

# Global sugar, regional water, and local people: EU sugar regime liberalisation, rural livelihoods, and the environment in the Incomati River Basin

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**This paper is concerned with how changes in the global economy, triggered by actions undertaken in one part of the world, can affect the lives and the prospects of poor rural people, as well as the environment they live in, in another very distant part of the world. It analyses the linkages between changes in the European Union (EU) sugar regime and the economic fortunes and the environmental future of a very poor and highly water-stressed area in southern Africa—the Incomati River Basin—where sugar production is the single most important economic activity. The case study epitomises the complex interactions between trade liberalisation on the one hand and poverty and the environment on the other.**

**Key words:** trade liberalisation, rural livelihoods, environmental sustainability, sugarcane cultivation, water regimes

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## Introduction

The EU agreed under international pressure in 2005 to gradually liberalise its highly distorting sugar regime. This case study epitomises the complex interactions between trade liberalisation on the one hand and poverty and the environment on the other. The paper first describes pertinent environmental and social conditions in the Incomati Basin. It then outlines how the EU sugar regime reform could affect sugar prices on the world market, and assesses the effects in South Africa. Next, it analyses the impact of a sugar production expansion on the environment and ecosystem services in the Basin. The geography of social impacts is then discussed. The conclusions include a recommendation as to how to reconcile local development with global trade liberalisation.

## The context

The key factor that links sugarcane cultivation, rural livelihoods, and the environment in the Incomati Basin is water availability. In 2001, annual per-capita water supply in generally semi-arid South Africa was a mere 1156 m<sup>3</sup>, which poses challenges to human health, food production, and economic development. An additional problem is a deteriorating water quality due to pollution. Agriculture is the biggest user of water in southern Africa. In 2000, it accounted for 73% of all water use, followed by domestic users (17%) and industry (10%). Worse still, agricultural irrigation is classed as 'consumptive use of water'; the resource 'disappears' on use, and the option of wastewater retrieval and re-processing for return to the resource is minimal or absent. In the same year South Africa had exploited 85% of its irrigation potential. In fact, water demands are expected to outstrip available supply (including from dams in Lesotho) by 2030.<sup>1</sup>

South Africa has an exemplary policy framework in place to deal with these challenges. The 1998 National Water Act 36 (NWA) elevated water to a national asset.<sup>2</sup> It acknowledges the

interactions between hydrological flows, ecosystem functions, economic growth, and human well-being. It has introduced water demand management and has linked it with the public good and more equitable access. This includes the recognition of water access as a constitutional right whereby all South Africans should be entitled to access at least 25 litres per person per day (there are still circumstances and locations where it is impossible to claim this rightful entitlement). In addition, ecosystems are seen as legitimate water users, whose 'rights' are subject to protection in the form of an ecological reserve. Finally, the NWA provides for a devolved governance structure whereby Catchment Management Agencies (CMAs) and Water User Associations (WUAs) are given authority to make decisions at the local level. Modalities of implementation are codified in the National Water Resource Strategy (NWRS).

The South African part of the Incomati Basin is located in Mpumalanga province. Just short of a fifth of the formal sector employment is in agriculture. The sector contributes about 6% to the provincial gross geographical product (GGP). More than half of agriculture's share comes from sugar, employing between 65 000 and 70 000 people, and more than 65 000 hectares are under cultivation. Sugar production is the single most important economic activity in the local municipality of Nkomazi, based around Malelane, and the district municipality of Ehlanzeni, of which it is a part. Its direct and indirect effects are estimated to involve some 70% of the local economy. Forward linkages are poorly developed. Apart from sugar refining itself and some fruit juice production, existence of agro-processing is marginal.<sup>3</sup>

The situation in the Incomati River Basin epitomises many of the water-related challenges that face southern Africa. According to the 2000 NRWS, water use already exceeds available allocation by 26–29%, meaning that the ecological reserve is being compromised. In the year 2000, irrigation made up 70% of total water use in the area. Since sugarcane comprises at least half and possibly up to 80% of irrigated crops in the area, it is clear that the medium-term sustainability of the area's current economic specialisation is in question, if only because there simply is not enough water.<sup>4,5</sup>

The ecological reserve is affected. The Incomati Water Management Area (WMA) accommodates high levels of species biodiversity and endemism.<sup>6,7</sup> But the catchment area is under more stress than it has been in the past 100 years.<sup>8,9</sup> This includes perturbation of the hydrological systems, biodiversity losses, land degradation, and atmospheric emissions.

