

How does Bagalkot beat drought?

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Drought proofing is a new concept added to our vocabulary, only recently. But this skill is not new to Bagalkot District. The local farmers have evolved different methods of water conservation that were unknown even to experts. Here is a close look at some methods followed by them.

Bagalkot district in Karnataka is recognised to have the least amount of rainfall in the state with an average of 543 mm. As per a government estimate, the district has suffered a crop-loss of about Rs. 1500 crores between 2002-04 due to drought conditions and water scarcity.

However, there are some villages in the district that have been able to withstand the impact of scanty rainfall and drought conditions. These are Badavadagi, Chittaragi, Ramavadagi, Karadi, Kodihala, Islampur, Nandavadagi, Kesarabhavi which are located in Hunagunda and Benakatti Taluk.

But what were these systems by which these villages are able to protect themselves from drought which had created severe adverse situations in other districts across the state? Unfortunately, there is little information known about this. Yet, experience shows that these seemingly obscure villages in Bagalkot possessed traditional wisdom which could maximise the scanty rainfall and control the onset of drought. At a local level, the knowledge can be used by neighbouring farmers, agricultural consultants and media to address the drought conditions. Infact, this traditional knowledge can be the pride of not only the district or the State, but also of the country.

Drought proofing is a new concept that has been added to the vocabulary. But this skill is not new to people in Bagalkot District. Contact with the villagers indicates that this age-old method has been nurtured and propagated over time, and the application and impact of this system has been truly amazing. The local community reflects the essence of the principle of drought proofing in very simple, and beautiful words :

- “Even under semi-drought conditions, grow 3/8th of crop” – *Mallanna Nagaral.*
- “We do not do much. We only ensure that the water does not run away; it has to take our permission” – *Hanumappa Mukkanavar.*
- “No embankment, no crop” – *Thamanna Bennur.*



A simple science

A major part of the land in Hunagunda taluk is composed of black cotton soil. Because of the sloppy terrain, erosion of the topsoil due to run-off of rainwater is common. Soil conservation is therefore of utmost importance.

In order to hold the rainwater that runs down the slopes, embankments are constructed at different levels. The aim, however, is not to stop all the water. Once the field is adequately wet, the remaining water is released into the next field. This method of outflow is called *holagatti*.

However, since the topsoil should not get washed off, the volume of water flowing down the slopes is assessed. The size and height of the mouth of the *holagatti* is calculated on the basis of the rain and the slope. This is generally constructed at a slightly higher level than the field. Stones are laid on the sides of the outlet as well as its base. These measures are followed for topsoil conservation.

At some places, the height between the embankment and the field that lies below is high. At such spots, a small well-like structure called *gundavarthi* is constructed. As the mouth of the *gundavarthi* is small, a stone is placed at the mouth of the drain at each level to retain water in the field. Once the soil is soaked to the required saturation level, the stone is removed and water is allowed to flow into the field at the next level and into the *gundavarthi* there. Thus, a small stone can help soak the entire field! The process continues till the lower-most field. While the

gundavarthis conserve water, the *holagatti* carries the excess water through the embankments.

Another step in drought proofing is to level the fields and divide them into smaller plots. The soil excavated from the fields at the higher level is used to fill the fields at lower levels. Heaps of top soil are made so that the rain dispenses this soil all over the fields; the soil remains at the surface of the fields thereafter. The advantage of leveling the land is that the top soil can spread evenly all over the field and thus ensure moisture content. In this way, maximum advantage can therefore be derived from one rainfall.

Precautionary measures

Since black soil has the property of cracking, special care has to be taken while erecting the base embankment or the *holagatti* as it breaks very quickly if the water gets into the crack. Thus, a layer of gravel or red soil should be applied to the upper portion of the embankment. Brownish coloured gravel is obtained by digging deep into the soil; this work is necessary only for newly erected embankments. Red soil is available in the nearby hillocks.

Mallanna, a farmer in Bagalkot warns that if this precautionary measure is not carried out, embankments are washed away, which leads to disaster through flooding. A lack of this precaution is the reason for the damage to the embankments. This structure can last longer if the farmers strengthen the embankments by using gravel or red soil.

The red soil that flows down till the water restores these nutrients and in addition, the manure also does not get washed away, making the land very fertile. Thus, if the flow of water is controlled and made to spread evenly to all the four corners, it will reshape itself into a single span; the land will improve and just one rainfall will then ensure a good crop. If the farmer at the uppermost level does not safeguard the embankment, the farmer at the lower level is likely to have a bumper crop with all water the nutrients and manure that overflows into his fields!

