CACILM

Central Asian Countries Initiative for Land Management

TECHNOLOGIES & BEST PRACTICES FACTSHEET

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Growing cereals using minimum tillage

AGROECOSYSTEM:
Irrigated and Rainfed

A minimum tillage depth of 10-12 cm by tractor and ploughshare creates a friable soil layer, facilitating the preservation of productive moisture until crops are sown. This strategy also eliminates the extreme soil compaction that results from the operation of heavy machinery and tractors.

With minimum tillage the field is cultivated at a depth of 10-12 cm by a tractor with a disker and is simultaneously harrowed immediately after harvest. Minimum tillage creates an even and loose field cover without inner capillaries through which moisture can quickly evaporate. The productive moisture reserve at this sowing depth is 30 percent higher in comparison to soil preparation by usual ploughing, and therefore increasing seed germination.

An additional advantage of minimum tillage is lower CO_2 emissions from soil, in comparison with mould board ploughing. Through the application of minimum tillage, the activity of subterranean micro fauna – earthworm, predatory beetles etc. – also improves. Furthermore, there is no need to even the soil, which reduces the tillage number and allows for greater conservation of fuel and lubricant, as well as reducing labour costs.

The ridge sowing technology has been applied in CIS countries – Kazakhstan, Kyrgyzstan, Azerbaijan, and Tajikistan – in the production of wheat and other cereals. In Kyrgyzstan, the technology was utilized through the use of the

BENEFITS

- Eliminates soil compaction
- Reduces the evaporation of moisture and CO_2 from the soil
- Creates optimal conditions for soil micro fauna
- Increases yields
- Reduces fuel consumption costs while tilling soil

APPLICATION

- Semi-arid regions receiving 250-500 mm per day
- An altitude of between 500 to 1000 meters above sea level
- Valley floors with grey-brownish, grey, red, and yellow soil types
- Land-use type: Cropland
- Soil depth of between 50 and 80 cm.

Turkish seeder CBP-2,8, which forms ridges, sows, and simultaneously cuts furrows to irrigate between the ridges.

The ridge sowing technology creates optimal conditions for agricultural crops and provides effective furrow irrigation. This prevents excessive use of irrigation water – saving 25-30 percent – and irrigation erosion, which happens in the case of using flooding methods on fields using common corn planters. In addition, it prevents the flooding of useful soil micro fauna, as well as saving time.

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Prior to irrigation, or after irrigation, a tractor or agricultural machine can easily go along the irrigation furrows to spray plants with herbicides and pesticides. Ridge sowing of cereals can be implemented on almost all types of grey-brownish, grey, red, yellow soil types with middle and light mechanical composition.

In addition to cereals, ridge sowing can be used for growing vegetables and legumes, as well as industrial and oil crops (sugar beet, rape, soya bean, and sesame). Depending on natural climatic conditions and biological peculiarities of the cultivated varieties, width between the ridges is about 60-70 cm. Two to three rows of seeds can be sown on the ridges with a row spacing of 15 cm.

Benefits of conservation agriculture - left side of field is conventional farming and right side zero till.

Over the course of three years, 10 ha of land were sown using this technology, and the wheat grain yield was not reduced in comparison to the conventional cultivation method using a corn planter. While sowing seeds with such a seeder, it is recommended to cultivate well-busing varieties. The ridge seeder decreases the seeding rate to a minimum. The seeding rate of cereals is 100-150 kg/ha instead of 200-250 kg/ha when using the usual sowing method with a classical corn planter and provides additional yield of winter grain wheat up to 5-8.3 centner/ha.

MITIGATION STRATEGIES

- During first years of the technology's application, infestation may increase. Solution: optimized application of herbicides
- Pests, which usually die during ploughing may increase. Solution: optimized use of pesticides
- Although infestation may increase, this can be effectively managed by applying crop rotation, mechanical eradication, and certified seeds.

About CACILM Factsheets

These factsheets share proven and sustainable interventions to improve land management in Central Asia, developed under IFAD-funded Central Asian Countries Initiative on Land Management.

Contact: www.cacilm.org

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