CROP PRODUCTION TECHNOLOGY OF WHEAT
Recommended Guidelines Developed for Small Farmers

Wheat is the major staple food crop in Pakistan and cultivated on the largest acreage.

**Recommended Sowing Time**

<table>
<thead>
<tr>
<th>Ideal</th>
<th>Late</th>
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<tbody>
<tr>
<td>Between first and third week of November when temperature is 22-23°C</td>
<td>Up to middle of December</td>
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If rainfall occurs early, wheat can be planted in the last second half of October.

Wheat sowing after the 20th of November can cause a reduction in yield of 15-20kgs per acre during each subsequent day.
There is a yield gap of **60%** for wheat which results in highly variable wheat production that is well below potential. Reasons for low productivity and instability include:

- Poor adaptation of recommended production technology
- Consequent late planting of wheat
- Weed infestation
- Drought/terminal heat stress
- Soil degradation
- Weak extension services system
- Non-availability of quality inputs like seed
- Inefficient fertilizer use
- Shortage of irrigation water
- Delayed harvesting of kharif crops
**RECOMMENDED WHEAT VARIETIES FOR SINDH**

The seed should be certified and bought from a trusted source such as the Sindh Seed Corporation to ensure that is pure, healthy and free of disease. The seed’s germination rate should not be less than 85%. The following are varieties approved by the local agriculture department and well adopted for Sindh’s climate:

<table>
<thead>
<tr>
<th>RECOMMENDED VARIETIES</th>
<th>AREAS</th>
<th>TIME OF SOWING</th>
<th>SEED RATE</th>
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<tbody>
<tr>
<td>Benezir-13, Sarsabz, Kirman, Kiran-95, Hammal, Ambar, Momal-89, Aabadgar-93, Saassi</td>
<td>Lower Sindh</td>
<td>1st Nov to 20 Nov</td>
<td>Early sowing: 50 Kg/acre certified seed</td>
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<td>Upper Sindh</td>
<td>7th Nov to 30th Nov</td>
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<tr>
<td>TJ-83, Anmol-91, Sarsabz, Kiran-93</td>
<td>Lower Sindh</td>
<td>21 Nov to 15th Nov</td>
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<tr>
<td></td>
<td>Upper Sindh</td>
<td>1st Dec to 21 Dec</td>
<td></td>
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<tr>
<td>TD-1, Sakrand-1, Bhittai, Marvi-2000</td>
<td>Entire Sindh</td>
<td>1st Nov to 25 Dec</td>
<td>Late sowing: 60 Kg/acre certified seed</td>
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</table>

**PREPARATION BEFORE SOWING**

1. Farmers should use resistant seed varieties to prevent prominent diseases like rust, smut and kernel bunt which are responsible for significant damage to production
2. The seeds should be soaked in water for 4 – 6 hours and dried under shade
3. They should also be treated with some fungicide before sowing at 2gm/kg seed
4. Land should be leveled as uneven soil surface has a major impact on the germination, stand, and yield of crops due to inhomogeneous water distribution and soil moisture
5. Wherever possible, the field should be ploughed after the first monsoon rain with chisel or moldboard plow, so that the field is ploughed to considerable depth and later plank it to store water as well as uproot the weeds
6. If there is any need for breaking clods, then use a Rotavator
PRE-HARVEST MANAGEMENT PRACTICES

Method of Planting
- Drill sowing method is best for wheat sowing
- In case of broadcast method, increase seed rate by 5%
- Wheat seed of new dwarf cultivar should not be sown deeper than 5 cm

Irrigation
Wheat crop requires 4 to 5 irrigations at different stages of growth. There are three critical stages to ensure irrigation during the crop development cycle:
- 20-25 days after sowing
- At the booting stage
- At the milking stage
Rainwater should not be allowed to stand in wheat field but be drained out to low lying areas

Green Manuring
Green and organic manures are very important for a healthy crop. If farm yard manure is available 40-50 days before cultivation, then 8-10 tons per acre (800-1000 kg) should be used. Another option is green manuring. If time allows then some legume crop should be sown in the field and at the time of flowering, it should be mixed with the Rotavator. This will increase the organic matter contents of the soil to great levels.
Green manuring with leguminous crops such as Bersem, Jawar, etc should be done at least once in three years. (Green manuring or FYM application used before Khareef crop cultivation is better)

Use of Fertilizer
Farmers can apply fertilizers on the basis of soil testing reports developed by soil testing labs situated in all districts headquarters.
- For average soils, 1 ½ bag DAP and 2 to 3 bags of Urea is recommended pre-sowing
- For sandy soil and tube well irrigated soil, ½ to 1 bag of Potash should also be added based on the soil testing report
To achieve optimal crop productivity and soil health, farmers should use farmyard manure in appropriate combinations along with Nitrogen (N) and Phosphorus (P) in recommended doses. Phosphorus and potassium and half of the nitrogen quantity is to be broadcasted and incorporated in the soil before sowing. The remaining half of the nitrogen is top dressed with the first or second irrigation. In case of TD-1 wheat variety, one more bag of urea is recommended for getting better results.

