Why Solapur, Sugarcane and Sustainability do not rhyme?

As I build this dam
I bury my life.
The dawn breaks
There is no flour in the grinding stone.

I collect yesterday's husk for today's meal
The sun rises
And my spirit sinks.
Hiding my baby under a basket
And hiding my tears
I go to build the dam

The dam is ready
It feeds their sugarcane fields
Making their crop lush and juicy
But I walk miles through forests
In search of a drop of drinking water
I water the vegetation with drops of my sweat
As dry leaves drop and fill my parched yard

Daya Pawar[1] (Original marathi song *Bai me dharan bandhte, majha maran kandte)*

The 2012-13 sugarcane crushing season (which goes on for 160 days [2] from roughly 15th October) has concluded. It may be instructive to look at the figures of the sugarcane crushed by sugar factories in Solapur, one of the worst drought-hit districts in the state (taluka wise rainfall in Solapur district is given in table 1).

During 2012-13 (latest crushing figures as on 11th April 2013), 126.25 Lakh tonnes cane was crushed in Solapur district alone in its 28 sugar factories[3]. Just for reality check, we should add that normal monsoon (June-Oct) rainfall in the district is 560 mm, in 2012 monsoon the rainfall was 412 mm, see table below for taluka wise rainfall in the district during June-Oct 2012 monsoon in Solapur district (source: http://www.mahaagri.gov.in/rainfall/index.asp).

Table 1: Taluka wise Rainfall in Solapur district in 2012 monsoon (June-Oct)

Taluka Name	Normal Rain (mm)	Actual Rain (mm)	% To Normal
N. Solapur	617.3	465.4	75
S. Solapur	617.3	465.4	75
Barshi	596.5	551.8	93
Akkalkot	676.3	556.3	82
Mohal	573.9	316.4	55
Madha	534.4	435.5	81
Karmala	544	272.6	50
Pandharpur	573.7	360.4	63
Sangola	462.4	393.6	85
Malshiras	441.3	308.3	70
Mangalwedha	519.8	402.9	78
Solapur	**559.7**	**412**	**74**

[1] From *Staying Alive: Women, Ecology and Development*, Zed books, Vandana Shiva, 1988
[2] Vasant Dada Sugar Institute Magazine *DnyanYaag* 2012
[3] Sugar Commissionarate Maharashtra: Crushing Figures as on 11th April 2013

Solapur seems to have the highest number of sugar factories in Maharashtra. The district accounts 18.25% of the cane crushed in the state during 2012-13. In 2012-13, a year that was called as a 'drought year, worse than 1972 drought', Solapur added 4 new sugar factories.

River basins of Solapur The Solarpur district belongs to five different sub basins as described by the Maharashtra Water and Irrigation Commission Report (June 1999), see details in accompanying map and Table 2. Among these five sub basins, the Maharashtra Water and Irrigation Commission report describes sub basins 18B, 19A and 19B as highly deficient considering the water availability from all natural sources. We can see from table 2 that 86.6% of Solapur district, barring parts of Karmala and Malshiras talukas, fall in this *highly deficient river basins*. The Commission says about these sub-basns: "It is desirable to impose a total ban on water intensive crops like sugarcane in these deficit sub basins". In these sub basins, "less water intensive crops only" and "less water intensive economic activities only" should be permitted, says the commission (p 138, Vol. III).

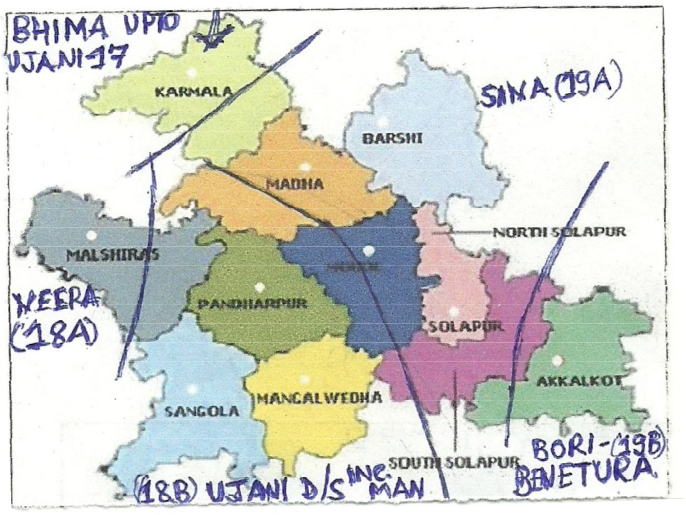


Table 2 Sub basin wise area of Solapur district

(Area in sq km)

