The "in-situ" rainwater harvesting technique of CPATSA/EMBRAPA

The major part of northeast Brazil is classified as arid and semi-arid, with an annual precipitation of 400—600 mm, poorly distributed and highly unpredictable. Therefore, chances of success in crop production are slim.

The responsibility for developing suitable agricultural techniques for this region lies with the Centre of Agricultural Research for the Semi-Arid Tropics (CPATSA) of the Brazilian Enterprise for Agricultural Research (EMBRAPA), which is located at Petrolina (PE), Brazil.

To increase and stabilize dryland crop production, CPATSA has been working on alternative soil management and tillage practices, with and without supplemental irrigation. Among the various other achievements, the development of an innovative system of soil management, along with the necessary mechanization (animal-drawn and tractorized) has drawn the attention of local extension workers and farmers.

The system consists in shaping the soil surface in the form of a "W", with alternating wide and narrow ridges following the contour (Figs. 2 and 3). The wide ridges serve as a rainwater-harvesting zone, the narrow ridges as planting zone and the furrows as water storage zone and pathway for animals and wheels. The furrows can also serve as drainage or irrigation channels when the system is laid out on sloping terrain. To initiate and to re-shape the system, 2 types of mechanization have been developed, one for animal traction (Figs. 4 and 5) and 1 for use with a tractor. Initiation takes 6—8 h ha^{-1} with animal traction and 2—3 h ha^{-1} when performed with a tractor.

The advantages of the system may be listed as follows: facilitates mechanization due to symmetrical configuration; facilitates separate, selective tillage operations for water-harvesting and planting zones; is adaptable to supplemental irrigation; reduces soil compaction in the planting zone; concentrates organic matter and fertilizer in the planting zone; is easily maintained with a minimum of tillage; facilitates preparation during the dry season; provides furrows for animals and machinery wheels.

The performance of the system in terms of higher and ensured crop production, fewer animal and tractor hours and better control of runoff and erosion has been very encouraging. First year's (1983) experience shows that the system can improve cowpea yield by 30% without any fertilizer and by up to 100% with a small amount of chemical fertilizer (15 kg ha^{-1} N and 45 kg ha^{-1} P_2O_5) as compared with the flat planting technique commonly used in the region. This year (1984) the system is being tested on an opera-

