Combating drought

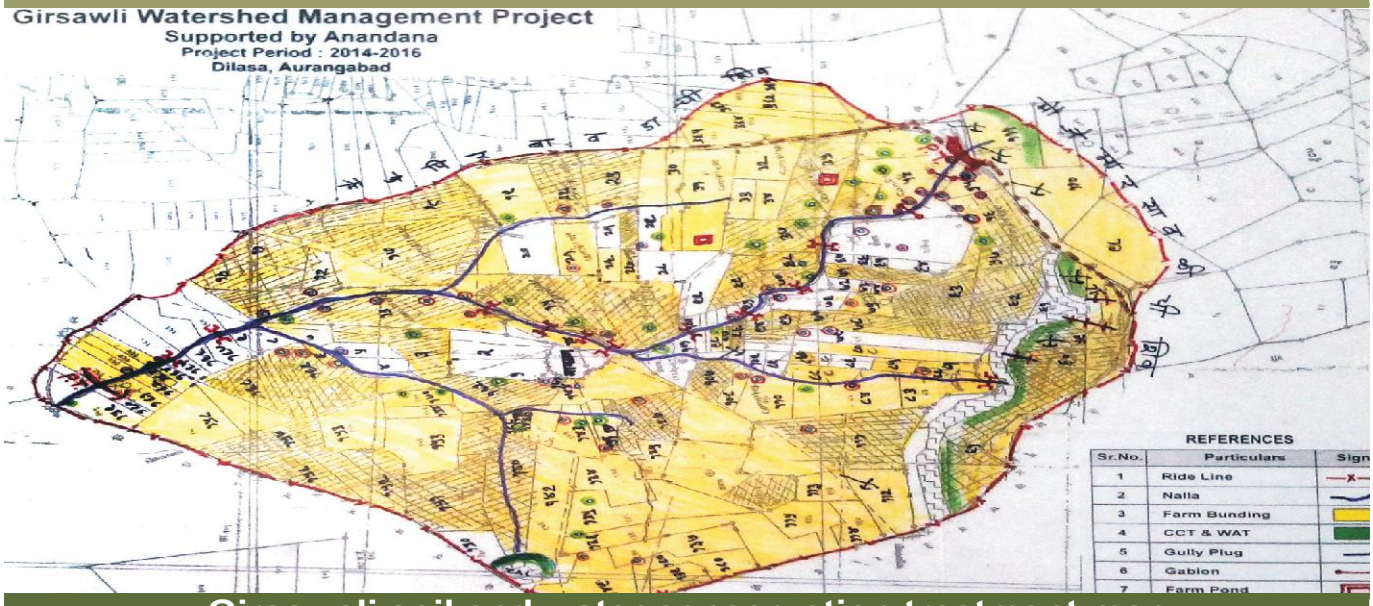
A pilot project in Girsawali village, Phulambri taluka in A'bad district with

Anandana™





Chain of activities... right from soil conservation to water conservation, thus providing livelihood to the locals as a consequence.



Girsawali soil and water conservation treatment map

About Girsawali

Girsawali watershed area is situated at a distance of 10 km from Phulambri block of Aurangabad district headquarters and 40 km from Aurangabad city in the state of Maharashtra (India). The total area covered under this watershed project is 403.16 hectares. The average annual rainfall in this watershed area is only 535mm and the soil is silty loam and silty clay type. As a consequence, the entire agriculture is rain dependent resulting in very poor agriculture production. Girsawali village has been facing severe drought due to scanty and erratic rainfall coupled with hailstorms during 2014-15. So, it is obvious that Girsawali is located in a drought prone area where the agriculture is entirely dependent on monsoon and also subjected to harsh weather conditions like hailstorms etc.