The slope of the embankments which faces the field is applied with a layer of black soil. This prevents excess water collection on the sides of the embankments. The slope is also tended at periodic intervals.

In some cases, even if the ground is leveled, the subsoil gets mixed up with the topsoil. However this problem can be rectified within three to four years, if the soil is not saline. By adding nutrients and manure, the land can be rejuvenated and made fertile. The flow of water has to be controlled and there has to be an even spread.

Presently, the JCB machine does the levelling work, completing a three-month job in just three days. However, this system cannot retain the topsoil at the top and leads to mixing with the subsoil.

A campaign that bore fruit

If drought proofing is new concept in the country, how did these people acquire this knowledge? The roots of this knowledge are contained in a treatise written by Nagabhushana Shivayogi Swamiji about 175 years ago. Based on their experiences of the past three generations, a local family of Hunagunda has been carrying out a village-to-village campaign on soil and water conservation. They have even composed *vaçanas*. Sankaranna, father of Mallanna, has spread this message by singing hundreds of his own *vaçanas* compositions. His *vaçanas* on slope cultivation and prevention of soil erosion stirred the imagination of the people. Swamiji's expertise of producing a good crop with just one rainfall was popularised by Sankaranna. The people readily accepted his logic of good rain = good crop, half the rain = half the crop and quarter of the crop at times of drought.

The efforts of three generations to control soil erosion has not been in vain. Other than converting wasteland into greenland, it has also created livelihood for hundreds and thousands of families in the taluk. This method of soil conservation still continues in full swing, thanks to the campaign efforts of Sankaranna and Mallanna.

A cost-benefit analysis

There are several people associated with Sankaranna for whom drought proofing has become a skilled profession. They have worked on the construction of embankments for decades and even today are called by the farmers to take up the work. This work is the regular means of livelihood for 200-300 families in the *taluk*.

What is the annual financial worth of the soil-water conservation work carried out by these experienced hands in a year? About Rs. 30 lakhs.

And the benefit? Take the case of Mariyappa Handi who has 10 acres of land. Previously he was able to get only 2-3 bags of maize from this land. But Sankaranna improved the land a few decades ago, and, since then there has been a huge change. Even during the last season of drought, Handi's filled his granary with 10-12 bags of crop.



There are scores of other such stories across the length and breadth of the taluk. Most people with a fair financial standing opt for a base embankment and lands without these are very limited. “The system ensures that even with a little rain, some moisture is retained on the flat embankments. One can be sure of a minimum of 4-5 bags of crop,” says another farmer.

There are only very few farmers in the taluk who have not had their land levelled. This is more due to the costs involved rather than a lack of conviction in the system.

The stone embankments of Benakatti

Situated at a distance of 20 km from Bagalkot, Benakatti is a small village of 900 families and with a population of about 4,000. It extends over three sq. km and presents a picture of greenery, creating the impression of being a well-irrigated area.

This is indeed surprising, as there is no river or streams nearby except for some *nullahs*, which can be identified, only during times of rain. This is because any water that trickles down a slope or a hillock is called a *nullah*. Stone embankments are built where water flows abundantly. The height and the width of these embankments are decided after assessing the extent of water flow.

The strength of the walls of the embankment is also a matter of experience. Some *nullahs*, which carry water from a catchment area of about 100-200 acres need to be very strong. Some large farms have more than one base embankment. A farmer is able to build an embankment for an area of 30-40 acres; however when the water volume is very large due to a larger catchment area, the initial expense as well as the maintenance is very high. Therefore, a farmer owning about 10 acres of land will find it more beneficial to build a second embankment for the larger volume of water.

Thamanna Bennur is a post-graduate and is a respected farmer in the village. Fondly called *Oddina Anna*, he built an embankment 15 years ago in the area. He still continues to do so and under his supervision, over 20 embankments have been constructed.

The total number of embankments in Benakatti may exceed 300 and at a rough



estimate of Rs 30,000 to Rs. 35,000 expenditure per structure, the value touches about Rs. one crore. If a farmer is unable to build it within a year, he stretches it in stages over a period of two years. “Though it is expensive to build, once built, an embankment betters life for several years,” explains Thamanna. “Embankments are an inalienable part of our lives. Even the youngsters of our village are convinced that this is the foundation for life. That is why everybody evinces keen interest in keeping it up.”

