ARTICLES

Plastic mulching: a proven means of raising cotton yields

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One of the key ways to improve the energy regime of the soil root zone and near-surface air is soil mulching – involving the application of a layer close to the ground, a proven means of conserving moisture, improving fertility and soil health, and reducing weed growth.

Mulching materials are diverse – they include stubble, manure, humus, and compost – and this diversity has very different impacts on plants and the wider environment.

One proven means of mulching is the application of plastic film. This intervention holds significant potential for cotton fields across Central Asia where it helps to regulate the temperature of the root zone and has a positive impact on water physical soil properties, the water regime, and the micro-biological environment.

Applying plastic mulching

For optimal performance, plastic sheets should be applied every two planted rows of cotton, with a 60 centimeter (cm) row spacing. The width of the sheet should be approximately 90 cm wide and have a thickness of between 70 and 100 microns (μm). From each side of the sheet, at least 8 to 10 cm need to be buried in the soil, and after the emergence of plant shoots, the film should be cut above each shoot to allow the plants to grow.

Reaping the benefits

Research has proven that applying a transparent film is a highly efficient agro-technical practice that has an integrated effect on water-physical properties and thermal regulatory regimes. This approach helps to preserve moisture in the root zone and accumulate a sufficient amount of heat – the practice allows a gradual increase in soil temperature between spring and summer - to obtain early and full-value cotton shoots.

Regardless of soil and climatic conditions, 85-95 percent of cotton balls burst under plastic mulching. In comparison, traditional methods of cultivation expose cotton to adverse conditions – extremely hot

Project Purpose

Acting as an information repository and knowledge hub, this website helps to increase the use of innovations developed by the well-established CACILM Project in Central Asia. Its synthesis, compilation, and dissemination of current research provide a secure knowledge base that policymakers and other stakeholders can access and utilize to develop sustainable strategies capable of addressing the region's severe land degradation.

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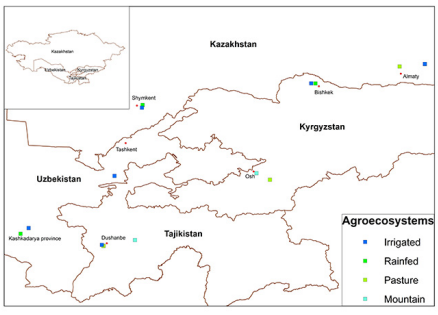
Visualization of technologies

TECHNOLOGIES

- Licorice
- Indigo
- Phosphogypsum
- Energy-efficient greenhouses
- Integrated Pest Management and Plant Protection

DEMO PLOTS



summers, cool nights, and frequent and protracted rainfall - which disrupt the development cycle, force farmers to reseed, delay crop ripening, and ultimately, lower yields.

Soil mulching, in comparison, protects against extreme weather conditions and creates optimal conditions for crop development, which positively influence, not only crop yields, but also crop quality.

Mitigating disadvantages

While the benefits of using plastic soil mulching are clear, there are some minor precautionary measures that need to be taken into account to mitigate potential problems. Applying polymer film can be costly, its removal from fields is not mechanized, and sheets need to be disposed of.

The main advantages of mulching with plastic sheets:

· Regulation of the thermal soil regime

· Reduction of physical evaporation

· Prevents 'crusting' of soil

· Reduces volume of work up to 50 percent

· Reduces costs by 20-25 percent (inter-row cultivation, irrigation and fertilizing are conducted through the beds).