DESIGNING OF DIRECT SEEDING CROPPING SYSTEMS WITH NORTHERN CAMEROONIAN FARMERS

Direct seeding Mulch Based Systems (DMC*) under the "Eau Sol Arbre" project (Water Soil Tree).

Naudin K.[1], Balarabe O. [2], Guibert H.[3], Abou Abba A. [2], Charpentier H.[4]

[1] CIRAD-CA, Projet ESA, Sodecoton, BP 302, Garoua, Cameroun, krishna.naudin@cirad.fr
[2] SODECOTON, Projet ESA, Garoua, Cameroun
[3] IRAD/PRASAC, Centre de Maroua station polyvalente de Bocklé, Garoua, Cameroun
[4] CIRAD/TAFA, Antananarivo, Madagascar

Development of SCV techniques is threefold: on station experimentation initiated in 2000, on farm experiment started in 2001, and on mixed experimentation (in the villages but under the supervision of project staff) which begun in 2002.

Only the farm results from the farm experiment in 2002 are presented here.

*** DMC must follow three principles:**

1) Do not plough the soil.

2) Have permanent soil cover with living or dead mulch.

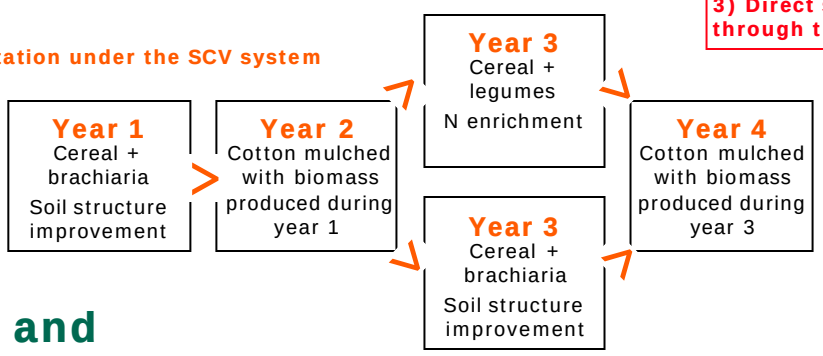
3) Direct seeding through the mulch.

Map 1.: Farm experiment locations

System trials during the 2002 farm experiment :

The aim was to develop SCV systems based on the usual cereal-cotton rotation. In these systems, an important quantity of biomass is produced with the cereal crop wich is used as a mulch for cotton the following year.

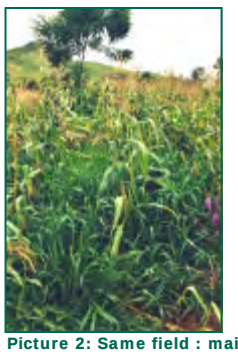
Fig. 1.: Cereal-cotton rotation under the SCV system



Interesting association between a cereal and brachiaria:

- **Above ground biomass** provides mulch for the following year, high quality fodder and weed control. (Pictures 1, 2). In 2002, in the Far North province where rainfall ranged from 535 to 660 mm, the biomass production from the sorghum + brachiaria varied from 4,5 in 10,5 T DW/ha. In general, in the farm study, little or no competition was observed between the brachiaria and sorghum. (Figure 3). Not only did the quantity of biomass produced by brachiaria increase, but the quality was superior as well. Its leaves homogeneously covered the ground but were attacked by very few termites (Picture 5).
- **Subterranean biomass** : natural soil structure improvement, replenishment of carbon to the soil.