With a view to develop this area despite the vagaries of nature, Dilasa has implemented several activities to counter drought, namely systematic study of hydrogeology and GIS mapping using advanced GIS technology from April 2013 with the support of Anandana Foundation, Delhi. The main objective of this soil and water conservation activity is to create sustainable livelihood opportunities through advanced management of natural resources. On a positive note, the activities initiated have borne fruit and the Kharif crop yield has improved substantially in Girsawali village resulting in enhancement of livelihood of the villagers. The migration figures in this village have dropped in comparison with adjoining non-watershed villages. The activities implemented at the grass root level have focused on making Girsawali village resilient in the face of drought due to scanty rainfall and other vagaries of weather to ensure moderate agricultural production even in such adverse conditions.

Visit of Raj Thackeray to Girsavali village the lush green area - To understand the concept of watershed development on the backdrop of severe drought in Marathwada region

Interventions Implemented

1) **Farm bunding:** Farmers are very eager to take up farm bunding activity in order to conserve moisture even in severe drought condition. This activity had been carried out till October 2014. The results were quite encouraging and prior to 2015 monsoon, almost every farmer in the same line with serial gut numbers, had completed the farm bunding activity on 316 ha in the village.

2) **Stone outlets:** Stone outlets are important structures in farm bunding activity to let out excess water from the farm safely. The outlet does not allow water logging within the farm. This is a low cost structure built with stones only. The shape of the stone is trapezoidal so that water will safely flow over it. A total of 1130 stone outlets have been constructed.

3) **Small Earthen Gully Plugs:** This is a typical earthen structure in which 4 to 5 ha catchment area water can be stored. It is effective in undulating land. The earthen material is compacted in such a manner that it substitutes a stone wall. The excess water slowly flows out through the outlet of the earthen gully plug. Stone pitching on the upstream end is necessary to safeguard the earthen structure. Hence, 25 EGPs are constructed covering two major gullies.

Earthen gully plug

4) **Gully Plugs:** Gully plug is a small structure across the gully. It reduces the velocity of water flow. It is an economical structure which is constructed with only stones that are placed without any cement and concrete. The unique feature of the structure is that within the series of gully plugs good soil conservation is observed. Good quality soil is trapped in these gully plugs leading to conservation of the soil. In Girsawali, a total of 51 gully plugs have been completed in small gullies, especially in the hilly areas.

Completed gully plug

5) **WAT (Water Absorption Trench) & CCT (Continuous Contour Trench):** The satellite images of Girsawali have revealed that the hilly area had good ground water potential. Hence, if water absorption trenches and CCTs are made on the hillocks, it could contribute to ground water recharge for Girsawali area. Technically appropriate CCT lines are made with specific distance on the hillock. 17 ha of CCT and 1000 RM WAT are completed.

WAT excavation

6) **Gabion structure:** To conserve the soil in the main nalla, a structure is typically constructed without the use of either cement or concrete. It is nothing but amassing a large number of stones and interlocking it in a mesh wire. This has proved to be a sturdy and intact structure to endure flash rains that occurred in Girsawali during the year 2015. Though these two gabion structures seem to be very small, activity-wise, in terms of impact, gabion proved to be a sustainable recharge structure.

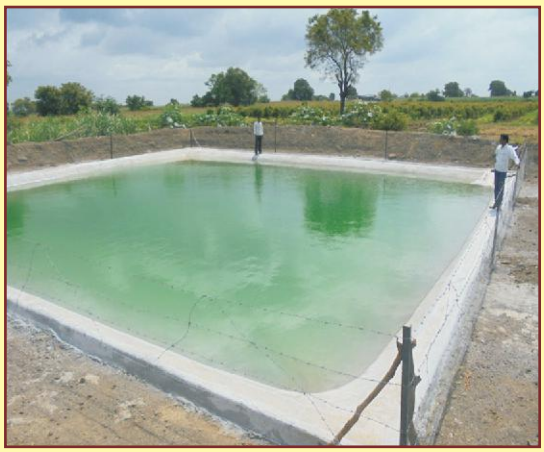
Gabion structure

7) Innovative farm pond with concrete lining: A water storage structure is beneficial for life saving irrigation. In the case of erratic rainfall, the stored water can be utilized by the farmers for irrigation, cattle water requirement etc. Two water storage structures of 675,000 liter capacity each have been built in Girsawali. In the event of a power shutdown, which is almost 12 hours in the villages, these structures are useful to the farmers who can lift the water from the dug well and store it in the storage structure so that irrigation could be done by gravity.

