**SAVANNAS OF COLOMBIA**

The Latin America savannas occupy about 250 million ha (50% of the world’s savanna areas).
- The Eastern Plains of Colombia cover an area of about 17 million hectares.
- The Altillanura (flat savannas) occupies 3.5 million hectares.
- The soil is mostly acid, with high aluminum saturation, dominated by kaolinite (1:1), having very low cation exchange capacity and very low base saturation.

**MAJOR SOIL CONSTRAINTS FOR CROP PRODUCTION**

For agricultural production these soils have the following limitations:
- Are very shallow, a horizon is of 10 to 20 cm thickness
- Have low rates of water infiltration (Figure 1)
- Are susceptible to erosion and prone to surface sealing (Figure 2)
- They are hard and not easily penetrated by roots
- Have low aeration capacity
- Are very infertile

**SOLUTION TO OVERCOME THESE CONSTRAINTS IS TO BUILD UP AN “ARABLE LAYER”**

To make these soils productive and to avoid degradation, it is necessary to develop an “arable layer”. Arable layer, is a top soil layer built-up by farmer to overcome the physical, chemical and biological constraints and to form a rich, productive and sustainable soil in such a way that it is possible in the future to establish it, a sustainable agricultural production system, that is economically and environmentally friendly.

To build-up an “arable layer” the following actions are needed:
- Evaluate the physical, chemical and biological constraints of the soil to a depth of 40 - 50 cm
- Based on these evaluations plan the soil and crop management practices needed to improve the soil to desirable conditions and depths.
- Vertical tillage with chisels is needed to improve the physical condition, applications of lime and fertilizers to improve the soil chemical conditions and use of tropical forage grasses that are genetically adapted to low fertility acid soil conditions to invade the soil with strong and abundant roots that will improve the biological conditions.

**EXPERIMENTAL RESULTS OBTAINED**

A) Soil Physical properties

- Reduction of the bulk density (Table 1)

<table>
<thead>
<tr>
<th>System applied to improve soil</th>
<th>10 cm</th>
<th>20 cm</th>
<th>30 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Pass of Chisel</td>
<td>1.2 a</td>
<td>1.1 b</td>
<td>1.0 c</td>
</tr>
<tr>
<td>2 Pass of Chisel</td>
<td>1.2 a</td>
<td>1.1 b</td>
<td>1.0 c</td>
</tr>
<tr>
<td>3 Pass of Chisel</td>
<td>1.2 a</td>
<td>1.1 b</td>
<td>1.0 c</td>
</tr>
</tbody>
</table>

**CONCLUSIONS**

- The development of an arable layer shows the interdependence of the biotic and abiotic components of the soil and it promotes their mutual interaction.
- The building an arable layer is a key strategy to improve food security and environmental sustainability in the tropics, particularly on infertile soils.
- For the “arable layer” concept to be widely adopted, more attention needs to be given to the driving forces behind farmer decision-making and the existing policies for intensifying agriculture on infertile savanna lands.

**ACKNOWLEDGEMENTS**

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