



# Improving food security of smallholders in the cold winter desert through the cultivation of improved wheat varieties

## 1. IMPORTANCE OF WHEAT

Wheat is the main staple food of the smallholders living in Durmon village in the cold winter desert of Uzbekistan. Most of the smallholders grow wheat on a part of their household lands. A few smallholders rent land from the local forestry department. All smallholders produce wheat that is sufficient to cover less than six months of their domestic requirements. The productivity of wheat is around 1 t/ha which is much lower than the national average of 4.t t/ha.

## 2. WHEAT VARIETIES GROWN BY THE SMALLHOLDERS

Cultivation of an unknown varieties of wheat from the grain market is one of the major reasons for the low productivity of wheat in the smallholders' fields. Usually, the variety grown by the smallholders is a mixture of grains of different varieties (Figure 1). The seed value of such a mixed variety is considered poor as grains had not been produced the requirements of good quality seed. The mixed nature of such a variety becomes obvious when plants matured (Figure 2).

## 3. IMPROVED VARIETIES AVAILABLE

The nearest research institute to the Durmon village producing improved varieties is the Scientific Research Institute of Southern Crop-Husbandry, Karshi. There are several wheat varieties developed by this research institute that fits well with the region. These include Shams, Gozgon, Turkistan, Yaksart, Gallakor, and

Hishorak. Good quality seeds of these varieties are available from the institute (Figure 1).

Genetic purity of the seeds is reflected through the uniform crop stand at maturity (Figure 3).



Figure 1. Seed of local (left) and improved (right) varieties of wheat planted by the smallholders in Durmon village in the cold winter desert of Uzbekistan, 2019



Figure 2. A field has grown by local variety showing mixed types of plants and spikes and heavy weed infestation in a smallholder's field in Durmon village, 2020

#### 4. RESULTS FROM SMALLHOLDERS' FIELD



Figure 3. Uniform crops stand from the planting of improved wheat variety Gozgon by a smallholder in Durmon district in the cold winter desert of Uzbekistan, 2020.

Three farmers successfully produced local and improved varieties side-by-side in their fields. Aziz Safarov harvested 863 kg of wheat using the improved wheat variety Gozgon compared to the 400 kg from the local variety using an equal size plot of 0.4 ha for each variety. Feruza Jabborova obtained 256 kg of wheat by growing an improved variety of Shams in comparison to 75 kg from the local variety from equal size household plots of 0.1 ha. Sanjar Khujakulov harvested 651 kg of wheat from the improved variety Gozgon compared to 237 kg from the local variety using 0.3 ha of land allocated for each variety.

#### 5. IMPROVED VARIETY VS. LOCAL VARIETY

Improved wheat varieties were superior to the local variety in several aspects. Compared to the local variety, the improved variety was superior in,

- Genetic uniformity
- Clean seed free from debris and weed seeds

- Lower seed rate
- Higher germination
- More vigorous seedlings
- Higher early growth before winter
- Longer spike
- More uniform plant height
- More uniform in ripening
- Larger and uniform grain
- Better disease resistance
- Better lodging resistance
- More tolerant spike from breaking
- Higher biomass yield

#### 6. IMPORTANT FACTORS FOR THE ADOPTION OF IMPROVED VARIETIES BY THE SMALLHOLDERS

- Awareness about the availability of improved varieties
- Information on characteristics of improved varieties
- Availability of improved seed
- Information on the improved production package
- Training on seed production
- Training on soil improvement through organic manures and compost using locally available ingredients
- Training on weed management
- Training on resource conservation tillage practices
- Training on narrowing the yield gap between the yield potential of improved varieties and the yield obtained by the smallholders

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