Sub basin No	Sub Basin Name	Talukas of Solapuar in the sub basin (area of the taluka in sub-basin)	Area of Solapur in the sub-basin	Solapur area in the sub basin as % of sub basin area
17	Bhima upto Ujani	Karmala (930)	930	6.32%
18 A	Remaining Bhima NEERA	Malshiras (1065)	1065	15.2%
18 B	D/s of Ujani including Man	Malshiras (457) + Sangola (1550) + Pandharpur (1304) + Madha (813) + Mohol (565) + S Solapur (146) + Mangalwedha (1141)	5976	57.3%
19 A	Sina	Madha (732) + Mohol (843) + S Solapur (718) + Akkalkot (80) + N Solapur (736) + Barshi (1483) + Karmala (680)	5272	41.37%
19 B	Bori-Benetura	Akkalkot (1310) + S Solapur (331)	1641	43.9%
	TOTAL		14884	--

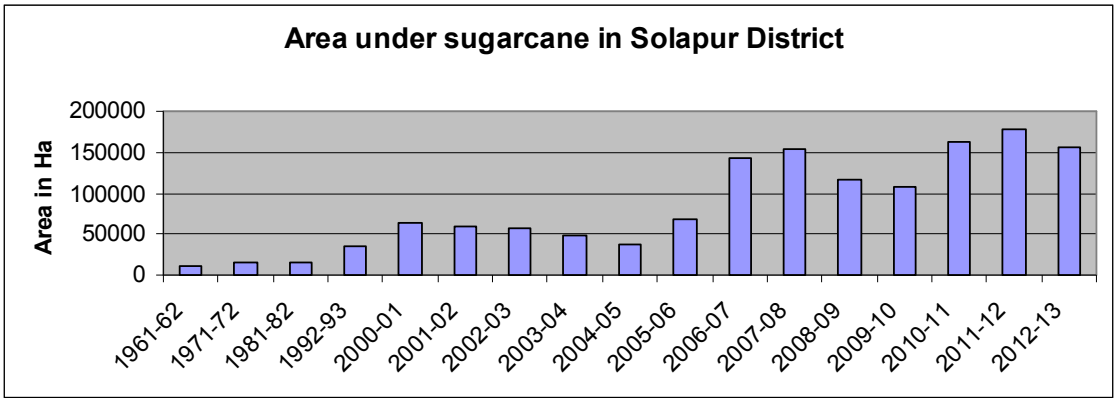
Note: Information from Maharashtra Water and Irrigation Commission, numbers in first column as per the same report; taluka wise area figures following http://solapur.nic.in

It means that sugarcane crop and sugar factories in all talukas of Solapur district, possibly except those in Karmala and Malshiras are unviable, in violation of the MWIC report and against prudent water management. There is some addition to the water available in these basins (18B, 19A and 19B) following implementation of Ujani dam and inter-basin transfers. However, that still does not justify any crops like sugarcane or setting up of sugar factories. MWIC clears states that additional water should be spread across the talukas to benefit maximum farmers. Sugarcane cultivation clearly won't help that cause.

Rise of sugarcane cultivation in Solapur

> "Sugarcane is a crop which exhausts the soil and, therefore, it is not grown in the same field from year to year but is rotated in alternate years with food-crops."
>
> District Gazetteer of Sholapur, 1977[4]

How rapidly the area under sugarcane in Solapur district has gone up can be seen from the graph (figures from official sources like http://mahaagri.gov.in and Sugar Commissionarate in Pune, 1961-62 and 1971-72 figures is from the Solapur district gazetteer and for 1992-93 from MWIC report). It is clear from the graph that the sugarcane area approximately doubled in Solapur during seventies and again during the eighties. Between 2005-06 and 2011-12, it seems to have gone up by over 160%, this is the highest growth phase for sugarcane cultivation in Solapur. That growth phase is likely to continue if we go by the number of new sugar factories that are planned to be set up in Solapur.



