soil loss of 24.2 tonnes per hectare per year in northern Ethiopia. Other studies have shown that the loss of soil from erosion in the Ethiopian highlands is even higher, ranging from 42-175.5 tonnes per hectare per year.

**HOST A:** And reducing the number of times you till the soil—or not tilling it at all—can strongly reduce erosion.

As we explained, reduced tillage is part of conservation agriculture and farmers can benefit a lot by practicing it.

**HOST B:** Reduced tillage provides better maintenance of soil organic matter, resulting in improved soil fertility, improved soil structure, and deeper root development.

**HOST A:** On the other hand, frequent conventional tillage can deplete soil organic matter and nutrients, damage soil structure, and leave it exposed to the wind and rain. Repeated tillage can result in declining yields and reduced resilience to drought.

**HOST B:** Repeated tillage can also decrease populations of some soil organisms, which affects their ability to decompose organic matter and make nutrients available to plants, and also disturbs soil structure.

**HOST A:** That’s a wrap for today’s edition of your farmer program! Thank you for tuning in. Why not give minimum tillage a try! Have an abundant harvest and don’t forget to care for the environment as you farm!

Signature Tune

## Acknowledgements

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**Sources of information**

Interviews:

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Yihenew Demissie, Programs Manager at Migibare Senay Children and Family Support Organization (MSCFSO), October 2018

Alemayehu Koysha, Monitoring and Evaluation Coordinator for Conservation Agriculture Promotion Project, Terepeza Development Association, October 2018

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