

# Pack # 117

# Type: Backgrounder

Date: 2021

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**Backgrounder on production practices for wheat**

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**Introduction**

***Why is this subject important to listeners?***

Farmers who want a good yield from their wheat farming need to know:

* The benefits of advance planning and planned allocation of resources.
* The benefits of involving women and the entire family in planning, including decisions to allocate resources.
* How they can access and use inputs (fertilizers, pesticides, seeds) and mechanization (ploughing, combine harvesting) services.
* How they can practice tractor ploughing, improved oxen ploughing (using Berken maresha and Aybar BBM) crop rotation (e.g., pulse crops in rotation), and row seeding to improve productivity.
* How using technologies (advisory services) and information about sources of inputs, and purchasing inputs through the Lersha online platform can improve their agricultural practices.

***What are some key facts?***

* Chisel ploughs are recommended when using tractor services for wheat farming; with disk ploughs, tractor should use low gears.
* If farmers sow wheat in rows by hand, the space between furrows should be 20-30 cms. With machine sowing, leave 20 cms between furrows.
* Farmers will need 100-125 kg for row seeding and 150 kg for broadcasting of seed per hectare.
* The amount of fertilizer to use per hectare depends on soil type, soil fertility, location, variety, and the type of fertilizer.
* Wheat require two rounds of weeding, at 25-30 days after germination and 40-45 days after germination.
* Farmers should regularly monitor wheat for diseases, which must be correctly identified and managed with the appropriate chemicals immediately.
* Farmers must know how to determine when the drying crop has reached the appropriate moisture level by pressing with the teeth or nails before harvesting. The moisture level should be 16-18% at the time of harvesting. The crop should be allowed to air dry before threshing begins.
* Clean, effective storage areas must be prepared before the harvest begins.
* If farmers use combine harvesters, they must ensure they are in good working order and that there are professionals to operate them.
* To reduce post-harvest loss, grains or seeds must have the right moisture content, the storage area needs to be clean, and farmers must manage rodents and insects.
* Storage areas need good ventilation.
* Rotating wheat with faba beans and some oilseeds helps improve wheat yields.
* To get good prices, farmers can gather and store a large harvest to sell later.

***What are the big challenges in growing and marketing wheat?***

* Preparing the land and ensuring the right level of soil moisture.
* Sourcing the right varieties and an adequate quantity of seeds.
* Sowing in rows and determining the required amount of seeds and fertilizers and the best time to apply fertilizer.
* Weeding at the appropriate time.
* Monitoring, identifying, and managing wheat diseases.
* Minimizing post-harvest loss.
* Accessing a market and getting a good price.

***Gender aspects of growing wheat***

* Women account for 43% of the agricultural labour force globally, with variations in specific areas.
* Men play a dominant role in land preparation for wheat, in ploughing with oxen, and in varietal selection.
* In Ethiopia, women are heavily involved in weeding and harvesting, but their effort does not get much recognition. Lack of recognition of women’s roles has led to women having limited access to and control over resources, including land, capital, agricultural inputs, credit, and extension services.
* In Ethiopia, when wheat is seeded in rows, any member of the family can plant the seeds. But broadcasting is dominated by men.
* In Ethiopia, when women and other family members are involved in decisions to grow and manage wheat and decisions about how to allocate resources, their inputs help ensure that all aspects of production, processing, marketing, and consumption are properly addressed.
* Social taboos may prevent women from working in the field. Some communities in Ethiopia believe that if women till the land, there will be no rainfall. In most other communities, it is not forbidden, but neither is it encouraged.
* In Ethiopia, women-led households cannot afford proper storage containers such as metal silos.
* Provision of Purdue Improved Crop Storage (PICS) bags along with training on how to use them could enable female and poorer wheat growers to effectively store their crops in an affordable way.
* In Ethiopia, men’s better access to information is reflected in their dominance in variety selection.

*For further information, see documents 1, 2, 4, 6, and 7.*

**Key information about growing wheat**

Farmers can increase yields if they use the following practices, in conjunction with advice from local agricultural experts.

