Research Program on WHEAT

CGIAR

ICARDA

Science for resilient livelihoods in dry areas

SUSTAINABLE INTENSIFICATION OF WHEAT-BASED FARMING SYSTEMS

THE CHALLENGE

To sustainably increase production and enhance climate resilience of small farmers' communities and their crop-livestock production systems in drylands.

Public-Private Partnership for enhanced conservation agriculture practices: the case of Boudour Zero-Till seeder in Algeria

Conservation Agriculture (CA) is considered as an alternative to the conventional tillage (CT) for rainfed drylands as it avoids soill tillage , saves time, energy and labor while conserving water and nutrients in the soil to support crop production. Research evidence illustrates that CA gives at least the same yields as CT in the arid areas, often more, with less time and energy input and better environmental sustainability. However the adoption of CA technology is very limited in North-Africa compared to the other developed countries. One of the main hindrances to the adoption of CA is the limited availability of appropriate and affordable seeding machinery for small to medium sized land-holding (SLH) farmers. Commercially available seeders are made mostly in industrial countries with expensive cost (US$20,000-60,000), which places them out of reach of smallholders in developing countries. In this response, ICARDA in collaboration with national and private partners through different Projects (including the ACIAR CANA and the IFAD CLCA-I) at different stages put its efforts to design, testing, development and scaling out the low-cost seeders in different countries in Middle-East and North-Africa. With this effort, the seeder prototype "Boudour" was developed in 2016 by the Agricultural Machinery Construction - Sidi Bel Abbes (CMA) in collaboration with Technical Institute of Field Crops (ITGC), National Company of Agricultural Equipment Production & Trading (PMAT) and the Spanish Company SOLA _ exclusively represented by CMA in Algeria. The low demand for such a machinery was not a good incentive for the company to engage in large scale production. But the partnership with the public field crops institute, who are closely working with farmers in

the fields, and their willingness to support the company made a difference. A first wave of twenty (20) seeders were then manufactured in a first step.

ICARDA led IFAD funded Conservation Agriculture for Crop-Livestock systems – CLCA-II Project in collaboration with ITGC, national private and public partners Project has countinued to put its effort for multiplication and promotion of the "Boudour" seeder at scale. With awareness program in the ground the demand for the Boudour seeder has increased and the PMAT has already mobilized the twenty (20) units of ZT seeder in different parts of the country through its different sales points along the cereal-production belt spreading from Northern East to Northern west Algeria (Algiers, Constantine, Msila, Sidi Bel Abbes, Setif). During the 2019/20 cropping season, 982 ha area was seeded under zero tillage mobilizing "Boudour" ZT seeder.

Together, ITGC and PMAT were able to convince the Algerian government about the relevance of the technology for small field crop farmers in Algeria and to include the seeder into the national nomenclature of subsidized agricultural machines. With this effort, the "Boudour" ZT seeder is now subsidized at 30% when the seeder is purchased individually and 40% when

it is purchased by a farmer association on its orginal price of US$13,000. Through the guidance of ITGC field techniciens and regional stations, farmers and local companies providing agricultural machinery services started also to acquire such seeders and renting them to farmers in their respective regions.

This process was all induced through the signed agreement between CLCA national coordinator (ITGC) and the PMAT signed in June 2018 immediately after the official start of the CLCA-II Project, thus providing strong evidence and argument for the ministry to include this zero-till seeder in the subsidy nomenclatures. The agreement signed between both parties stipulates that ITGC (in the framework of the CLCA Project), provides technical assistance to PMAT for further promoting zero-tillage seeder. This will give a strong push to CLCA production systems in the coming two (2) years, especially in terms of expansion of No tillage areas.

"Boudour": Effective Direct seeding equipment for small to medium sized land-holding farmers in dry farming systems

It is a 2.5 m three-point linkage seed drill with fourteen (14) tine sowing units. The hopper is in a raised position which allows a simple gravity flow. The spring release seeding tines are curved with a narrow furrow openers to limit soil disturbance. It has separate seed and fertilizer boxes. The tines are placed on three different ranks which allows a wide spacing between seeding rows and adequate crop residues management. The last rank ensures the attachment of simple covering device with option for press wheels.

This Zero-till seeder allows water to be stored in the soil. It compensates for the weak and irregular rainfall. The furrows formed by the tines are transformed into real rainwater collectors to ensure consequently a better germination-emergence. The location of phosphate fertilizers under the seeds allows for better humidity and good absorption of phosphorus, which is usually-rapidly insolubilized in local soils with high pH. It improves performance on sticky soil handling, residue handling capacity, and marginal moisture suitability.

Background

ICARDA and its partners in Algeria are working now through CLCA Project to develop financially viable business models for no-till service provision enterprises. The objective is to support the development of innovative business models and business plans suitable for small entrepreneurs willing to invest in machinery service delivery. Given that one of the major problems of CA in North Africa is related to the high costs of seeders, an effective and profitable business model where both service providers and farmers can respectively achieve motivating benefits and reduced costs will certainly be of great support for the rural CA communities in the study areas.

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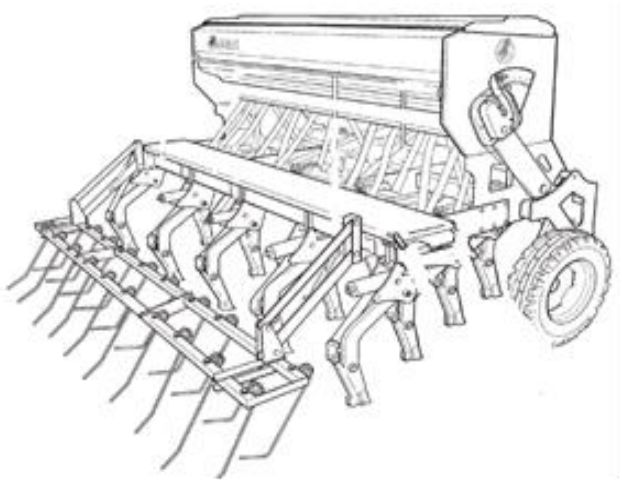

"Boudour" Zero-Till Seeder, Credit: Sola.

Technical Specifications

- Fully mounted seeder on 3 point linkage;
- Power source: suitable for 65-75 HP tractors;
- Overall width (m): 2.8;
- Seeding system:
  - ✓ 14 Spring release seeding tines,
  - ✓ Seed row spacing (cm): 18,
  - ✓ Depth control: adjustable (0-8 cm),
  - ✓ Furrow openers: Tungsten carbide (W_2C) protected openers,
  - ✓ Double Functionality: Conventional and Zero-tillage;
- Dual seed/fertilizer hopper:
  - ✓ Capacity (Seeds 150 kg, Fertilizers 150 kg),
  - ✓ Internal agitator,
  - ✓ Product level indicator (float),
  - ✓ Loading height (cm): 154;
- Seed and fertilizer metering system:
  - ✓ Adjustable gear box for each hopper, with reference scale Rates [Cereals and small pulses: 42-244/ha, Small seeds: 6,2-30kg/ha Large pulses (field pea, chickpea, common bean, etc): 53-193 kg/ha, Fertilizers (MAP-TSP-NPK): 0-577 kg/ha],
  - ✓ Plastic metering system with fluted and tooth peg sections [3 section rollers (small, standard and large seeds), 1 section rollers (fertilizer), Outer flap adjustable for seed size],
  - ✓ Connecting hoses: Metal spring tubes, UV and kink resistant,
  - ✓ Simple covering device with option for press wheels;
- Reliable functionality.