CASE STUDIES

BIDAR, CHAMARAJANAGAR, DAVANAGERE, GADAG, KALABURAGI, KOPPAL, TUMKUR, VIJAYAPURA, YADGIR DISTRICTS

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1. Sujala Helps Farmer Find Some Use for Barren Land

Gira Reddy and his father Hanumantha Reddy are farmers in Mustari Wadi, a village in Humnabad taluk, Bidar district. They own 15 acres of land in this village.

The family's primary occupation is agriculture and the primary source of income is cultivation. The annual household income from cultivation is R 25,000. As kharif crops, they grow toor and ginger. As annual crop, they grow sugar cane. Gira Reddy is 38 years old and has studied till class VII. There are three members in his family, including wife and children.

Of the 15 acres that he owns, 12 acres are cultivable and the remaining 3 barren. For several years, Reddy had left this part unused and barren, not knowing what to do with it. But during his interactions with the Karnataka Watershed Development Department, Reddy got to know of the Sujala watershed development scheme, a programme designed by the Karnataka Watershed Development department. Sujala-III has been designed to help farmers by implementing sustainable agricultural practices and soil and moisture conservation efforts that would in turn improve crop productivity and generate better yields and income for these farmers. Under this scheme, Gira Reddy



"As farmers we don't get much even after a lot of the effort that we put in. In my case, I had to also deal with barren and uncultivable land. So, when Sujala offered to help, I readily agreed. They showed me a way to use the barren land and at the same time improve soil quality, moisture and rainwater retention with very simple methods."

implemented forest plantation on his land and adopted a trench cum bund structure to prevent water run-off as well.

Forestry Plantation

When the Sujala team visited Gira Reddy's land, they inspected it and found it to be suitable for forestry plantation. "Some part of my land is not suitable for any kind of cultivation. It was lying unused all this while. My interactions with the Karnataka Watershed Development Department and with the Sujala team helped me understand what I could or could not do with the barren land that I have. They told me that I could plant forestry saplings, which could provide me yield years from now. This is good because earlier I was not getting anything from this land," says Reddy. Further, under Sujala, we can get these

saplings for free, which are revenue generating ones in the long run. And they will also help in improving the moisture content of the soil in this area, explains Reddy. "I have planted these saplings over 1.5 acres of land, he adds.

Reddy uses irrigation to supply water for his crops and so the forestry plantation also is supplied water in the same way. "I use drip irrigation to supply water from the well that I own," he explains. "We planted 190 hebbevu saplings and 150 mango saplings planted on this land area. We planted

then in September 2017 in what I was told was a block plantation. Today, only 95 hebbevu plants are surviving and each of these has grown to a height of 1.5 metres with an average girth of 5.5 mts. I have not applied any manure so far nor have I seen any pest attack," he says.

After the saplings were planted, the Sujala officials came by to follow up on progress and provide guidance on maintaining the plantation, says Reddy, adding that the visit was made once every two to three months. Stating that he is satisfied with the work implemented so far, he says that the quality too seems optimum and good. "The best thing is that I did not have to pay a penny in all this," he says.

Although it is too early to expect a yield from the plantation, Reddy believes that he will get his income and profit in a few years from now. In addition to the forestry plantation, Reddy has created a trench cum bund around the plantation area to prevent rainwater from running off. This was also a part of the Sujala scheme, he said, adding that there were no other structures, either through Sujala or any other scheme.

When asked to list some of the improvements he has noticed after adopting the practices suggested under Sujala, Reddy said that the soil quality was showing improvement and soil erosion was reducing. The amount of moisture in the soil was also increasing, which showed in the health of the crops and plants, he said, and thanked the Sujala team for the support in implementing the structure on his land.

Wait and Watch on Yield

Apart from on-field support, Reddy said that he learned about LRI techniques in the Krishi Vigyan Kendra (KVK) training that he had participated in. the KVK training was organized by the Agriculture department and covered agricultural best practices, crop production techniques, manure and fertilizer application, soil quality assessment and more. "The training was very useful because it also provided information on the types of crops that could be grown on my land and how to determine whether what I did was correct or not," explains Reddy. He, however, said that the LRI techniques were not fully used on his land but that the information was useful for future activities.