Conventional farm pond structure is done with a plastic lining. However, a plastic lined pond structure is not accepted well by farmers as the life of the plastic lining is limited to 2 to 3 years. Relining the pond structures is very tedious and difficult for the farmers. The Dilasa team initiative to overcome all such hurdles proved to be a boon.

Concrete-lined permanent interventions of the farm pond created a permanent storage system with a provision for drainage of excess water through a pipe opening into the nalla. Proper care was taken for safety of cattle and children by constructing a compound wall along the farm pond boundary. Further, to reduce evaporation losses, a green shade net cloth was used which is reusable. Thus, farmers are able to save their pomegranate fruits and other crops like Zea Mays (*maize*), pearl millet (*bajra*) etc.

All the above successful measures that are taken before the onset of monsoon ensured tremendous conservation of rain water in Girsawali. With just 10% contribution as recharge, the entire village can survive peacefully with sufficient agriculture income.



Completed water storage structure with compound so that cattle do not fall into it. Fishery activity by the beneficiary is a bonus and enhances means of livelihood

Saving evaporated water with shade net

Water Conserved in Girsawali

Sr. No.	Type of Structure	Water capacity of Structure (litre)
1	CCT under afforestration	3094200
2	Water absorption Trench (WAT)	1375200
3	Farm Bunding	42890080
4	Earthen Gully Plug	100000
5	Water Storage Structure	1350000
	Total	**4,88,09,480**

8) Livelihood activities: Inspite of implementation of activities to enhance agri-production in drought prone villages, chances of crop failure or decline in crop production is a reality. This occurs due to changes in the precipitation pattern with respect to timing and quantity. In a ripple reaction the livelihood of small and marginal farmers is adversely impacted.

To counter this situation, Dilasa, has implemented the following livelihood activities in a very systematic and participatory manner. Initially, a poultry shed from Sahyadri Industries Ltd. was set up in the village. Interested families became part of the venture. A resource person from Sahyadri Industries along with the Dilasa Team held a workshop in village Girsawali and enlightened the villagers about the complete costing of this venture comprising 120 poultry birds. Two families from the village came forward and Dilasa processed the enterprise with a 10% contribution from beneficiaries. Dilasa Team who kept track of the poultry activities through veterinary doctors from Sahyadri who visited the poultry units at regular intervals. Vaccination and other services were regularly provided to the beneficiaries. The happy families are earning around Rs 1800 per month from poultry farming. Two families have survived when drought has devastated most villages in Marathwada. Similarly, shade net and vermin-composting with vermin-wash, have been introduced as livelihood activities.

A special round-shaped shade net was designed as demonstration of livelihood activity in Girsawali village. This is done keeping in view the two devastating hailstorms that occurred during the year 2014-2015, which caused heavy damage to the existing crops. Hence, Dilasa took the initiative of constructing a shade net and converged the activity in project cost and under NHM.

Vermicomposting with vermin wash

Poultry farming as allied activity

One person in the family can take care of the enterprise

Shade net can save crops

9) Convergence of drip irrigation system: watershed plus intervention: Rainfall in India in general and Marathwada in particular has been unpredictable down the years. Our farmers bear the brunt. To counter climatic changes, efficient use of water is of prime importance for agriculture. Dilasa Team specifically emphasizes on convergence for direct benefit to farmers. It is observed that small and marginal farmers have no access to micro irrigation interventions. Their income is meagre. Hence, Dilasa acts as a techno-financial facilitator to these farmers to resolve such issues. Dilasa, in association with Netafem Financial Services and Ratnakar Bank Ltd. made it possible for Girsawali farmers to avail loans for drip. Dilasa team is a facilitator between the farmers, financial companies and micro irrigation companies in this massive project to combat nature's fury. A total of 40 farmers are presently equipped with micro irrigation.

