



Aapresid

Update! Evolution of No Till adoption in Argentina

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The potential of agricultural best management practices towards offsetting GHG emissions is estimated at 0.3 to 1.17 Pg C yr⁻¹ (Lam et al., 2013; Neufeldt et al., 2013; Neufeldt et al., 2015) and represents 2.7 to 10.4% of the global GHG emissions (Lal, 2004; Houghton, 2014; Le Quéré et al., 2014 and 2015). Among these agricultural practices, the C sink capacity of No-till (NT) and associated cropping systems to offset emissions and mitigate climate change has generated intense debate (Powlson et al., 2014; Sommer and Bossio, 2014; Corbeels et al., 2016; Powlson et al., 2016; VandenBygaart, 2016). The contribution of NT cropping system to mitigate global climate change, based on weighted average for world for 11 to 22% of the cropland, is as much as 24.5% to 52.7% of the Land Use Change C emissions per year.

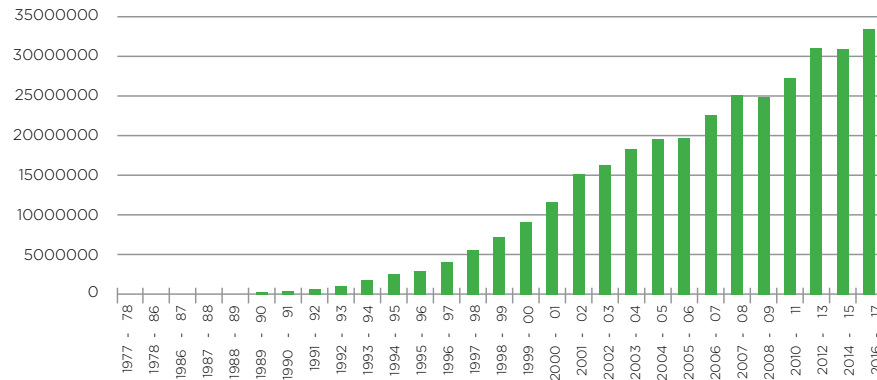
At the international level, NT is known as “conservation agriculture” and it accounts for the 11% of total cropland (Kassam, 2017). It considers three basic principles related to: minimum soil disturbance, crop diversity, and permanent soil cover through cover crops or stubble. In all the countries of the world at least a small area is driven under this system, from dry conditions (300mm / year Bolivia) to very humid (2000 mm / year in Brazil). There is no soil, climate, or crop in the world that cannot be carried forward under this technology.

In the national level, there are not Official entities that perform measurements of agricultural land under NT. Such information is highly demanded, for national and international stakeholders. Since The Argentine No Till Farmers Association (Aapresid) is reference in NT, the Institution took in the labor to relieve the evolution of this technology in our Country.



The data

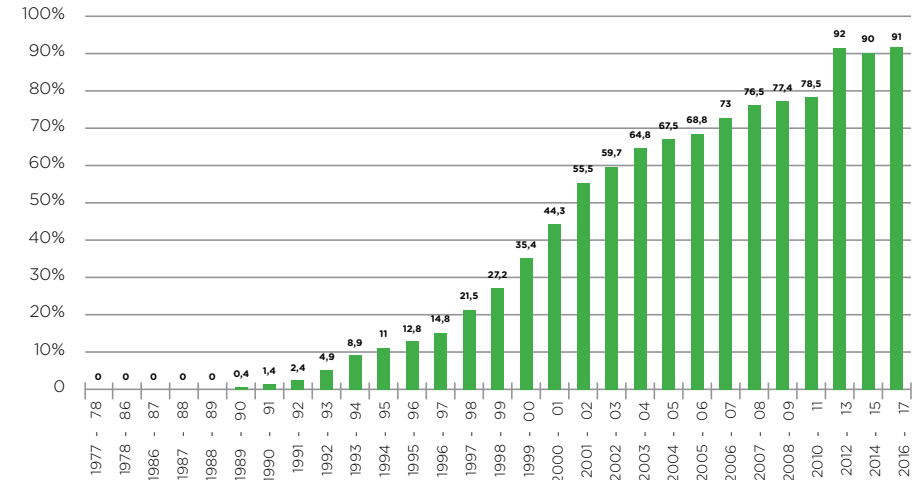
No Till surface evolution since 1977/78 till 2016/17. (Source: Bolsa de Cereales de Buenos Aires / Aapresid):



Aapresid was and is a key player in the dissemination and adoption of No Till in Argentina. This technology was synergized along with incorporation of biotechnology in Argentina's agricultural sector, since 1996 when the first transgenic event is approved in the country, RR soybeans. Thereafter, the growth

was exponential, until our days with values of 91% of surface under No Till; very positive and globally rare (the raise between 2010/11 - 2012/13 is the result of a change in methodology).

