

## Mallanna saves farmers from cruel sun

The northern part of Karnataka, India, has very unpredictable rainfall, averaging just over 500mm/year but this varies from area to area. The land is undulating and the soil is mostly black with patches of red earth. In a span of five years, a farmer can expect an average crop in two years, with one year yielding nothing. The other two years rainfall will be scanty so yields will be thin. So conservation of rainfall is of paramount importance. Shree Padre reports on the conservation methods promoted by one family for over 100 years.

In 2003, when Hungund, in the Bagalkot district of Karnataka, was hit by a severe drought, farmers did not have to buy in food. Nearly 90 per cent of them had built bunds and conserved both topsoil and soil moisture using traditional techniques of drought-proofing which have their roots in this district.

Three generations of the Nagaral family have diligently and magnanimously educated farmers in an ancient method of drought-proofing. They are the repositories of this knowledge, which they not only willingly share with farmers but propagate innovatively.

"If fields don't have bunds, we won't have money in the country," says 60 year old Mallanna Nagaral. He is the third generation Nagaral who is much sought after for his expertise in conservation even though he had little formal education.

On an average, Mallanna spends two months a year helping fellow farmers at no charge. "If I ask for money, then that is not service. This year I got a bumper crop in groundnut. Mother Earth is giving me, no? If I get a few bags more from my field, I feel I have been compensated," he explains with a carefree laugh.

Mallanna was supervising construction of a 'dundavarthi' (drop inlet spillway) on a farmer's field when I met him. "I have spent 15 days here. We need another 10 days to complete this work," he says.

The saga of the Nagaral family's remarkable knowledge of soil and water conservation goes back to Mallanna's grandfather, Sanganabasappa. He read a manuscript written by a seer 175 years ago. Moved by unprecedented drought, named davagi bara (skull drought) because thousands of people had died from hunger, the seer wrote a manuscript on agriculture and drought-proofing for drylands entitled, *Krishi Jnana Pradeepike*. The seer's manuscript was



Dr Mallanna near a simple open spill-way, explaining its principle. For small fields the open spillway is sufficient.

*Credit Shree Padre*

eventually published as a book. It became very popular and has seen eight editions.

In 1913, Sanganabasappa started testing the drought-proofing practices prescribed in the handbook. Impressed by the results these experiments yielded, he started popularising them. His son, Shankaranna Nagaral, made it his life's mission to spread this knowledge, and now Mallanna is using the knowledge acquired from two generations of his family.

### Conserving rainfall

Mallanna's methods sound simple but they are in fact very intricate. Two kinds of interventions are carried out. First, a thala oddu is built. This is a broad-based bund placed at the lowest point in the field. Then additional bunds are built across the field, thereby dividing the field up into sections, which are then levelled by hand or with a JCB. It should be noted that most of the land in this area is undulating.

On small fields with a little amount

of run-off, an open spillway is constructed in the middle of each bund. In larger fields with more run-off, or when the height between the treated field and the lower field is more, a concealed spill-way is constructed and built out of stone or concrete. It reduces the speed of flow and doesn't put pressure on the bund. Open spillways are constructed in the bund, but the concealed ones are constructed not on the bund, but at a slightly higher point in the field.

"We won't allow the topsoil to run away from our fields. As for the rainwater, it has to take our permission before running," explains a local farmer humorously.

It is complex to understand, judge and implement such a system. First, one has to assess the runoff from the upper fields down to the lower fields. The height of the broad-based bund should be just enough to check the outflow of water. The mouth of the spillway has to be designed so that no top soil is washed away, and it holds water back so that it

has time to percolate into the soil.

Mallanna has perfected the art of assessing the angle of the slope. By just looking at the site he can say which portion of the field is slightly low-lying and which is above the average height etc. He makes his estimations accurately without any instruments, a feat which has amazed university graduates and professors.

The Nagal family's own fields are the best examples of what academics call 'inter-plot rainwater harvesting.' Mallanna recalls that he has never had to buy food grain from the market. This is an achievement because total and partial crop failure is very common in the district.

He says his two most challenging assignments have been with the fields belonging to two farmers, Sarangimath and Pattanashetti. Sarangimath's fields

receive a huge run-off from around 400 acres. Pattanashetti's fields receive run-off from only 100 acres. But since the water originates from a steep hill it comes down at great speed. Mallanna has dealt with both of them.

#### Ode to soil

Long before the phrase 'drought-proofing' got popular with rural development experts, the Nagal family was popularising the concept with innovative methods. Their first slogan was, Ara baradaaga entaane bele, which means 'the eight anna crop' or 50 percent yield. They tell farmers that during a year with scanty rainfall or none at all, they could still get at least 50 per cent of their average crop yield by drought-proofing.