A tripartite agreement governs water flows between Swaziland, South Africa, and Mozambique. Honouring international commitments is an important principle of the NWA. The so-called Interim IncoMaputo Agreement provides for South Africa's minimum release of two cubic metres per second to Mozambique. The agreement allows for adjustments of this minimum flow in times of drought. South Africa has periodically fallen short of this commitment, which has led to conflicts with Mozambique.

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The Incomati River Basin has some of the poorest people in the region. Official unemployment in the Nkomazi municipality exceeds 40%; 44% of people above 20 years of age have no formal schooling. Almost two thirds of households are without piped water, and more than half are without adequate sanitation. Life expectancy at birth in 1980 has dropped from 62 years to 53 years at birth in 2001, much of which is due to the impact of HIV/AIDS, underlining the vulnerability of the population.

Post-apartheid attempts to address this situation have yielded varied results. On the one hand, a considerable number of black small-scale farmers have emerged, most of whom have become active in cane growing. On the other hand, this has merely reinforced differentiations within the previous homeland populations insofar as it has been primarily locally privileged people who have managed to gain access to communal land earmarked for cultivation. Effective land redistribution in favour of the very poor has not really taken place.<sup>10</sup>

The sugar industry has been instrumental in helping black farmers establish themselves on smallholdings and guaranteeing an outlet for their crop. But because of the way in which the process of land access was handled during and after apartheid, the sugar industry has effectively brought about the displacement of people from land by traditional authorities, who retain control over communal lands. On occasions these people have received no compensation, and on others they received marginal land in exchange. Further expansion of the sugar industry is thus likely to have a differential effect across households.

Because of severe water stress, the Incomati River Basin will be subject to compulsory licensing (NWA, Section 43–48). The process includes the option to reconsider all the water use authorisations in an area. Potentially, this has far-reaching economic, social, and environmental ramifications.

### EU sugar trade reform

The EU had managed for decades to reconcile top world export status in refined sugar with a production cost structure that lay two to three times above the world price.<sup>11</sup> This was only possible through a complex system of import controls, price support, and export subsidies. The system singularly depressed world prices and discriminated against more efficient producers. Eventually Brazil, Thailand, and Australia summoned the EU before the WTO in November 2002.

The WTO ruled in favour of the plaintiffs. The EU accepted the verdict and agreed on a reform proposal in November 2005. In essence, it entailed a 36% reduction in the guaranteed intervention price, phased in from 2006/07 over four years, and thereafter, an abolition of the intervention price system. The agreement was rigid, with no option of review until 2014/15.<sup>12</sup>

It is without question that the reduction of the EU intervention price will increase the world price of sugar. The question is, by how much?

### Effects on and responses by producers

The reform of the EU sugar regime and the gradually increasing EU market access on offer under the Everything-But-Arms (EBA) Programme will affect the world price of sugar in three ways.

- Subsidised sugar will be removed from the world market. According to Commission estimates, sugar exports will decrease from 3.1 million tons in 2003/04 to 0.4 million tons in 2012/13.<sup>13</sup>
- Many ACP countries (i.e. former European colonies in Africa, the Caribbean, and the Pacific) will not be able to produce economically at the new EU price, let alone the lower world price. More efficient ACP producers will replace them with

exports to the EU, thus withdrawing some supplies from the world market. By the same token, Swaziland may divert some exports from South Africa to the EU.

- Sugar originating in EBA beneficiaries will by year 2012/13 replace up to a third of sugar previously produced in the EU, again withdrawing supplies from the world market.

Those producers who stay in the market are likely to increase production. This goes for EBA beneficiaries, who manage to produce below the EU intervention price, and all other countries with the ability to produce below the new world price. The overall magnitude of the supply response is importantly affected by the world's largest and most efficient sugar producer, Brazil.<sup>14</sup>

Estimations of a future world sugar price vary from an increase as low as 10% to as high as 63%, depending on the liberalisation scenario (see Table 1).