The area under sugarcane in Solapur at its high in recent years was 1.79 lakh ha in 2011-12, which is 19.46 % of net sown area of 9.2 lakh ha in the district (see table 3 below). Of the net irrigated area of 2.52 ha in Solapur, sugarcane take away 71.03%, way above the prudent 5% prescribed in Maharashtra. It is clear that sugarcane has been taking away disproportionate share of water of the district, at the cost of the rest of the farmers.

Table 3: Profile of Solapur district[5]

Area in '000 ha		Solapur
Geographical area		1487.8
Sown area		919.7
Net Irrigated area		251.5
Canal irrigated area		31.4
GW irrigated		193.5
Sugarcane area	2007-08	154.5
	2010-11	163.1

The area under sugarcane in 2012-13 consumed about 2630 MCM water. Assuming a rather high irrigation efficiency of 60% (considering that most of the water comes from surface water sources) water required from source would be 4383 MCM[6].

[4] http://solapur.gov.in/htmldocs/1977/agri_irrigation.html
[5] http://agricoop.nic.in/Agriculture%20Contingency%20Plan/Maharastra/MH1-Solapur%203.2.2011.pdf
[6] CACP chairman Prof Gulati clarified to us through email on April 21, 2013, the water requirement per Tonne sugarcane produced, as given in the CACP report is calculated at farm and the irrigation efficiency would depend on the source.

In addition, the sugar mills consumed at least 19 MCM water, total coming to 4402 MCM water. According to MWIC report, even with maximum possible augmentation (from all planned schemes, many of which are not even implemented or sanctioned), Solapur district's total share of water is 4188 MCM. But the current level of sugarcane cultivation in Solapur already seems to be using more water than the ultimate planned water allocation for Solapur.

During 2012-13 (latest crushing figures), 126.25 Lakh tonnes cane was crushed in Solapur district in its 28 sugar factories. The normal monsoon (June-Oct) rainfall in the drought prone district is 560 mm, in 2012 monsoon the rainfall was 412 mm. Solapur seems to have the highest number of sugar factories in Maharashtra. The district accounts 18.25% of the cane crushed in the state during 2012-13. In 2012-13, a year that was called as a 'drought year, worse than 1972 drought', Solapur added 4 new sugar factories.

New Sugar factories planned in Solapur! To add to this, at least 19 new sugar factories (see details in Table 4) are planned in Solapur[7]. *Sakhar Diary 2013* gives the locations and capacities of these factories. Some of these factories have also received distance certificates[8] from the Sugar Commissioner's office, Maharashtra indicating that they are at an advanced clearance stage at the state level. Together, these new factories will add crushing capacity of 85.52 Lakh tonnes of sugarcane. Madha, part of the constituency of Union Agriculture minister Sharad Pawar, is in the forefront of getting new sugar factories.

Table 4: Taluka wise crushing capacities of existing and proposed sugar factories in Solapur

(crushing capacity in T/day)

Taluka	Existing sugar factories		Planned sugar factories	
	Number of Factories[9]	Crushing Capacity	Number of Factories[10]	Crushing Capacity
Madha	3	11000	5	15000
Mohol	3	7500	1	2500
Karmala	3	6250	2	5000
Malshiras	5	19500	--	--
Akkalkot	2	6000	2	5000
Barshi	2	5000	1	2500
Mangalvedha	1	2500	3	9950
Pandharpur	4	12500	--	--
Sangola	1	2500	1	2500
North Solapur	3	10000	1	2500
South Solapur	1	2500	3	8500
TOTAL	**28**	**85250**	**19**	**53450**

Note: For some of the proposed factories where we could not get figures of crushing capacity, we have assumed it to be 2500 T/d, the normal minimum capacity. Source: Sugar Commissionarate, Pune

To grow this 85.52 L T sugarcane, an additional 105 580 hectares will have to be brought under sugarcane cultivation. Additional 1782 MCM of water will be required at farm to cultivate this sugarcane. Assuming even a high irrigation efficiency of 60%, this would mean requirement of 2970 MCM water at source. In addition, the Sugar factories will require 12.83 MCM of water for crushing this cane.