***Preparing land with oxen and/or tractors***

* If farmers are using oxen to plough their land, it is advisable to use a Berken plough, which requires only two rounds of ploughing as opposed to four times with traditional ploughs.
* If using a tractor, chisel ploughs are recommended over disk ploughs as they can penetrate deeper into the soil.
* Plough land as soon as the previous crop is harvested and before the land loses its moisture. Conduct a second ploughing after the first rains when the soil has adequate moisture. This ploughing helps to remove weeds. More ploughing may follow, depending on the type of soil, amount of rain, and weed density. The last ploughing should occur just before sowing.
* Deep ploughing increases the amount of water that infiltrates into the soil and facilitates better root growth.
* For deeper ploughing, tractors are recommended as they enable roots to increase in volume, which enables higher uptake of nutrients and water and better yields. Tractor ploughing with a mould board plough cuts deeper, lifts and turns the furrow, and buries most weed seeds and already growing weeds.

***Improved seeds***

* Over a hundred wheat varieties have been developed over the years. More recent varieties, including 33 varieties of bread wheat and 12 varieties of durum wheat \*, are in circulation.
* The most common improved seeds used in Arsi, for example, include Ogolcho, Wane, Hidase, Kingbird, Dandaa, and Sanate.
* Do not mix improved seeds with other kinds of seeds as this could reduce productivity.
* The quantity of seeds needed varies because of several factors, so verify with local experts.
* If using improved seeds and seeding in rows, sow 100-125 kgs of improved seeds per hectare.
* Sources of improved seeds include Farm Service Centres (FSCs), Seed Producing Cooperatives (SPCs), public seed enterprises, and private seed companies.
* Local sources include a farmer’s own harvest and other farmers.

***Fertilizers***

* The quantity of fertilizer used varies with location, type of soil, soil moisture, soil pH, type of fertilizer, crop, and variety. For example, here are fertilizer recommendations by soil type:
  + *For light soils:*Apply 100 kg of NPS and 67 kg (or one-third) of urea at sowing to provide a good start for the plant. Apply 133 kg of urea 30-35 days after planting (after first weeding).
  + *For heavy soils:*Apply 100 kg of NPS and 83 kg (or one-third) of urea at sowing. Apply 167 kg of urea 30-35 days after planting (after first weeding).
* The rate of natural fertilizer (for example, manure, compost) per hectare has not been precisely determined by scientific studies. In the meantime, farmer can use 100 kg of natural fertilizer along with chemical fertilizers.

***Weeding***

* Proper ploughing removes most weeds.
* Using clean, healthy seeds avoids sowing weeds when you sow your crop.
* Do the first weeding 25-30 days after germination and the second weeding 40-45 days after germination.
* Use appropriate herbicides that don’t harm wheat. Always read and follow the instructions on the package before using.
* It is recommended to use the services of a trained pesticide applicator to apply herbicides.

***Wheat diseases and pests***

* Common wheat diseases include rusts, Septoria, tan spot, and scab.
* Rust affects the leaves, stems, and shoots, causing red, brown, and yellow spots on one or both sides of the shoots.
* Septoria is transmitted by contaminated seeds and causes spots on leaves.
* Tan spot causes brown spots on the leaves.
* If not monitored and managed, diseases can kill an entire crop
* If farmers do not detect specific diseases, they should continue to monitor for diseases once a week. If farmers identify a disease, they should monitor the crop for further signs of disease daily.
* Correct identification of the disease will enable farmers to buy and use the appropriate fungicides.
* If five leaves in a hundred show signs of rust diseases (yellow, stem, or leaf rusts) farmers must act immediately to manage the disease, which is spread by wind.
* Disease-causing microorganisms can be carried over from the previous season, either through contaminated seeds or through vegetation, especially grassy weeds growing on the farm.
* Common insect pests of wheat include aphids, barley flies, and armyworms.

*Pest management*

Aphids

* Use improved varieties that are tolerant or resistant.
* If the infestation is severe, use insecticides at the recommended dose and timing.