**Table 1.** Estimates of future world sugar price increases, %.<sup>15,16,17,18</sup>

Study	EU liberalisation	OECD liberalisation	Multilateral liberalisation
CIE	16	63	
Elobeid and Beghin			48
Koo	22		
Wohlgenant		10	43

None of these studies models the events of 2005 explicitly. But it is possible to derive an 11% price increase following the 36% reduction in the EU intervention price. Other authors arrive at much lower estimates. For example, Wohlgenant<sup>18</sup> suggests an increase of 10% following *full* liberalisation in all developed countries, something that is clearly different from a change in the EU regime alone, which should then have a logically smaller impact. As no study reports a higher estimate, it is reasonable to regard an 11% increase as the upper limit. Likewise, because no study reports a zero estimate, the lower boundary must reflect a positive price change. The world price of sugar is likely to rise by more than 11% through oil price increases.

The reform will affect production in two ways in South Africa. The increase in the world price will elicit a positive supply response, as will the withdrawal of Swazi sugar from the South African market. Again, the extent is the question.

One can estimate South Africa's supply response to changes in the world price based on historical data. The model used in this study explains the production of raw cane as a function of the world price as quoted on the New York Board of Trade, the producer price fetched in South Africa, and previous sugar production in South Africa. It explains 78% of the variation in production in sugarcane from 1994 to 2004.

The model estimates that every 1% increase in the world price of sugar will lead to a 0.49% increase in sugar production. Using a 95% confidence interval, an 11% increase in the world price will thus evoke a South African supply response between 2.4% and 8.5%. Counter-intuitively, it also estimates that any increases in the producer price will lead to a decrease in production. But this merely reflects the dynamics on the local sugar market, whereby it makes sense for millers to limit supplies in order to increase the domestic sugar price.<sup>19</sup> Other studies produce similar estimates.<sup>20,21</sup> The estimates are adequate for the purpose of gauging the effect of trade liberalisation on ecosystem services.

### Environment and ecosystem changes

The analysis looks at the current effect of sugar cultivation and milling on water demand. This then allows discussion of the magnitude of changes in water consumption in relation to

projected changes in sugar production.

The sugar industry generates water demand in the Incomati Basin through irrigation of crops and as an input to cane milling and processing. Sugarcane is a relatively water-intensive crop, and in this region, natural rainfall is augmented by supplementary irrigation. Milling and processing do not fall under irrigation legislation but have to comply with regulations concerning discharged water quality objectives, and the like. For the purposes of this analysis, the irrigation water estimates produced by the South African Sugar Research Institute's (SASRI) model CANESIM have been compared with similar models, field trials, environmental audits, and feedback from farmers, so as to derive representative estimates of water consumption per unit of recoverable value (RV, *i.e.* sucrose mass) produced.<sup>22,23</sup>

Over the past decade the sugar industry on average has managed to achieve a yield of 65 tons per hectare and a RV of 11%. With technological advance, any expansion of the industry should lead to a lower marginal increase in water consumption. This study estimates an average crop requirement in Incomati of 12 500 m<sup>3</sup> per hectare per annum, or a gross water requirement of 17 850 m<sup>3</sup>. Moreover, it estimates a future yield of 90 tons per hectare, with a 12% RV. This translates into an irrigation requirement of 1653 m<sup>3</sup> per ton of RV. Failure to employ best practice strategies would raise this figure to as much as 4609 m<sup>3</sup> per ton of RV. In case of a contraction of the sugar industry, less water-efficient growers are likely to exit the industry first, thus reducing total water demand by this higher figure.

The two sugar mills in the Incomati catchment area in Malelane and Komati crush over four million tons of sugar per annum. The annual gross operational water requirement of the mills is over 40 million m<sup>3</sup>. Allowing for all recycling and closed-loop water-minimisation technology, the net consumptive figure is nearer six million m<sup>3</sup>. This translates into a per-ton requirement of 0.75 m<sup>3</sup> for cane and of 6.0 m<sup>3</sup> for RV. The sugarcane crushed by the Incomati mills in year 2003–2004 consumed more water than was reported available as an allocation for all irrigation in the region in the NWRS and just under a quarter of the WMA's mean annual run-off.