"My first attempt at planting saplings has not been entirely successful because of the 190 hebbevu saplings planted, only 95 have survived. This means that my income will be reduced. But based on how the remaining saplings fare and the income I can generate from those, I would like to invest in planting more of such trees on my land. Along with the hebbevu saplings, I had planted 150 mango saplings on my own. But the mango saplings have not done better than the hebbevu saplings in my opinion. Their survival number has been far lower," says Reddy.

2. Sujala Comes to Farmer's Rescue with SMC

Maremma Siddappa is 34 years old and is a resident of Udabal village in Humnabad taluk, Bidar district. She is married to Siddappa and the couple owns three acres of land on which they grow



jowar and tool dal as kharif crops. The family's primary occupation is agriculture.

Maremma has completed her graduation, and helps her husband on the field. With a household consisting of seven members, including three children, the family runs on a tight budget with just Rs 25,000 as the annual household income from all sources, including the toor dal and jowar harvest on two acres.

In recent years, changing climate, cropping patterns, and deforestation have led to less moisture in the soil and water run-off due to which Maremma's family started seeing reduced soil fertility, decreasing yield, and low quality of crops and harvest.

Alternatives for Water

One day, Maremma's family heard of the Sujala-III programme, which was being implemented by the Karnataka Watershed Development Department (WDD) in various watershed regions, through officials of the Agriculture department. The Sujala programme promised to assist all farmers in watershed regions to enable moisture retention in soil, in water collection in ponds and trenches, and in preventing soil erosion and

improve the moisture condition in the soil. Having taken part in the Krishi Vigyan Kendra (KVK) training, the couple were aware of the kind of help that was being offered and gladly took the support.

Under the soil moisture conservation (SMC) programme, a trench-cum-bund (TCB) was built along the land in April 2017. Initially an inspection was conducted and a plan drawn based on the type of soil and land by the Agriculture department. After this, the type of intervention required and the activities to be implemented were decided. "We were told that it helps moisture conservation in soil, enhances water retention, and prevents water run-off," says Maremma, explaining the reason for going for the Sujala watershed programme. "Rains are irregular and scarce these days and we do not have any other source for irrigation or a pond; therefore, we needed to have other alternatives for livelihood," she added.

After implementing the SMC programme, the Watershed Development department (WDD) officials returned after the rains to follow up on the implementation, says Maremma. "They wanted to check on the TCB," she said, adding that the family was very satisfied with the work implemented by the

officials of the WDD. "The quality of work implemented is good. We did not have to contribute anything towards this work. They implemented the original plan as is and all, to only help us do better. We are grateful for that," she explains.

Listing the benefits obtained through the Sujala programme, she says that mainly the quality of top

soil has improved, the moisture content in the soil is better, water is getting collected because of the TCB, and crops are doing better. "This means better harvest or agriculture produce for us," says Maremma happily. The family harvested toor dal after the SMC plan was implemented in April 2017. According to Maremma, the crop production was slightly better than before. She said that it was also too early to expect really good results and that rains were not good that year.

Mango Plantation

In addition to the SMC programme, the family also did block plantation on the remaining one acre of land. "We have planted 150 mango saplings on one acre. And on the bunds, we have sown



vegetables such as okra (ladies finger), and also planted neem and tamarind trees. This is based on the advice given by the Watershed department officials," explains Maremma, adding that there is no other structure on their land.

With the block plantation in place, the family now requests support for building a fence, implementing drip irrigation, and procuring manure. "We also want to dig a well and ensure better irrigation for the plants and trees in our land. We want to set up drip irrigation and supply adequate water for the mango trees."

When asked to speak how the Sujala programme helped her and what her future plans are, Maremma said, "Under the Sujala programme, the officials helped us build create a plantation and provided efficient after-support. They advised us to plant trees such as hebbevu, tamarind, and honge on these bunds. We hope to generate some income through these plantations. We also have planted okra, ridge gourd, and water melon on these bunds. We hope to become model farmers and encourage other farmers to get involved in this programme and better their lives."