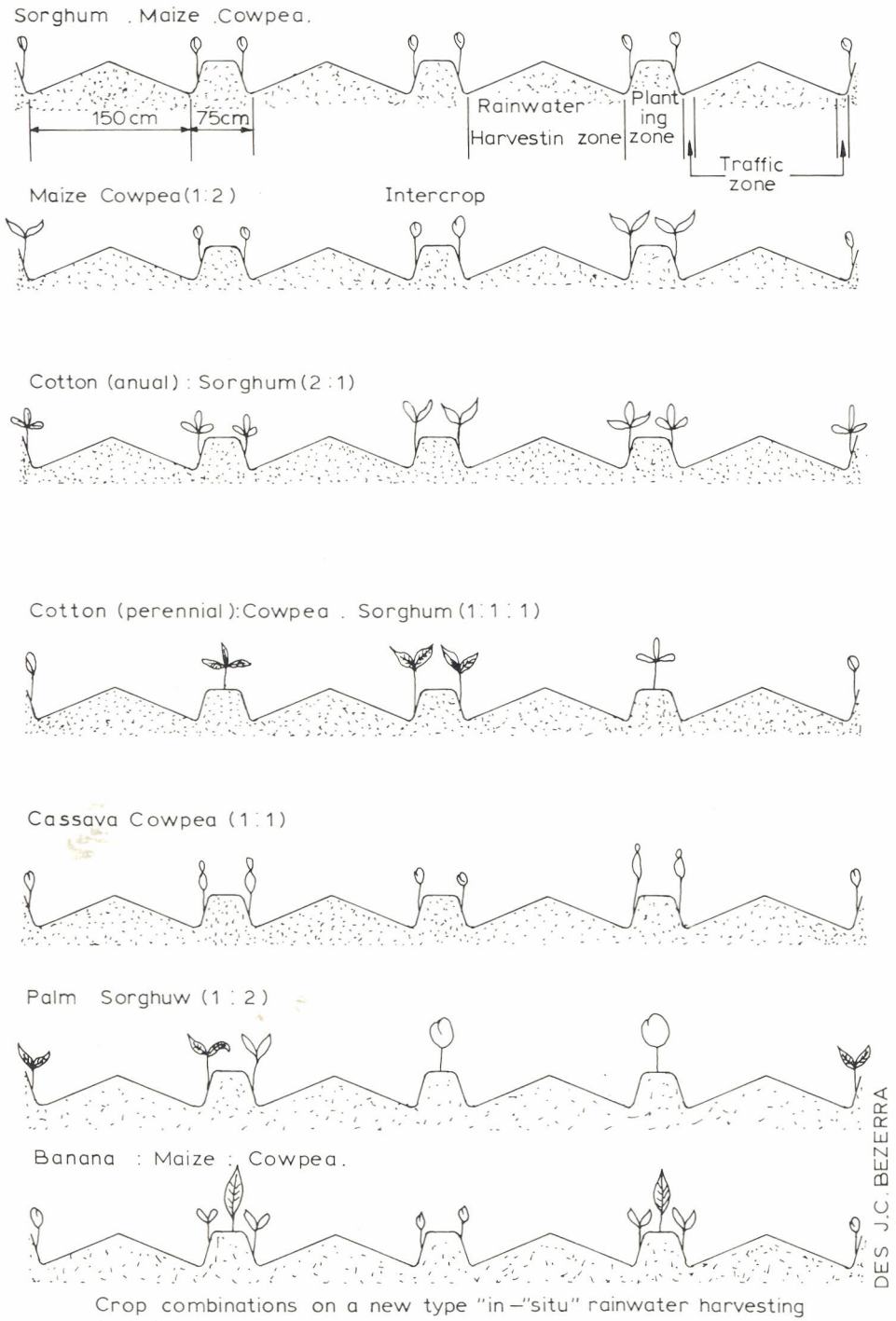

Fig. 2. Crop combinations on a soil surface shaped in the form of a "W" for "in-situ" harvesting of rainwater.

Fig. 3. Cowpea on a "W" shaped soil surface in the arid climate of Petrolina (PE), Brazil.

Fig. 4. Animal-drawn ridger blade, re-shaping the water-harvesting zone.

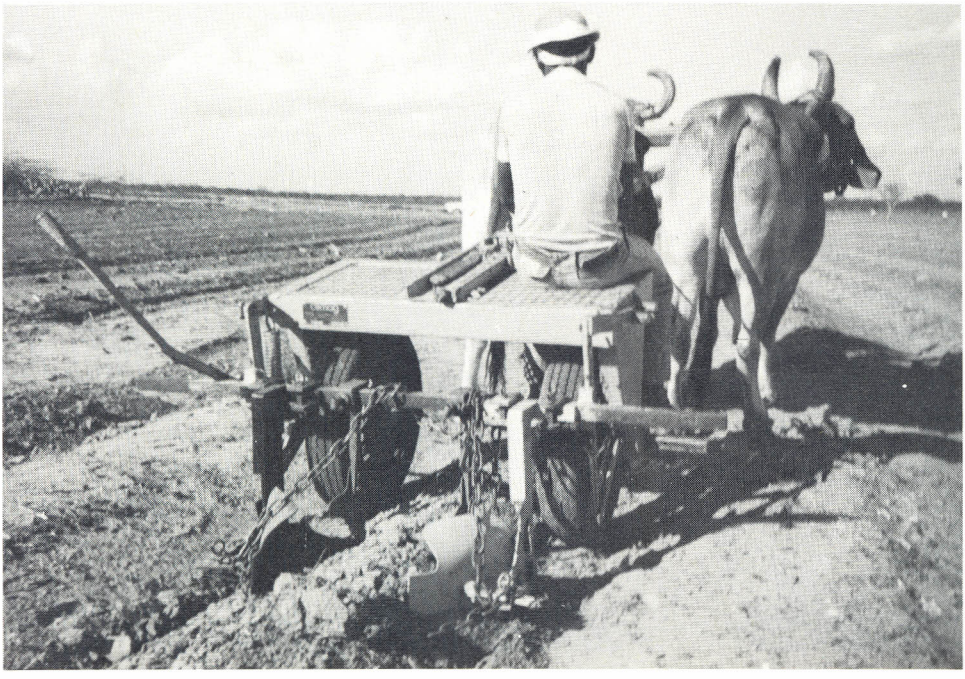

Fig. 5. Animal-drawn sugar cane ridger, re-shaping the planting zone.

tional scale at the CPATSA research centre and at different locations on farmers' fields to obtain detailed information on the effects of the system in different cropping systems.

On the whole the system looks quite promising for the arid and semi-arid region. We would be glad to share our experience with fellow colleagues interested in testing the system under their conditions.

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