#### Impact

LR Mali Patil, a retired Deputy

Superintendent of Police got Mallanna to drought-proof his 28 acres three years ago. The work cost him Rs 250,000 (\$5,600). "We constructed the broad-based bund and spillway only," he explains. "Another two years are required for the runoff from above to fill the lower areas of our field. But our yields have already increased by 30 to 35 per cent."

Guru Ganiger has only four acres. He got two acres treated three years ago. It cost him Rs 30,000 (\$674). "The money I had invested is already giving me returns," he says. "Mallanna offers free service without differentiating between class or community. He is great."

"One has to think ten times before investing big sums in dry lands like ours," says Dr MD Kachapur, a retired agronomist. Nevertheless, he got his 14



A concealed spillway in one of Mallanna's Ramavadagi fields. A single stone can control the run-off. Uneven and infertile a century ago, this field is as fertile as any other in the area.

Credit Shree Padre





A bountiful crop in Mallanna's fields. Fruits of three generation of farmers' research and development.

*Credit Shree Padre*

acres treated by Mallanna. "Once these measures are implemented, our farmers are able to reap a crop even with timely rain of just six to seven centimetres."

In 2005, under the dynamic leadership of District Collector KS Prabhakar, a water awareness programme or Jaljatha was organised in the district. The 12-day event covered 120 villages. In the course of this programme, Prabhakar learnt about the Nagal family, and Mallanna was at once invited to be a resource person. He became much in demand at village meetings.

### Recognition

In 2006 the University of Agriculture Sciences (UAS) in Dharwar conferred on Mallanna an honorary doctorate in recognition of his contribution. After this, Mallanna became even more popular. He finds it difficult now to meet the demand for his services. Though the university's watershed department is active in these areas, it has a paltry budget of Rs 6,000 (\$135) per hectare, which is just enough to pay for field boundary bunds.

"The inter-plot rain harvesting Mallanna is advocating would require an average of Rs 50,000 (\$1,124) per hectare for the first stage of work – that is, construction of the broad-based bund and spillway," says Dr M B Guled,

Principal Scientist, Regional Research Station (RRS), Bijapur, who is working for the All-India Coordinated Research Project for Dryland Agriculture at the UAS. "For the second stage of drought-proofing, which is division and levelling of land, much more money would be required."

Dr Guled says that if just the first stage of the Mallanna method of drought-proofing is done, a family gets enough to sustain itself even with very low rainfall. The Karnataka government has announced crop loans with one per cent interest through the cooperative sector. "If a long-duration loan scheme for drought-proofing in drylands is introduced, it would help to catalyse drought-proofing work and thereby ensure livelihoods here," says Dr Guled.

### Historical research

Mallanna's grandfather, Sangana-basappa, started his experiments on a 28 acre field. At that time, his fields were so severely damaged that a person standing in its eroded gullies wasn't visible! Mallanna hasn't stopped experimenting. Levelling, bunding, incorporation of organic material, in situ sheep manure and other activities continue. This land used to yield hardly a quintal (100kgs) of crop per acre. Now the yield is eight to nine quintals, equal to the best fields of the area.

Mallanna calls his family's drought-proofing techniques, 'hola tidduvudu', which roughly translated means 'correcting the fields.' He says despite the crisis in farming interest in drought proofing is on the rise. According to Dr Guled, this method of drought-proofing is relevant for the northern dry zone of Karnataka. For the last three to four years, machines have replaced labour in soil and water conservation work. This has speeded up the process.

In an unusual development the RRS and Mallanna are working together. While Mallanna takes care of planning and supervising the soil and water conservation work, Dr Guled and his colleagues advise farmers on soil health, corrective measures that are needed, crop selection and crop combination. This is a classic case of scientist-farmer collaborative development.

Dr Guled says that the increase in yields starts from the very first year after drought-proofing is carried out thanks to better moisture retention. "In a matter of three years, the entire expenditure is recovered completely provided the farmer chooses the right crop combination." For some areas, RRS advises chilli, onion and cotton for the kharif (autumn) season and sorghum for the rabi (spring) season. Sunflower for kharif and chick-pea for rabi is another set of options.

Over several decades the Nagal family's drought-proofing formula has spread to neighbouring areas. One important advice is not to use black soil for building bunds. Once a bund cracks in summer and sheep stamp on it, it collapses and gets washed off.

"None of the farmers who spent money used black soil for the bund," he emphasises. "Show me a bund done by the government department that has lasted more than five years. But hundreds of bunds built with traditional knowhow have remained intact for centuries."

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