3. Farmer Finds Greater Confidence in Agriculture, Thanks to Sujala

Over the years, the harvests of crops on their land reduced due to various reasons and therefore, their income too reduced. But for this family in Rampur village in Humnabad taluk in Bidar district, there was no go but to continue with agriculture—because agriculture was their primary and main occupation.

Shivaleela is a 48-year-old woman and married to Prakash. They are both residents of Rampur village in Humnabad taluk. Shivaleela has studied up to class X and helps her husband in agriculture. There are four members in her household, including two children. The family's annual income is Rs 20,000 and this is generated from agriculture and animal husbandry, and the minor income generation activities that they take up during non-cropping seasons. The family owns 2.2 acre of land on which they grow toor dal and green gram as kharif crops.

In the recent years, the family observed that their harvest was not as great as it used to be. They got to know that excessive grazing, wind, changing cropping patterns, deforestation, and improper land maintenance was diminishing the quality of soil. The family also noticed that the soil on their land was losing all moisture and that rainwater was not collecting anywhere, leading to soil erosion and water scarcity for irrigation. This was adversely affecting their crops and the land. With the future and livelihood in mind, the family started looking out for any support that they may get from the Watershed development department.

So when the Karnataka Watershed Development department (WDD) announced the Sujala-III programme under which assistance for soil and water conservation would be provided for farmers in the watershed region, they decided to take advantage. The Sujala programme was implemented in April 2017 on Shivaleela's land.



"We want to become model farmers by taking up activities that are sustainable and environmentally friendly. We want to show that one can do well in agriculture too."

Farm pond for water collection

With no perennial source for irrigation, Shivaleela's family was happy that they were getting a farm pond, along with a trench-cum-bund (TCB) and bund plantation under Sujala-III. "The plan was to collect rain water in this pond and use it for irrigation purposes. While improving the moisture content in the soil nearby, the water can be used too," she says, adding that the family has already received approval for bund plantation on their land.

"Now that the basic setup is in place, for the future, we think that it would be useful to have a borewell to irrigate our crops during summer. We also want to try and grow sugarcane and take up cropping for the whole year," she says, talking about plans for the future.

Soil and Moisture Conservation

In addition to the farm pond, as part of the soil and moisture conservation (SMC) programme, the WDD officials implemented a trench-cum-bund (TCB) to prevent rainwater run-off on the land that Shivaleela's family owns. "We were told that trenches would prevent soil erosion and enable water conservation and recharge. We were also told that because run-off was being prevented, soil quality will be enhanced and erosion would be reduced," explains Shivaleela, adding that they were also aware of these benefits. The couple has attended some agriculture training programmes conducted by the Krishi Vigyan Kendra in their village as part of which they have been educated in LRI techniques such as type of crops, fertilizer applications, deficiency of micro nutrients and other topics.

After implementing the necessary structures for soil and moisture conservation, the department officials made follow-up visits to their land and checked on the status and progress of work, according to Shivaleela. "The officials visited several times and inspected the condition of the TCB and waste weir. They also gave advice about growing vegetables on the bunds," she added. Currently, they have planted tamarind and hebbevu saplings on the bund.

"It is a free programme and we did not have to do anything. They came up with a plan based on visits, and implemented everything on their own. We are very satisfied with the work on our land. Work is good and was implemented as per plan," Shivaleela says, adding that this was a good attempt to improve crop and biomass quantity and quality, and the quality of tillable soil.

With the trenches to stop water from running off, moisture content and soil quality started improving. "Water has collected in the farm pond and we can now think of irrigation support for a few more months," says Shivaleela.

Animal Husbandry

Shivaleela's family is also into animal husbandry, and is into growing the required fodder for the cattle. They have two cross-breed cows and they earn approximately Rs 4,000 to Rs 6,000 per month for six months in a year. "We want to learn the correct technique of growing fodder grass and become model farmers in our village for all these things: growing fodder and for water and soil conservation. We want to protect and save the age-old occupation of agriculture which is the backbone of our country and show the future generation the importance of agriculture. If done properly, we can generate good income from agriculture too. Instead of going out of our village in search of work and livelihood, we can use our own land and grow crops and earn money. We want to prove to everyone that one can achieve great things in agriculture as well," says Shivaleela, voicing her thoughts about the future and about agriculture.