With a supply response of between 2% and 9% to a world sugar price increase of 11%, the Incomati mills would produce an additional 84 000 to 378 000 tons of sugar, translating into a RV ranging from 10 080 to 45 360. In turn, this would increase water demand by between 16.7 and 75 million m<sup>3</sup>, adding to the 850 million m<sup>3</sup> that the sector currently consumes. Changes in international trade are therefore likely to exacerbate the stress suffered by terrestrial and aquatic ecosystems in the area.

The more relevant discussion is whether the costs of the sugar industry—in its current or in an expanded capacity—are worth enduring in the interest of the various benefits that it brings. Allocation of economic values to water remains problematic in the absence of a social and environmental accounting matrix that imputes the full ecological cost of various options available to Incomati, and that reports their opportunity costs. This is the norm for water evaluation exercises.<sup>24</sup> What is indisputable, however, is that water in the Incomati is scarce, that sugarcane is an extremely water-consumptive crop and that the price paid by sugarcane growers for water does not reflect its scarcity value.

### Human wellbeing changes

EU sugar reform is too recent an event to have led to discernible changes in people's livelihoods.<sup>25</sup> So the question to which the study seeks an answer is how an increase in the world price of sugar *might* impact on the ability of someone living somewhere in rural Mpumalanga, or next to a stream in Mozambique,

to make ends meet under conditions of compromised freshwater supply.

The section first describes the importance of land access and ownership to economic activities in the sugar industry. Second, it interrogates available databases with a view to identifying those members of rural communities who are most likely to suffer any adverse consequences of changes in the Incomati sugar economy. Third, it makes some conjectures about ecosystem deterioration and livelihoods in the Incomati area.

Since 2000, South African land policy has linked land reform with agricultural development, favouring more articulate, better connected, and relatively well-resourced land claimants. Traditional leaders continue to exert a high degree of control over decisions concerning the tracts of communal land that are made available for commercial purposes, and decisions as to those occupants who will be made to leave this land. In summary, both government land reform programmes and traditional institutions of land governance reinforced relations among the 'already haves' rather than distributing land to the very poor.

The sugar industry is important to the issue of land access because it has created the conditions under which subsistence land can be elevated to commercial use. TSB, the owner of the two mills in Incomati, built its mill in Komati specifically to source cane supply from smallholder growers, for which it provided extension services, while a government initiative, the Nkomazi Irrigation Expansion Programme (NIEP), provided the necessary infrastructure. In the view of emerging farmers, sugarcane is the single most successful developmental crop in the entire area between Malelane and Swaziland. On the other hand, the approximately 1 300 people working mostly informally on smallholder farms, in practice, do not enjoy the protection afforded to their counterparts on commercial farms, and reportedly receive wages considerably below the mandatory minimum. It is thus a rural elite that has a primary stake in the sugar industry. This means that growth in the industry is first and foremost likely to benefit these stakeholders. So the critical question is: who are the losers?

The gaps in our understanding of poverty are substantial. The quality of the information about income contained in the South African Census and the Income and Expenditure Survey (IES) is deficient and partly out-of-date. Results from the General Household Survey (GHS) and the Labour Force Survey (LFS) are also not reliable below the provincial level. In summary, poverty analysis in the Incomati Basin cannot be conducted at anywhere near the level of disaggregation that is required to substantiate anecdotal impressions of deprivation with definitive evidence.

By contrast, the prevailing conditions of poverty in the province are known. The 2004 LFS shows that 54% of the population lived in households with monthly expenditures below R1 200, 41% below R800, with a respective 86 and 88% falling below the poverty line. Despite the massive increase in social grants in the last few years, poverty has decreased minimally after the mid-1990s.

A ten-year-old Rural Survey<sup>26</sup> shows that some 130 300 out of 1.1 million people in the old homeland of what now belongs to the province of Mpumalanga considered themselves farmers. Almost half the households had access to some land for farming, 80% of which had been allocated to them by tribal authorities. The survey results imply that the proportion allocated by traditional leaders to households rose with increasing income. In aggregate, access to land was the greatest need, followed closely by access to water. Finance was a distant third. Fewer than one in five farmers had a water source on the farm. This source occasionally dried up in half of the cases. This affected poorer house-

holds disproportionately. More than one of three households with on-farm water supply used irrigation systems. Those without on-farm water have relied primarily on rainwater, but have also used outside sources. The picture that emerges from the Rural Survey is thus one of a relatively poor subsistence farming community, most without reliable water sources, and all in need of land.