The new planned sugar factories will bring total area under sugarcane in Solapur to 2.685 lakh ha and the annual water consumption by sugarcane and sugar mills over 7400 MCM. This is way above the full planned allocation of water for Solapur as per the MWIC report.

[7] Sakhar Diary 2013, a leading reference book for sugarcane cultivators and factories in Maharashtra.
[8] Certifying that the new factory locations are 25 km or more from the nearest existing sugar factories, as per the Dec 2012 notification from Govt of India.
[9] Source: Sugar Commisionerate Maharashtra, 2012-13 Crushing figures
[10] Source: Sakhar Diary 2013

MWIC assessment is exhaustive including all possible planned water schemes, so there is no possibility for Solapur to get water over and above the ultimate planned schemes in Solapur. This means that by going for these new sugar factories, Solapur would possibly taking water of other regions or accelerating towards rapid exhaustion of its available groundwater.

Similar situation prevails in Osmanabad, Beed, Jalna, Parbhani in Marathwada which are reeling under severe drought and where drinking water itself has becomes scarce. Osmanabad crushed 26.35 LT of sugarcane through its 9 sugar factories. Significantly, here the district Collector had written a letter in November 2012 to the Sugar Commissionerate to suspend cane crushing in Osmanabad in face of drought. Nothing was done about that recommendation. To top this, 10 more factories are planned in Osmanabad. In the case of Beed, in addition to the existing 8 factories, 14 are in pipeline, Ahednagar has 20 with 8 in pipeline, Latur has 12 existing and 5 in pipeline and Satara has 11 existing and 14 in pipeline.

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Absence of credible sanctioning process for new capacities How did these factories get permissions from the Sugar Commissionerate which is the nodal sanctioning authority for sugar factories in Maharashtra? What role did the district administration play? What role do the Agriculture Department as well as the Water Resources Department play in this sanctioning process? What role do the farmers and people have in this sanctioning process? Who decides these are sustainable, just decisions? These are not just rhetorical questions. If prudent answers to these questions not found, Maharashtra water crisis may only get worse in days to come.

With a growth cycle of 11-17 months, sugarcane cultivation locks up the farmers, the state and the system in a vicious cycle of irrigation at any cost. On an average, sugarcane requires irrigation twice a month. Once planted, the farmers have no choice but to look for all options to irrigate it. And the sugar mills have no options but to crush the sugarcane and the downstream water consumption lock in only grows. Since the whole product cycle is so long, once the crop is in place, everyone tries to get the necessary water to run the system, irrespective of drought, water scarcity, irrespective of impact on other sections of society or on long term sustainability. The whole state machinery is slave of the survival of the sugar manufacturing process, it seems. Even the Comptroller and Auditor General, in its report for five years ending in 2007 have reported how the Sugar Commissionarate sanctioned capacities without considering water availability.

In this situation, it is very important to have credible checks before allowing more sugar factories or expansion of existing sugar factories.

[11] Sugar Commissionerate 11 April 2013
[12] http://www.livemint.com/Politics/tBAf2SQJDHNzcmRGmlifsM/Suspend-cane-crushing-in-11-factories--Osmanabad-DM.html
[13] Sakhar Diary 2013

However, the basic checks and balances to ensure only sustainable sugarcane crushing capacity is installed seems to have completely failed in Maharashtra. There is no acknowledgement of this reality. In absence of prudent decision making process, the repercussions are bound to be painful and far reaching, the poor and likely to be the worst sufferers.

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How much do the small farmers and poor benefit from sugar boom in Solapur? It is true that large number of small farmers and agricultural labourers, including dalits, tribals and other backward classes are also benefiting from sugar boom in drought affected districts of Maharashtra. However, a number of researchers have pointed out[14] that these sections benefit much less than do the large sections. Secondly, the adverse impact of allocation of all or most of available water for this process on rest of the sections are mostly disproportionately felt by these sections. Today there does not seem to be even an acknowledgement of the collateral damage this sugar boom in Solapur is causing. As Osmanabad collector said, sugarcane and tanker fed villages co exist. And as Daya Pawar's poem given above narrates, it is the women of the poor sections that are facing the worst adverse impacts. Moreover, no one is asking how sustainable are these benefits and what will happen when even the sugar mills bust, as they surely are bound to?