Picture 1: Manbang field in 2001 : maize alone *Striga hermontica* present



Picture 2: Same field : maize associated with *Brachiaria ruzisiensis* very little *Striga hermontica* present

Cotton under mulch - What is the farmer's opinion

Advantages:
- Soil water content (water conservation at the beginning and end of the growing season because of the mulch cover and "coutrier".
- Weed suppression (less weeds grow under mulch).
- Soil enrichment (from decomposition of the mulch)

Disadvantages:
- Mulching (finding, gathering, and storing mulch during the dry season).
- Weed control (more difficult by hand).
- Tillage with the "coutrier" (animals are weak at the end dry season, hard soil)

Source: *survey of farmers participating in the SCV study in 2001.*

Cotton under mulch - decrease on climatic risks / increase on yield:

- Early sowing takes advantages of the first rains and the peak in the supply of mineralised nitrogen.
- Elimination of soil tillage - saves times and money with little initial investment.
- Mulching : i) increase water infiltration and decreases evaporation ii) decrease climatic risk at the beginning of the growing season and lengthen the growing season of the cotton.
- Mulching and elimination of soil tillage reduced growth of weeds, complementary control with localized applications of a general herbicide.

Generally, when the SCV technique is followed correctly, its produces increased yields. These increases were most dramatic (3 times as mulch) in the areas with the worst water shortages in 2002, in the Far North province. (Figure 2, Pictures 3 and 4).

Picture 3 : Manbang field in 2002 : cotton in ploughed filed - yield of 700 kg/ha.

Picture 4 : Same field in 2002 : cotton under mulch (no till) - yield of 2100 kg/ha.

Picture 5 : *Brachiaria ruzisiensis* associated with sorghum. During the dry season, termites destroyed the sorghum leaves but spared the brachiaria.

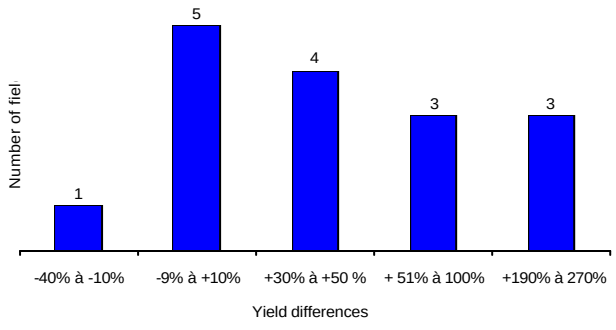


Figure 2 : Comparison between the SCV technique and traditional methods (direct sowing or tillage). Yield differences for the 16 harvested plot pairs.

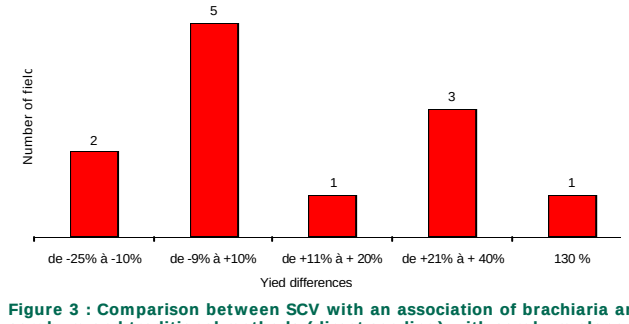


Figure 3 : Comparison between SCV with an association of brachiaria and sorghum and traditional methods (direct seeding) with sorghum alone on adjacent plot.

Conclusion

Besides long-term advantages such as increased erosion control, agricultural sustainability, and the improvement and stabilization of crop productivity, the SCV technique also provides short-term advantages :

1) Decrease in heavy labor for weed control.
2) Increase in land and labor productivity.
3) Greater crop tolerance to uncertain climatic conditions.
4) Fieldwork is spread out over a longer period with a more flexible schedule.

Nevertheless, as promising and efficient as the SCV technique is on the cropping system scale, it can only be successfully implemented if there is an understanding between the farmers and the cattle raisers using the land, and also the participation of local traditionnal authorities. It is also important to better manage the existing biomass as well as increase its production so that using it as mulch does not conflict with its use as forage.

CIRAD
Centre de coopération internationale en recherche agronomique pour le développement

SODECOTON ESA
Projet Eau Sol Arbre

IRAD
Institut de Recherche pour le Développement

Design and production: Cirad/IciLaBas - July 2003 ©