Barley fly

* Use wheat varieties that are resistant to barley flies.
* Use crop rotation. Because the flies survive by feeding on wheat and barley, planting a different crop after wheat helps reduce their population.
* If the fly poses a great threat to your crop, treat seeds with a registered insecticide dressing before planting.

Armyworms

* Naturally occurring predators such as birds, lacewings, ladybugs, wasps, certain flies, rove beetles, and ground beetles are important for keeping armyworm populations low.
* The risk of armyworm infestation can be minimized by eliminating or controlling grassy weeds in and around fields.
* Hand pick and dispose of caterpillars in soapy water if infestations are not too great.
* It is important to avoid using harmful pesticides or practices that could injure beneficial insects, such as those mentioned above, which should be the first line of defence against armyworms.

*Using pesticides*

* Use integrated pest management methods (IPM). Pesticides should be used only when necessary.
* Use chemicals only for the specific diseases and pests they are intended to treat.
* Follow manufacturer’s instructions closely; too little or too much pesticide will either not manage the disease or damage the wheat, as well as human health and the environment.
* Protect yourselves when spraying chemicals to minimize risk to you and your family. Hire the services of a trained person to conduct the spraying.
* Closely monitor the crop after spraying a pesticide as more treatment could be required after a certain period of time.

*For further information, see documents 1, 2, 8, 9, and 11.*

***Row seeding***

* If seeding by hand, rows should be spaced 20 to 30 cms apart, and seeds planted 3-4 cms deep.
* If seeding by machine, rows should be spaced 20 cms apart and seeds planted 3-4 cms deep.

*Alemayehu Row Seeding Technology (ART)*

Before using ART (see photo below), it is recommended that land be well-ploughed and prepared.

ART has three components:

1. A row maker, which creates ridges and furrows after ploughing and prior to broadcasting wheat seed.
2. A levelling board, used after broadcasting to create wheat and wheat-free bands, thus enabling row seeding.
3. A cultivator, which removes weeds growing between the rows.

*Steps in using ART for row seeding*

* Make rows (ridges and furrows).
* Broadcast the seed.
* Level with the levelling board to create wheat and wheat-free bands thus enabling row seeding.

*For further information, see document 5.*



***Crop rotation***

Farmers should alternate between wheat and faba beans in order to manage pests and diseases and improve productivity.

* Other crops to rotate with wheat include peas, chickpeas, and various oilseeds, including rapeseed and niger seeds.

*For further information, see documents 1 and 2.*

***Post-harvest activities***

Using recommended post-harvest practices can strongly reduce post-harvest losses in wheat, which are an average of 5.6 quintals (560 kgs) per hectare in Ethiopia.

To reduce post-harvest losses, farmers should use best practices for the following activities:

*Threshing and cleaning*

* Avoid delays in threshing after harvest to minimize losses in yield and quality, as the crop is susceptible to rodent, bird, and insect attack when exposed to the field environment.
* Threshing can be carried out manually, by animals (a slow process), or using mobile threshers and combine harvesters. Using mechanized threshers helps avoid delays in threshing.
* Clean grains well when winnowing and screening/sifting to reduce insect infestation, growth of mould, and unwanted taste and colour.

*Storage*

* Use hermetic/airtight storage containers.
* Apply chemical fumigants to storage areas, but be aware that fumigant use is associated with potential harm to seeds and human health. Fumigant use can also result in pests developing resistance to specific insecticides, and to re-infestations. These risks are exacerbated by farmers’ lack of knowledge of recommended application techniques, including dosage and timing.

*Transportation*

* Good roads reduce spillage and contamination.
* Minimize the number of times the crop is loaded and unloaded during transportation to reduce the risk of grain damage or loss.
* Use good quality bags to prevent spillage during transport.

*For further information, see document 10 and 11.*

**Preventing post-harvest loss**

The following actions can also help prevent post-harvest losses.