Traditional water and soil conservation methods are fast vanishing from most of villages and are a rarity these days. But Benakatti still nurtures its deep respect for embankments.

The new and the old

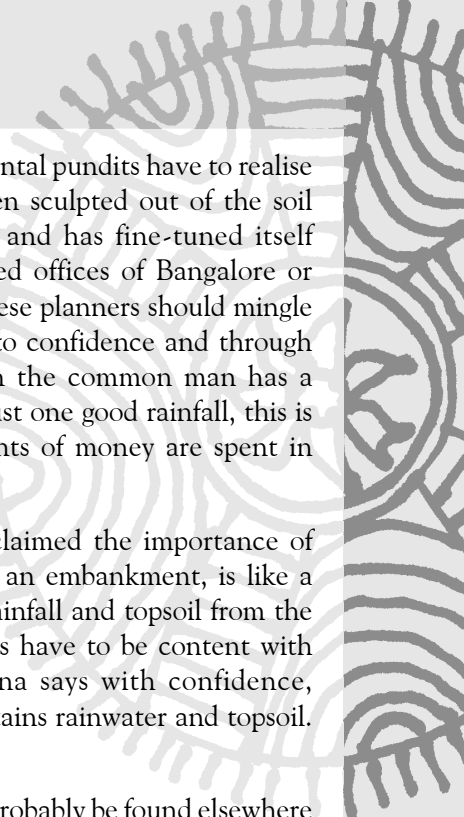
The new embankment built by Muttanagowdara Yankanagowda is all ready to face the rainwater. Though he owns a total of 16 acres (of mostly red soil), he receives an average flow from hundred acres. There are two stone embankments here and a smaller one which is quite old. The new bunds are roughly 300 feet long and about seven feet high. The width of the *holagatti* is 30 feet and the adjacent stonewalls have a thickness of eight feet. The wall tapers towards the end and at the edge, it is only two feet thick. The old bund cost Rs. 10,000 but is not functional now, while the new one costs Rs. 80,000. Muttanagowdara says that with a good crop, he can recover the capital invested on the embankment within four years.

While this is true, yet why should the mud embankments for Hunagunda be different from any other area with black soil? Do they really need the expensive stone embankments? Thamanna clarifies that here too there are some mud embankments that are adequate where the water pressure is low. If pressure builds up, these demand constant repairs resulting in a continuous expense. A stone embankment ensures a levelled field where a crop can be grown even with little rainfall, and a good crop can be obtained during normal years.

A lesson to be learnt

The drought proofing of Bagalkot provides the assurance of a livelihood to all rain-dependent farmers. The farmers probably spend more money than any other village in the country to resist drought – without any help or support from the government. In fact the government may not even be aware of this extensive work undertaken by the villagers and the prosperity they enjoy as a result of this work.

However, a detailed study and documentation about the ‘do’s and don’ts’ in erecting the embankments, is necessary. An affordable handbook should be published and an educative documentary film will be useful. The knowledge which is an oral tradition passed on from one generation to the other should not be obliterated. In states like Kerala, where the media is very active, such pro-people knowledge would never have been relegated to the background.



The state administration, government and the developmental pundits have to realise the truth, that such drought proofing systems have been sculpted out of the soil that has witnessed centuries of scarcity and hardship and has fine-tuned itself according to the needs. Thus, sitting in air-conditioned offices of Bangalore or Delhi and thinking about the solution is not enough. These planners should mingle with the people who face these problems, take them into confidence and through research and development, solve the issues. When the common man has a proven technique to grow a reasonably good crop with just one good rainfall, this is not propagated nor rewarded. Instead, colossal amounts of money are spent in conducting seminars and research.

However, this can still be changed. Mallanna has proclaimed the importance of the embankment through his *vacana*. “A field without an embankment, is like a barren buffalo”. Some farmers are fortunate to receive rainfall and topsoil from the hillocks, as well as, water from other fields, while others have to be content with whatever rainwater they are able to collect. Mallanna says with confidence, “Whatever is the case, any farmer can cultivate, if he retains rainwater and topsoil. For this the embankment is of utmost necessity.”

Experienced people like Mallanna and Thamanna could probably be found elsewhere also and based on the same principle, it is possible to create soil and water conservation methods in dry lands. Minor changes can be made and with a pilot study at a few places, suitable efforts can be continued to enrich and irrigate the earth.

Shylaja D.R. is a writer with a keen interest in developmental issues. Though she hails from the rain-rich Malnad, she has devoted herself to the study of various agricultural practices in drought stricken regions.