The so-called Index of Multiple Deprivation is based on the 2001 Census and measures the combined effects of deprivation across five domains, namely income and material deprivation, employment, health, education and the living environment—but notably not specifically in agriculture.<sup>27,28</sup> These indices are available for very disaggregated areas. They support the insight from the Rural Survey in that 80% of the wards in Mpumalanga are among the most deprived 25% in three or more domains, clearly an instance of cumulative deprivation.

These depressing data make it imperative to resort to conjectures. The study has marshalled enough evidence to support the contention that the development of the sugar industry has benefited some relatively poor and subsequently upwardly mobile rural people. It has also shown that the very poor have not benefited from the development, mostly because prevailing power relations in rural areas, both past and present, have prevented them from enjoying access to the key asset required for smallholder farming, namely land. In fact, sugar industry expansion may have contributed to their predicament through the land dispossessions that accompanied it, both under apartheid and to this day. If the sugar industry expands further, it seems more likely that this trend would if anything be exacerbated.

The link between ecosystem deterioration and the livelihoods of the very poor is paramount in this respect. Presently about a third of the people in Mpumalanga rely on direct abstraction from streams and rivers for their domestic water needs. Outbreaks of water-borne diseases such as dysentery and typhoid are periodic in the province. Helminth (worm) infestation is widespread amongst schoolchildren in the Lowveld region.<sup>8</sup> The point here is not that these diseases are somehow particular to the Incomati Basin. In fact, they exist elsewhere in the country. Yet to the extent that people rely on direct water abstraction, they are more vulnerable to health hazards than communities with piped water supply.

In summary, the sugar industry is implicated in the undesirable state of hydrological resources in the WMA. Available data do not clearly indicate exactly who the losers of this state of affairs are—other than that it is the poor, outside the sugar-value-chain, who rely on direct water abstraction for domestic, stock, and agricultural purposes. This is where they live, and how their predicament manifests itself. The problem is justification for future research.

### Conclusions and recommendations

The most important argument to emerge from the analysis is that global trade liberalisation remains an external issue. The situation of the rural poor and the environment in Incomati is so serious, even in the absence of trade liberalisation, that it would be inappropriate to focus on a factor that may only change a bad situation for marginally worse, as opposed to investing constructive attention to the reasons for the predicament in the first place.

All the same, the reform of the EU sugar regime is likely to lead to a positive supply response by the South African sugar industry, including in Incomati. As this will entail an increase in water consumption, it is likely to undermine ecosystem services.

In turn, this can only have negative consequences for very poor people. Since employment on sugar farms is reconcilable with severe income poverty, it is doubtful that the trade-off between environmental degradation and the expansion of the sugar industry will occasion net benefits for the very poor. On the contrary, the benefits and costs imposed by an expansion of the sugar industry seem likely to reflect existing patterns of wealth and patronage on the one hand and poverty and vulnerability on the other.

Everything else need not be equal. If water pricing were realistic, or at least distributed across sectors and enterprises in accordance with its economic value, then the South African sugar industry would become less competitive.<sup>29</sup> Higher water charges, or less water, would narrow the differential between producer prices in South Africa on the one hand and world prices and EU import prices on the other. This could thus offset the supply response that would take place under current conditions. The evolving CMA can effectively amend the opportunity costs of water, or through compulsory licensing, rather reduce the costs that the Incomati Basin faces as a whole from a (mis-)allocation of water that does not reflect its true scarcity value.

This will practically reverse the causality of the research question, in that it would then be a change in the articulation of the regulatory regime in a small neighbourhood, provoked by ecosystem changes, that affects international trade flows. It highlights the importance of strong local institutions, including legislation, in formulating appropriate responses to international trade events. The potentially negative consequences arising from a trade-related expansion of sugar would be averted if the NWA, and specifically compulsory licensing, were judiciously and systematically implemented with a full acknowledgement of the time and the cost of the consequential corrective transition that would otherwise be required at a later stage.