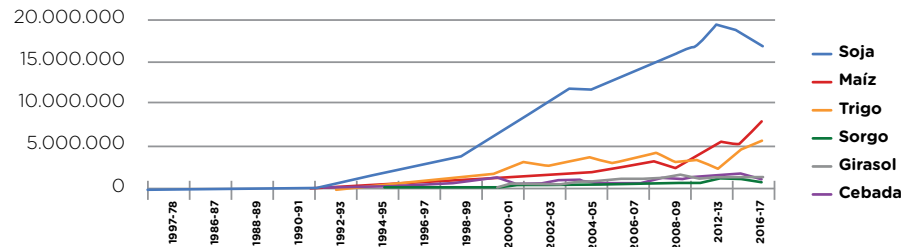
The evolution of surface under NT is phenomenal:



No Till gained ground quickly, and was an effective solution to the problem of soil erosion; It allowed us to stop soil degradation issues in a 90-96% of its intensity.

It meant to keep soil in its place and mainly keep the top layer which is the most fertile fraction. From the economic side It allowed us to reduce fuel consumption by 66%, constituting a complete solution from economic and environmental aspects.

However, in Argentina the production system did not evolve along with this phenomenon, poor crop rotations were the general picture of the Argentine pampas. Argentina's agriculture in recent years was characterized by the relative increase in soybeans at the expense of other crops, the surface under NT was not the exception; 70 % of NT surface is occupied by soybean in season 2012-13(chart below):



This situation was due to export quotas (ROEs) which didn't allow farmers to export nor maize neither wheat and also high export taxes for these two crops, it turned uneconomical the introduction of them into farming systems, complicating the situation with resistant weeds, the result was poor straw coverage and also lack of rotation of herbicides molecules and crops; additionally the lowest wheat planted area in many years, achieving equivalent in terms of wheat production similar to productivity in a century back in time, corn also out of the equation; It ended up in large volumes of

water left on the fields not being consumed by crops, triggering the problem of surplus water, crop lost, water logging and affecting also cities.

After the elimination of ROEs and taxes due to a change in the national government, we can clearly notice the increase in cropped area of corn and wheat getting a place back into the rotation systems over soybeans which is still the mayor crop in Argentina. This is the clear example of the importance of right policy to promote sustainable systems.

Comments

The drop in no till adoption levels in the country are an issue, we moved from 92% of no till adoption in 2012-13 season to 90% in 2014-15. It turns on a warning light for the sustainability of the system in the long term. An occasional tillage destroys most of cumulative benefits of building "biopores" (channels in the soil that are generated by dead roots) and are largely responsible for maintaining a good infiltration and soil aeration. No till shouldn't be seen as a practice more, but as a system, in which benefits are the result of the cumulative of years keeping up with this practice. It is wrong to think that "to plow for just one time" is a minor disturbance; on the contrary, it must be considered as a "surgical" method when we have exhausted all other possible options, this, for the destructive effect on soil organic matter and structure. Among the causes we highlight the situation of resistant weeds: at the beginning one resistant weed took 10 years to appear, then after 5 years and currently reports of the Network of Resistant Weeds of Aapresid (REM) the rate of emergence for resistant weeds is 4 weeds/year (graphic below); secondly plowing operations to remove weeds as a consequence of harvesting in moist soils.



Even with a massive and sustained adoption of NT thru the years in the country, we have been witnesses of the drop on organic matter levels in Argentine pampas, which clearly shows a flaw on how the system is adopted. In addition to the information presented before about crop participation in the rotation which clearly shows a predominance of soybeans over other crops, we must also check how close of zero nutrient balance we are on, according with Fertilizar Asociacion Civil in Argentina just 27% of the nutrients exported as grain from the fields are being

replenished, this is been going on from many years by now, if we look closer to each specific nutrient: just 35% of N, 47% of P, 29% of S and 1% of K (Argentinean soils are very rich in potassium feldspars and micas so crops do not have any response to K fertilizer applications, yet). The challenge is to rethink the systems; always in a holistic and integrated manner. Best management practices are the path, and no till a strong pillar.