When Sweet Lime plantations over thousands of hectares died in Marathwada in the absence of water this year and when hapless farmers set their own horticultural plantations on fire as they could not bear to witness the wilting and dying trees they planted, sugarcane still continued to get water. So while there is a lobby to protect the sugarcane farmers, no such luck for other farmers.

Once farmers have cultivated sugarcane, the sugar industries hide behind the farmers saying what will happen to the farmers if factories do not process this cane. While the risk of cultivating sugarcane and fighting for its water falls on the farmers, sugar industries are insulated from any risk, in the name of farmers and can continue crushing, using thousands of lakhs of litres of water and polluting even more water.

Water Consumption in 2012-13 Considering a productivity of 81 tonnes of sugarcane per hectare[15], the cane crushed during 2012-13 occupied 155 864 hectares in Solapur. Considering that ratoon type of sugarcane requires 168.75 lakh litres water per hectare at farm[16], which is the lowest water requirement among all types, (40% of sugarcane in Maharashtra is under ratoon type cultivation), amount of water used for cultivating sugarcane on 155 864 hectares of area in Solapur works out to be 2630 Million Cubic Meters. This is 1.73 times the live storage capacity of Ujani Dam (Live Storage: 1517 MCM), the largest reservoir in Bhima basin and third largest reservoir of Maharashtra.

[14] See for example Vandana Shiva reference above or http://www.academia.edu/172012/Growth_and_Poverty_In_Maharashtra

[15] Commission for Agriculture Costs and Prices, Ministry of Agriculture, *Price Policy for Sugarcane, the 2013-14 Sugar Season Report*: puts Maharashtra average productivity at 80 tonnes per hectare, Vasant Dada Sugar institute Report *Dnyan Yag* 2012 puts it 83 tonnes per hectare. We have assumed 81 tonnes/ hectare.

[16] Commission for Agriculture Costs and Prices, Ministry of Agriculture, *Price Policy for Sugarcane, the 2013-14 Sugar Season Report*: Chapter 5

For crushing 126.25 lakh tonnes of cane, the sugar factories used a minimum of 18.93 Million Cubic Meters. This is a very conservative estimate as per guidelines of Central Pollution Control Board (CPCB), considering 1500 litres water required to crush and process one tonne of cane[17]. The live water storage of Ujani reservoir, at its highest was in October 2012 at 14% and it rapidly receded to zero in January and sub-zero levels from January to March[18] (as on 21st April, 2013, it is -32.91%)

The adverse impacts of allocation of all or most of available water for sugar business on rest of the sections of society are mostly disproportionately felt by the poorer sections. Today there does not seem to be even an acknowledgement of the collateral damage this sugar boom in Solapur is causing. As Osmanabad collector said, sugarcane and tanker fed villages co exist. And as Daya Pawar's poem given above narrates, it is the women of the poor sections that are facing the worst adverse impacts. Moreover, no one is asking how sustainable are these benefits and what will happen when even the sugar mills go bust.

In the entire discourse on the costs and efficiency of sugarcane in Maharashtra, the water angle, which is of a paramount importance as demonstrated this year, is the most neglected. Institutes like Vasantdada Sugar Institute (VSI) (For every quintal of sugar generated by Sugar Factories, Rs 1 goes to VSI) and the Sugar Commissionerate seem strategically silent on this.

Maharashtra Chief Minister and also the chairman of Commission on Agriculture Costs and Prices have said this year that there is need to make drip irrigation mandatory for sugarcane cultivation in Maharashtra. This looks more like a band aid solution, designed to continue the status quo of massive sugarcane cultivation in drought prone areas without askng if that is sustainable. In absence of such questions, drip irrigation could become a reason to continue to expand unsustainable sugar mills and sugarcane cultivation in drought prone areas.

However, when we contacted the drip irrigation cell in Vasantdada Sugar Institute and asked about the area of sugarcane under drip irrigation, we were told by the person in-charge that Drip Irrigation Cell itself does not have these figures. This indicates either that this data is not available or they are not ready to share available information.