With this intervention, the impact of drip installation has been remarkable and the income of the farmers has almost doubled when compared to the benefits reaped with flood irrigation. Girsawali farmers who have witnessed the benefits of micro irrigation but are yet to install the system in their farms, are demanding that the implementation be done at the earliest.

Dilasa has specifically planned the activity of drip after completing all water storage structures, as judicious use of water is the need of the hour, particularly in the drought affected areas like Girsawali.

Ginger crop sustained due to drip

Venturi and liquid fertigation

Woman farmer pleased with the good cotton growth on her land due to drip irrigation

Mr. Suryabhan Gadekar's income doubled in cotton crop

Green Island in severe drought

During the years between 2013 to 2015, Girsawali watershed works were almost completed. The water storage initiatives have resulted in good moisture conservation in almost all the fields. The presence of moisture in the soil enhanced the agri-produce in terms of quantity and quality when compared to the production prior to the completion of watershed works. For instance, the production of Sorghum (*jawar*) was just 2 q/ha before the watershed works were taken up. However, the productivity has improved fivefold to 10 q/ha. Similarly, the cotton production is almost 25 q/ha as compared to the nearby villages where the production is a meager 7 q/ha where watershed works are yet to be carried out.

Another impressive impact of Girsawali is that, even after reeling under drought conditions continuously for the last 4 years, the villagers have not migrated. They are self-sufficient where drinking water is concerned in the severe drought condition to which the region is subjected. The village does not need supply of water through water tankers anymore. This emphasizes that a systematic implementation of the watershed programme is the only answer to counter the devastating impact of severe drought as seen at Girsawali which looks like a green island situated in the midst of drought hit Marathwada region.

Summer crops and vegetables are still available in April 2016.

IMPACT

The presence of the constructed Farm Pond has resulted in a good output of the Turmeric crop. Gabion structures have enhanced the ground water levels. Due to the availability of water in the wells, crops like Gram, Maize, Bajra and Onion are being grown by the farmers ensuring their sustainable livelihood. In Girsawali, there were only 2 heavy rain showers during the year 2015. On 7th June and 18th September 2015, there was rainfall for about 18 hours. This filled the existing percolation tanks, the completed farm bunds and the gabion structures to the brim. With a rainfall of just 18 hours duration, the farmers of Girsawali are able to harness the natural resources for all 365 days of the year.

Divisional Commissioner Dr Dangat amazed at the transformation

Dr. Umakant Dangat, the Divisional Commissioner of Aurangabad, who was earlier the Commissioner of Agriculture of State for three years made a special visit to Girsawali for a first-hand information about water conservation related initiatives taken up by the NGO Dilasa. After making a detailed observations of all the activities and their impact on the villagers of Girsawali, he praised the work sponsored by Anandana Foundation under CSR.

Dr. Dangat expressed that many activities in the Girsawali village are not only innovative in nature but also can be implemented very easily in other villages so that the farmers in those villages can also reap similar benefits. Further, he also appreciated the concept of concrete lining of farm pond instead of using conventional plastic sheets to overcome the problems related to wear and tear of the plastic sheets as recounted by the farmers and also pointed out that the concrete lining is a sustainable and a long term solution compared to the usual plastic sheet application.

Moreover, the farm pond was covered with a green shade net to reduce the rate of water evaporation thereby conserving the water to a great extent, especially when the temperatures reach around 43°c during May. Dr Dangat was quite impressed with the small poultry units covered with asbestos sheets belonging to Shakuntalabai Gadekar, a woman entrepreneur who disclosed that she had earned Rs. 12,000/- within a period of two months.

