SHOULD SOIL CONSERVATION BE ON YOUR BALANCE SHEET?

BY

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"If the air's bad you'll cough. If the water's bad you'll be sick. If the soil's bad you won't notice"
– Arwyn Jones, Joint Research Centre of the European Community

At no time in history has agriculture had such a high impact on the environment as in the last 100 years:

- Agriculture globally occupies 13 times more land than is used by any other anthropogenic.
- Agriculture is arguably the biggest contributor to biodiversity loss.
- Seventy percent of all freshwater globally is used for agriculture, with no surplus for future development.
- Agriculture currently emits up to 25% of global CO^2.
- The USA, to take one example, uses 17% of all its energy to get food through the value chains. That is 1 000 ï 1 500% more energy than the food itself contains.
- Agriculture deploys 2.5 million tons of pesticides and fungicides annually and nevertheless loses 40% of crops globally to pests, diseases and weeds.

Covering a third of the planetôs surface, agriculture has resulted in disturbed ecosystems, land degradation, loss of biodiversity, fertiliser leaching, nitrification of groundwater, suffocation of above groundwater ecosystems, coastal dead zones, small organism mortality, and biological resistance build-up against agrochemicals. Modern industrialised agriculture and overgrazing are blamed for destroying one-third of the planetôs topsoil within 40 years, adding 10 million hectares every year to the toll of soil erosion, which is 100 times faster than the natural rate of erosion. Without any further loss of topsoil, the projected situation for South Africa is shown in Table 1.

TABLE 1: SOUTH AFRICAN POPULATION AND AGRICULTURE

	Unit	2015		2035	
		Number	%	Number	%
Population	Million	53.0	100%	70.1	100%
Urbanisation	Million	32.8	62%	52.6	75%
Farming units	-	34861	0%	20182	0%
Population/Farming unit (with current units)	-	1520	-	2010	-
Population/Farming unit (with projected units)	-	-	-	3472	-
Total arable hectares	Million	100.7	-	95.7	-
- Commercial	Million	82.2	-	77.2	-
- Emerging	Million	14.5	-	14.5	-
Commercial hectares/population	-	1.6	-	1.1	-

Source: Statistics South Africa

As the population increases and more and more people move to urban areas, the opposite is happening to agricultural land. According to Table 1, the projected area of arable land will decrease during the next 20 years because agricultural land firstly has to be used for ever-expanding cities and, secondly, an increasing number of farms have to be sacrificed for mining purposes to supply the growing population with energy and resources. Currently, each farming unit has to support 1 520 people but this could increase to a projected 3 472 in 2035. Where there is currently 1.6 ha of arable land available to feed one member of the population, there will only be 1.1 ha available twenty years from now.

What we still possess is therefore extremely valuable and must be conserved at all costs. In spite of this, the following questions arise regarding conservation agriculture (CA):

- Why, when CA poses less risk, do financial institutions not promote CA?
- Why are we not seeing CA products on retail shelves more regularly?
- What happens if you practise CA and your neighbour doesnôt?
- What if for some reason you have to sell your CA farm, built up over 20 years, and the new owner simply puts a plough to the fields?
- Can we put a value on CA so that it can be acknowledged as a financial asset?
- Can we legally protect the status of conserved soil?
- Does the ultimate result of CA belong on a farmerôs balance sheet?

Value chain participants

Table 2 shows results of the research done by Von Loeper, Drimie and Blignaut, which show that none of the interviewed value chain participants had products that support CA.

TABLE 2: SUMMARY OF RESPONSES AROUND CONSERVATION AGRICULTURE

	Do you have a CA product?		Have you planned for a future CA product?		Do consumers demand CA?		What are you inclined to support?	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**CA**	**Organic**
Banks	0%	100%	25%	75%	n.a.	n.a.	n.a.	n.a.
Insurers	0%	100%	0%	100%	n.a.	n.a.	n.a.	n.a.
Traders	0%	100%	0%	100%	0%	100%	0%	100%
Retailers	0%	100%	0%	100%	0%	100%	0%	100%
TOTAL	**0%**	**100%**	**6.3%**	**93.8%**	**0%**	**100%**	**0%**	**100%**

Source: Von Loeper, Drimie & Blignaut

All four participating banks argued that good production practices for a farmer automatically reflect in production output benefits and a better balance sheet, which should in turn result in a lower risk profile for a farm and consequently cheaper credit with better premiums. The argument that this might take time to achieve was generally met with the response that this is the nature of farming. One bank confirmed their view that a production method changeover, specifically to CA, would probably result in an initial increase in costs and a reduction in yield before any yield increases could be observed and any benefits would reflect on the balance sheet. None of the banks, therefore, supplied a product that would give a farmer who converted to CA credit in the form of reduced premiums.