Foliar Application
Wheat grains in Pakistan are generally low in Zinc, resulting in its deficiency. To tackle this, Zinc concentration in wheat grains can be increased effectively at farmer’s field by applying two foliar sprays of Zinc at 15 day-intervals, (350 gm of Zinc Sulphate + 1 kg Urea in 100 liter of water) should be sprayed on one acre, preferably preferably at booting stage (15 days before head emergence).

Weeding
Weed eradication is helpful to increase the grain production from the same piece of land. According to an estimate, wheat production can be increased 14-42% if the weeds are properly eradicated from the field. Strategies opted for weed management are:
- Hoeing - Manual weeding with khurpa and kasola in the dry field is very effective method in controlling weeds but only if enough labor is available
- Chemicals - Selective weedicides for broad and narrow leaved weeds should be used. Wide spectrum weedicides can be used when both types of weeds are problem
Commonly found weed varieties are Dumbisitti, Wild oats, Bathu and Lehli, Weedicides should be applied after 1st irrigation in good moisture condition when weeds are at 2-3 & wheat crop at 3-4 leaf stages

Diseases
Wheat is also attacked by a number of diseases that cause great losses to the quantity and quality of the produce. Rusts, smuts, powdery mildew and septoria are diseases that can reduce the yield of wheat in different parts of Sindh. To combat this, use resistant varieties and seed treatment as precautionary measures
POST-HARVEST CARE

HARVESTING & THRESHING: Complete harvesting and threshing on time and try to protect the crop from all adversities. During the early stage of threshing, check straw of wheat to ensure that the thresher is not mixing grain with straw. Otherwise ask the operator to repair the fault of the thresher.

SHATTERING: Over-drying of the harvested crops in the field results in shattering and damage by rodents, birds, animals and sometimes by the dispersing wind.

TRANSPORTATION: Substantial losses also occur during the transportation from field to the threshing yard. It is recommended that the crop should be heaped after proper drying in the threshing yard.

DELAYED THRESHING: Light to heavy losses may occur, if threshing is delayed. Untimely rains and fast winds may cause severe losses. It is recommended that threshing should be carried out without any delay. While heaping the materials in the threshing yard, it is recommended that ear heads should face the center, so as to prevent losses from periphery damage by animals etc.

REASONS OF THRESHING LOSSES:
- Soil cracks and unclean threshing yard
- Malfunctioning thresher
- Unskilled thresher operator
- Wind velocity and direction of the thresher are not proper

LOSSES IN STORING: Improper storing results in losses. It is recommended that:
- Wheat grain should not have moisture content higher than 9-12%
- Always use new gunny bags for storage
- Add neem leaves in gunny bags to avoid any pest attacks during storage
- Wheat should be stored at an elevated place
- Store should be cleaned and treated to avoid insect pest attack for seed storage but for home consumption avoid direct chemical use
- Store under concealed and airtight condition
- Store should not have the entrance place for animals such as dogs, cats, rodents etc.
- Gunny bags in the store be placed systematically in lines
- After rainy season, the store should be fumigated and if possible, the grain may be sun dried to maintain the proper-moisture percentage
- Continuous regular periodical examination of the store and grain is required
Each farmer should try to produce his own seed for future use. And to get pure, healthy and quality seed, the farmer should follow these instructions carefully:

1. Only the recommended varieties should be cultivated
2. Plants of other varieties should be uprooted from the field
3. Seed should not be collected and used from disease affected field
4. Irrigation and fertilizer requirements of the fields intended for seed production should be fulfilled at all times and at all cost
5. Different varieties of wheat should be cultivated in different plots
6. The thresher should be cleaned before and after threshing of every variety of wheat to maintain varietal purity
7. Name of the variety should be written on the bags
8. The moisture content of the seeds for storage should not be more than 10% and seeds should be dried by spreading on a clean floor for 3 to 4 days
9. Use a seed grader for separating shriveled light seed, cut seed, insect-damaged seed, mud clods and other contaminants from the seed lot to get a good seed of high quality, purity and germination levels
10. Store should be fumigated before seed storage

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