Dr Dangat also suggested that such small units can be replicated with ease so that others who are interested can also benefit. The asbestos sheets, covering the shed kept it reasonably cool in the scorching sun so that the birds and the persons working in it did not feel the heat. The divisional commissioner had appraised the large scale micro irrigation system implemented by the farmers who reaped the benefits from ginger, ground nut and other crops. The farm bunding, the gabion structures and CCT on the hilltop proved the fact that Girsawali has implemented soil and water conservation activities effectively for the benefit of the villagers rather than Jalyukt Shivar, which is being promoted only for water conservation.

While speaking to the villagers, Dr Dangat urged them not to opt for just BT cotton and sugarcane crops in the future; instead they should choose traditional crops as the land in the region is conducive to produce a variety of crops. Girsawali was known only for specific local crops like the cotton, maize and bajra but within a span of one year, eight different crops with low water input were grown.

He pointed out that the above initiatives had changed the face and colour of the landscape here in the true sense. He also said that he had witnessed a miracle where meagre rainfall of less than 180 mm had transformed the village. The villagers are reaping all the above benefits inspite of low rainfall in the village only due to the implementation of the well-articulated, effective and efficient soil and water conservation and management activities, he added.

Impact Assessment using Google Images – Girsawali

The ground reality of Girsawali Village before intervention projects: 31-12-2013 Google earth image showed poor crop condition of the village. In the image, the Yellow color polygon shows the Boundary of Girsawali village and Red colour indicates Girsawali gaonthan. Similarly in the image, the thin green colour indicates various crop conditions, Blue colour indicates the water-bodies, and brown colour of the land indicates the wasteland i.e. barren land without any agriculture.

Girswali village after treatment of the land: 14-01-2016 Google earth shows a different and an impressive image indicating increase in the greenery. In this image, the Green colour indicates the healthy condition of various crops. In this image it is clear that there is a reduction in the size of the wasteland which in turn has increased the cropping area with changing cropping pattern in the year 2016 when compared to the image taken in the year 2013.

NRM (Natural Resource Management) works have been completed. All different works are indicatedby a colour coding as a part of NRM viz. Rose colour indicates the Farm ponds, Yellow colour indicates the CCT (Continuous Contour Trenches), Dark Green color indicatesthe WAT, Electron gold colour indicates the pits, Beryl green colour indicates the Gabion Structure, Light green colour indicates the FB (Farm bunding), Light green colour indicates the Cement nalla bund and Light Blue colour indicates the Water bodies.

Promotion of improved agriculture technology

As the farmers are interested in the vegetable cultivation, the organization made an exposure visit of interested farmers at Mangesh Patil's shednet house. Mangesh Patil is pioneering in the shednet and its expansion. More than 10 farmers expressed their interest in shednet. However, Mr. Bhaskar Gadekar came forward and installed circular shednet which can face the effects of the climate change.

Utilization of existing structures

The organization identified the CNBs in Girsavali, which were constructed long back and silted fully in the flux of time. As no body has taken the initiatives for lifting the silt, which is fertile, most of the structures became dead and without any storage of water. Dilasa initiated the desiltation activity of all the cement plug structures and appealed the farmers to take away the fertile soil to their farms. In turn, all these cement plug structures became live and in the coming monsoon farmers will reap its benefits.

Rain Guage Installation

This was most important activity to measure the rains appeared in the Girsavali watershed. The organization installed a rain guage with its specification and village youths are trained to count the every day rains in the coming rainy season. This is very important to compare the block level figures with the village level rains. Moreover, rain guage is the base for the prospective water audit of the village.

Vermicomposting

Vermicomposting is the important activity known to the farmers but no specific unit was installed for the multiplication of the *Ice Anafotida* variety of the verm. This demonstration will be replicate d when the farmers will understand the impact of the vermicomposting on per acre yield and in turn reduction in the chemical fertilizers.

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