Insurersô willingness to take on climate risk on behalf of farmers also makes them susceptible to farming practices, particularly where new machinery and farming principles such as CA have the ability to reduce drought risk and the risk of exposure for insurers. When asked whether they knew about research proving that CA results in more climate resilience and less water stress, the insurers argued, as the banks did, that their business model would automatically benefit those farmers who chose better farming practices.

The two large traders and food processors in South Africa who participated and who also owned maize silos and milling operations were generally confused by the term CA as they were not sure how it related to organic and GMO-free farming practices. Unlike banks, that have dedicated agricultural business units with knowledgeable staff, the traders usually buy produce from other traders and agri-businesses, without needing to understand the production methods.

All three participating retailers agreed that there was very little understanding of CA on the part of consumers and that this was unlikely to change in future.

Biological valuation

The International Valuation Standards Council (IVSC) is an independent, non-profit organisation that produces and implements universally accepted standards for the valuation of assets across the world in the public interest. It defines agricultural property as all the rights, interest and benefits attached to agriculture or assets associated with agricultural activity. According to them, agricultural property comprises land, structural improvements, plant and machinery attached to the land, plant and machinery not attached to the land, biological assets attached to the land (living plants), biological assets not attached to the land (living animals) and lastly agricultural produce.

The International Accounting Standards (IAS 41), which establishes accounting standards for agricultural activities, has concluded that agricultural activity is the management by an entity of the biological transformation and harvest of biological assets for sale or for conversion into agricultural produce or into additional biological assets. The IVSC further states that biological transformation comprises the

processes of growth, degeneration, production and procreation that cause qualitative or quantitative changes in a biological asset.

The IVSC has noted that the physical and economic characteristics of agricultural properties differ from those of common real property. Land in urban environments needs to be suitable for bearing the improvements erected on it but for agricultural properties the soil is the principal agent in production and it varies in its capacity to support a given amount of a particular commodity or class of commodities. In urban environments, the economic use of a property may remain unchanged over a period of years and might be guaranteed by contractual arrangements. In the valuation of agricultural properties, the physical and environmental aspects of the property assume special importance and include features such as climate, soil type (and its productive capability), the availability of water for irrigation and the feeding/carrying capacity for livestock.

Market value for agricultural land is therefore the estimated amount for which an asset or liability should change hands on the valuation date between a willing buyer and a willing seller in an armôs length transaction. This assumes that the parties are acting knowledgeably, prudently and without compulsion, which, from a participantôs perspective, would produce the highest value for an asset.

Knowledgeably, prudently and without compulsion

To determine whether farmers understand the value of soil organic matter and how much they are willing to pay for it, Paul Overby, a farmer and researcher from Wolford, North Dakota, conducted a survey amongst farmers in the USA. Two scenarios were presented to ascertain farmersô willingness to pay. The first was: *"If you were evaluating two parcels of land to purchase, both otherwise equal, but one had an average soil organic matter of 3% and the other had an average soil organic matter of 5%, how much more would you be willing to pay for the one with 5% soil organic matter?"* The results are shown in Table 3.

TABLE 3: HOW MUCH MORE WOULD YOU BE WILLING TO PAY FOR LAND WITH 5% SOM VS 3% SOM?

ANSWER CHOICES	RESPONSES	
Nothing, it would be based on other factors	48	33.3%
I don't know	28	19.4%
SUBTOTAL	76	52.8%
$100 per acre	26	18.1%
$200 per acre	19	13.2%
$300 per acre	14	9.7%
$400 per acre	9	6.3%
TOTAL	**144**	**100%**

Source: P Overby

Table 3 shows that for 52.8% of the participants, soil organic matter, as an indicator of conserved soil, had no relevance in relation to the price of land. For 6.3% of the participants the conserved soil was worth $400/acre more.

Following the first question, Overby provided an explanation regarding the nutrients that were made available to a crop for each percent of soil organic matter as well as the added water content provided by each percent of soil organic matter. He purposefully did not provide a dollar value for either the nutrients made available or the extra water capacity and then asked: *"Based on learning the above information, how much more would you now be willing to pay to purchase a parcel of land with 5% soil organic matter versus a parcel with 3% soil organic matter?"*

TABLE 4: HOW MUCH MORE WOULD YOU BE WILLING TO PAY FOR LAND WITH 5% SOM VS 3% SOM AFTER BEING INFORMED THAT 1% OF SOM INCREASES AVAILABLE NITROGEN BY 20–30 lb/acre/annum?