It is important to underline that these actions need not be detrimental to the small-scale farmers. A future scenario for Incomati might be as follows. TSB has moved its operation to Zambia or Angola. Many white commercial farmers have sold their land and retired. The black farmers who bought their land are engaged in the cultivation of diversified water-conservative crops. Access to land is no longer beholden to traditional authorities. Agriculture is viable and ensures fulfilling livelihoods. Access to and availability of water is still a problem, but much less so than at the beginning of the 2000s because the agricultural sector has reduced water consumption.

In such a scenario a mill would export 'virtual water'—the water consumed in generating a product—from the DRC to South Africa, other parts of Africa, Europe, and the rest of the world, where water availability may well be less of a problem. The composition of trade would begin to reflect the relative abundance of precious natural resources with which a location is endowed—in this case, water from the Zambezi River and its tributaries. The millers would not just export technology that at this level of sophistication is scarce in other parts of Africa. They would also bring with them more tacit forms of knowledge embodied in the South African Sugar Association's (SASA) advanced seed research, *inter alia*, much to the benefit of the recipient SADC economies.

Emerging farmers can graduate from a crop that by their own account they only began cultivating for relatively easy and quick money in the context of a guaranteed demand and low entry barrier. Said differently, they would move away from a crop that, in the long run, is unsustainable. Thus, they would lay the foundations for sustainable farming business that offers not just quick money, but invests in assets for the attainment of more

prosperous livelihoods. Sugar is then relegated to an essential stepping stone towards sustainable farming, instead of being an end in itself. The alternative scenario is a technological lock-in—a situation in which economic actors pursue technological paths based on dynamically inferior products and processes that will ultimately lead into developmental cul-de-sacs.

With the conflicts over land and water within the sugar industry, and the relative lack of understanding among small-scale farmers of water allocation, price setting, division of proceeds, and the like, a transition away from water-intensive forms of production in the Incomati would be bedevilled by severe communication and consensus issues. Furthermore, water users in the Incomati share many of the same problems, without necessarily perceiving their interests as being reflected in the same set of solutions. An altered water allocation regime within a water-wise economic development strategy for the region could face formidable coordination problems. Left to its own responsibility, the sugar industry cannot be expected to fashion collectively beneficial responses to these inadequacies. If and when water scarcity increases, its better-resourced members will eventually exit the industry or relocate. By contrast, the small farmers, for whom entry into the industry was supposed to open economic prospects, will suffer because they do not have the resources to defend themselves in what will be a zero-sum game between them and industrial and residential users over their key input, namely water. As a consequence, economic development for the Incomati will suffer as a whole.

This scenario underpins tensions between existing policy mandates and implies that the necessary coordination is currently unlikely to be forthcoming from provincial authorities. This is because they do not perceive any existence of a conflict between the economic development and the ecological integrity of the region. As far as they are concerned, the sugar industry is important, but they fail to realise that this is a transitory situation. This currently positive contribution to regional income and employment may eventually become a liability.

The South African government is committed to accelerated and *shared* growth. The latter is an acknowledgement that growth by itself has not and will not alleviate poverty to the desired extent. This acknowledgement, however, is largely limited to the recognition that economic opportunities often escape the poor because of skill or other constraints. It is much less part of the policy discourse that the poor are particularly vulnerable because of the deterioration of ecosystem services that accompanies such forms of growth. The expansion of the sugar industry is a case in point. Where this study was unable to make a contribution is in quantifying this trade-off across different income categories. Achieving this would underline the importance of the issue for shared regional development. It would also allow decision-makers to think about compensatory facilities in favour of those most severely affected by ecosystem changes at any point of the trade-off.

In the absence of such a measure—namely under circumstances of incomplete information—authorities committed to shared growth can only apply the precautionary principle to planning, water allocation, and so on, whereby one would not support any water-intensive development with a currently unknown, but potentially substantial adverse environmental consequence. Because of the huge developmental backlog, however, there could be pressures that favour familiarity—more growth—to the detriment of what you do not know—the costs of this growth to parts of the population. This is why further research into the implications of changes in ecosystem services to the very poor in Incomati is of such importance.

## Notes

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