While claiming that Maharashtra has the highest efficiency of sugarcane in the country, it is forgotten that if crop duration and water consumption factors are added in the equation, Uttar Pradesh is more efficient than Maharashtra by a whopping 175%.[19] Maharashtra consumes on an average 1000 litres more water than UP to produce 1 kilogram of sugar.

Even as farmers from Mohol region sat on dharna, urging Maharashtra government to release water for Ujani dam, the same Mohol block in Solapur district has 3 existing sugar factories. These factories crushed 13.56 lakh tonnes of sugarcane this year till March 2013[20], using 20,340 Lakh Litres of water from 15 October 2012, when the drought was already severe till March 13, when farmers from Mohol were protesting in Mumbai for drinking water. So even when farmers were protesting for drinking water, all the factories continued crushing and the district administration, sugar commissionerate as well as the state administration did not do anything to curb fresh sugarcane cultivation.

[17] http://cpcbenvis.nic.in/newsletter/agro-dec-1994/dec943.htm
[18] www.mahawrd.org: dam storages
[19] CACP, Ministry of Agriculture Report, Chapter 5
[20] Sugar Commissionerate, April 2013

In addition, Mohol also has one more sugar factory planned[21], with a capacity of crushing 6,40,000 tonnes of sugarcane, which will additionally require 133 MCM water at farm and 222 MCM water at source to cultivate this sugarcane and 9,600 lakh litres of water to crush this sugarcane.

The area under sugarcane in Solapur at its high in recent years was 1.79 lakh ha in 2011-12, which is 19.46 % of net sown area of 9.2 lakh ha in the district. Of the net irrigated area of 2.52 ha in Solapur, sugarcane take away 71.03%, way above the prudent 5% prescribed in Maharashtra. It is clear that sugarcane has been taking away disproportionate share of water of the district, at the cost of the rest of the farmers. The sugar cultivation and mills consumed 4402 MCM water. According to MWIC report, even with maximum possible augmentation (from all planned schemes, many of which are not even implemented or sanctioned), Solapur district's total share of water is 4188 MCM. But the current level of sugarcane cultivation in Solapur already seems to be using more water than the ultimate planned water allocation for Solapur.

Factories operating beyond sanctioned capacities Moreover, many companies are running at higher than sanctioned capacity, increasing their water consumption and area under sugarcane in the process. Review of figures of cane crushed by various Solapur Factories (figures obtained from Sugar Commissionarate in Pune) for the last two crushing seasons show that at least four of these factories crushed much more cane then their sanctioned capacities in both the years and an additional seven factories crushed much more than sanctioned capacity in one of the two years. The highest % by which the cane crushed exceeded the sanctioned capacity was 120% above the sanctioned capacity. This over crushing has many implications, the prominent one being extra water consumption.

Pollution by Sugar mills In addition, water pollution is a major issue with sugar factories. In Feb. 2011, Member Secretary of Maharashtra Pollution Control Board had written a letter to Secretary, Environment, Government of Maharashtra about the need for taking strong steps to curb over-production and non-existent effluent treatment by sugar factories. The ETPs in sugar factories are not monitored by any independent entities and there are hundreds of complaints about factories polluting precious water sources through their high BOD effluents. When this author visited a Sugar Factory in drought-affected Ahmednagar District, it was witnessed that the ETP has been non-functional and in a state of disrepair for many years, with putrid effluent spread all around. The factory people questioned threateningly when pictures of this were taken.

In the end, while the High Court decision on releasing water for Ujani from upstream dams is welcome in one sense, the water releases from upstream dams is likely to be used up for the same unsustainable sugarcane cultivation in Solapur. There is an urgent need to look at the bigger picture as to how the sugar boom happened in in Solapur in the first place. Drought is a common phenomenon in this region for centuries, as described by the Solapur district Gazetteer. Solapur experiences drought once in every five years. In the context of climate change, rainfall will become more unreliable and drought more frequent. But if corrective steps are not taken about the unsustainable sugar boom in Solapur, we may be inviting worst disasters in future.

It is high time there is a public debate about why Sustainable Sugar won't rhyme with Solapur. And something is done urgently to stop setting up new sugar factories and review the existing ones through some credible independent process.

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[21] *Sakhar Diary 2013*