ANSWER CHOICES	CHANGE		RESPONSES	
Nothing, it would be based on other factors	-20	-14%	28	19.4%
I don't know	-12	-8%	16	11.1%
SUBTOTAL	-32	-22%	44	30.6%
$100 per acre	18	13%	44	30.6%
$200 per acre	3	2%	22	15.3%
$300 per acre	4	3%	18	12.5%
$400 per acre	7	5%	16	11.1%
TOTAL			**144**	**100%**

Source: P Overby

As shown in Table 4, there was a significant change in the response after the benefits of soil organic matter had been explained. The participants who indicated that they did not care about soil organic matter with the first question decreased from 52.8% to 30.6% and those who were willing to pay $400/acre increased from 6.3% to 11.1%.

Finally, participants were asked to evaluate their expectation of payment if they were the ones who had invested in increasing the soil organic matter on their land. This was an attempt to determine what value they placed on soil organic matter, even if they werenôt willing to pay someone else for it. The results, shown in Table 5, correlate significantly with those in Table 4.

TABLE 5: IF YOU HAVE ADOPTED CA TO BUILD SOM UP FROM 3% TO 5%, HOW MUCH MORE WOULD YOU WANT TO BE PAID OVER THE MARKET VALUE?

ANSWER CHOICES	CHANGE		RESPONSES	
I wouldn’t expect to be paid anything	-26	-18%	22	15.3%
I don't know	-1	-1%	27	18.8%
	-27	-19%	49	34.0%
$100 per acre	2	1%	28	19.4%
$200 per acre	15	10%	34	23.6%
$300 per acre	-1	-1%	13	9.0%
$400 per acre	11	8%	20	13.9%
TOTAL			**144**	**100%**

Source: P Overby

Overby concluded with the following:

- Farmers have a basic understanding that land with a higher soil organic matter is preferable.
- Farmers lack full knowledge and understanding of the economic value of soil organic matter.
- Education may be important to help farmers gain knowledge and to understand the economic value of soil organic matter.
- A value can be placed on soil organic matter/CA.

When equipped with knowledge, farmers will understand and act on economic value. Where there is a known economic value for farmers, they will adopt practices that increase soil organic matter on their farms, resulting in the conservation of their soil.

Protection

In years gone by we could get away with the destruction of farm land by simply moving on to new virgin soil. It eventually became apparent that the amount of soil available is limited but it was also apparent that soil conservation could never be accomplished through reliance upon voluntary efforts by farmers. The year 1946 saw the promulgation of the Soil Conservation Act 45 of 1946. This Act was later considered inadequate since it was aimed essentially at reclamation or correction rather than at conservation. It did, however, prescribe that every time farm land was transferred the new owner had to be in possession of an approved conservation plan for that specific property.

The shortcomings of the Soil Conservation Act of 1946 eventually led to the drafting of a new Soil Conservation Act, 76 of 1969. The main feature of this Act was to provide a democratic basis for co-operation between the government and the farming community with a view to soil conservation. The Act enabled farmers to initiate actions without waiting for the government, and to play an active role in carrying out appropriate soil conservation measures. This Act stimulated soil conservation by offering financial rewards (subsidies/grants) for certain actions but also relied on criminal sanctions for securing compliance with its provisions. The compulsory conservation plan when transferring farm property was omitted, however, because it caused lengthy delays at the deeds registry.

The Conservation of Agricultural Resources Act 43 of 1983 replaced the 1969 Act. Its aim was to provide for control over the utilisation of the natural agricultural resources of the Republic in order to promote the conservation of the soil, water sources and vegetation and to combat weeds and invader plants. In order to achieve the objects of this Act, the Minister may prescribe control measures with which all land users must comply. Such control measures may relate to ï among many other things ï the cultivation of virgin soil. "Virgin soil" means land that has not been cultivated at any time during the preceding ten years and it includes established perennial fodder like eragrostis. This underlines the strong case for regarding no-till soil that ñhas not been cultivated at any time during the preceding ten yearsò as having the status of virgin soil.

Conclusion

Soil conservation is recognised and protected by law. Conserved soil can be classified as a biological asset within the framework of international auditing standards. It can be valued by the financial benefits it creates in terms of soil organic matter. It has a market value if the willing buyer and willing seller acted knowledgeably, prudently and without compulsion and this market value can easily be specified within the framework used by the accounting profession. Our ñcreditò with nature is limited. Therefore, we should limit our natural overdraft accordingly and acknowledge any effort to the contrary as an asset on the balance sheet of a CA farmer.

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