* Information and training on:
  + adapting to weather conditions (particularly during the harvest period),
  + how to better measure moisture levels,
  + use of improved storage structures (metal silo, hermetic bags, improved traditional storage structures, etc.)
  + better storage techniques (including using pesticides during storage), and
  + accessing better market information.
* Overcoming taboos against women working on the farm.
* Implementing a local warehouse receipt system to enable women-led households and poor households without proper storage to store their produce and not be forced to sell immediately after harvest when selling prices are lower.
* Encouragement and support for using highly effective improved storage techniques (e.g., metal silos), through credit and membership in extension programs and local farmers’ associations.

*For further information, see document 4.*

***Lersha***

Lersha (<https://www.lersha.com>) is an online digital platform that enables small-scale farmers to order farm inputs and request mechanization and advisory services through call centres, Lersha agents, or the Lersha mobile app.

How Lersha works:

* Trained Lersha agents are physically available in villages.
* The call centre accepts calls from farmers in various languages.
* Farmers can place orders for inputs through the Lersha mobile app.
* Farmers can also place orders for services such as mechanization and advisory services.
* A network of farm service centres delivers farmers’ orders 24/7.
* Farmers can offer their products for sale through Lersha.
* Farmers can access Lersha services directly through the online platform or through the call centre, agents, and delivery services.

*For further information, visit* [*www.lersha.com*](http://www.lersha.com)

**Definitions**

*Durum wheat:* Durum wheat, also known as pasta or macaroni wheat, is a kind of hard wheat planted in high-and mid-altitude areas and used to produce pasta.

**Sources of information**

1. ጂ.አይ.ዜድ። ጥቅምት 2013። በአማራ ክልል ለስንዴና ባቄላ አምራች አካባቢዎች አፈራርቆ በማምረት ላይ የተመረኮዘ የተሻለ የእርሻ ስራ አተገባበር
2. በኢትዮጵያ ፌደራላዊ ዴሞክራሲያዊ ሪፑብሊክ ግብርና እና እንስሳት ሀብት ሚኒስቴር። ስኔ 2010። *የሰብል አመራረት ፓኬጅ*።
3. Belay, F. and Oljira, A., 2016. Gender Role in Agricultural Activities in Ethiopia. *Journal of Culture, Society, and Development*, Volume 22. <https://core.ac.uk/download/pdf/234691181.pdf>
4. Dessalegn, T., et al. 2017. Post-harvest wheat losses in Africa: An Ethiopian case study. In: *Achieving sustainable cultivation of wheat, Volume 2* (pp.85-104). <https://www.researchgate.net/publication/318879047_Post-harvest_wheat_losses_in_Africa_an_Ethiopian_case_study/link/59bf87d0458515e9cfd506d6/download>
5. Hirpa, D., et al. 2019. *Evaluating the impacts of using Alemayehu row seeding technology (ART) on wheat production as compared to manual row seeding: the case of selected six Woredas of Arsi Zone.*
6. Kumar, D. and Kalita, P., 2017. Reducing Postharvest Losses during Storage of Grain Crops to Strengthen Food Security in Developing Countries. *Foods*, 6(1): 8. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5296677/>
7. Lersha website: [www.lersha.com](http://www.lersha.com)
8. Atlaw, A., Kaske, K., and Haile, M, 2014. *Wheat Production: Manual for Quality Seed Production*. Ethiopian Institute for Agricultural Research. <http://publication.eiar.gov.et:8080/xmlui/bitstream/handle/123456789/140/Wheat%20Manual.pdf?sequence=1&isAllowed=y>
9. Seyoum, A., 2019. *Good Agricultural Practices (GAP) Intervention through Crop Rotation Based On-Farm Demonstrations (RoBOFD) in Arsi Zone.*
10. Federal Democratic Republic of Ethiopia Ministry of Agriculture, 2014. *Wheat Sector Development Strategy (Working Document 2013-2017)*.

**Acknowledgements:**

Contributed by: Ayenew Haileselassie, Media & Communication Professional, Ethiopia.

Reviewed by: Dr. Tadesse Dessalegn, Advisor, Wheat Value Chain, Promotion of Agricultural Productivity Programme, Green Innovation Centres for the Agriculture and Food Sector – Ethiopia, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

*This resource was supported with the aid of a grant from The Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) implementing the Green Innovation Centre project.*