4. Sujala Spurs Vishwanatha's Dreams of Better Income

Vishwanatha Reddy's main occupation is agriculture and he shares this occupation with his father Tukkareddy. Vishwanatha is a resident of Udabal in Humnabad taluk in Bidar district. He is 34 years old and has graduated with a Bachelor's degree in Arts.

His family comprises six members, including his wife, parents and two children, and the family

income is Rs 2.15 lakh, which is generated mainly from agriculture. The land-holding spans three acres and the family used to grow toor dal as the kharif crop. They also grew sugarcane as the annual crop. Their land has red soil on which they now grow guava. Like other farmers in watershed regions, Vishwanatha too was having problems due to reduced moisture, water scarcity, scanty rainfall and soil erosion, all of which was denting his annual income.

During his interactions with the Agriculture department seeking support, he had heard of Sujala and other initiatives of the Karnataka Watershed Development department. "What we do under Sujala-III is not something new. It is just more scientific and standardized with a greater chance of success. After the block plantation takes off successfully, I want to get into growing different crops and vegetables. I would definitely want to earn more income and do better in agriculture."

Vishwanatha was chosen as one of the beneficiaries under Sujala-III, which provides support and assistance for small farmers living in watershed regions to adopt sustainable techniques for better productivity and for improving livelihood. Based on inspection and study of his land, it was decided that block plantation was a good option for him.

Vishwanatha's land is irrigated by using flood irrigation for the crops. He uses a borewell. In 2017-18, as per the plan drawn up under Sujala-III, 190 guava and other saplings were planted in a block plantation structure. "Guava is something I know to grow very well now. I now want to grow different crops and vegetables and earn more income," says Vishwanatha, who has undergone basic training in cropping techniques, fertilizer application, application of micro-nutrients and more, organized by the Krishi Vigyan Kendra.



Saplings Planted

"All 190 saplings have survived. The average height of each plant is 4 to 5 inches and the girth is 2 inches. We used 50 kg of DAP as manure. There has been no incidence of pests or diseases so far," he says. After helping us plan the block plantation details, the department officials followed up to check on whether the saplings were growing properly and whether there was onset of any disease or pests that needed to be treated. They advised and guided us on how we should control pests and diseases, says Vishwanatha.

According to him, the family is very satisfied with the work implemented and the quality of advice too. "We did not have to make any contribution during implementation, which is very good and helpful," he says, adding that there has been no yield yet from the horticulture plants because they are too small.

In addition to block plantation, the other benefit that was obtained from Sujala includes soil and moisture conservation support and trench-cum-bund creation. Apart from this, no other structure was created on his land for soil or water conservation.

Manure and Pest Prevention Support

"While we wait for the saplings to grow, we want some help in getting manure for supplying to the plants and pesticides/organic pesticides and insecticides for preventing pest attack," says Vishwanatha when asked whether they would need additional support to successfully implement the block plantation.

"We have fenced the three acres of land on which the guava plantation is so that cattle



don't come to graze. We want to ensure that we take the necessary steps to generate good income and through our success motivate and encourage other farmers to take this up. We want to become model farmers for the other farmers in the village. For this, we want to make all the effort to grow the plants properly and ensure that it fruits well. We would want other farmers to come to our land and see the plantation and appreciate and learn from our plantation" explains Vishwanatha. He also adds that there has been several benefits from Sujala-III, including SMC. But the biggest of them was the additional source of income that they have been directed to. With the help under Sujala, we can aspire to grow more crops, grow varieties of vegetables and trees and we can aspire to earn a better income than now, he says.

5. Chandra Takes Up Fodder Enrichment and Silage Making

Chandra is a 32-year-old resident of the Badrapura village in Humnabad taluk of Bidar district. He has studied up to class X and currently takes care of his family's primary occupation, which is agriculture.

Including his father, Anthurama, Chandra's family comprises seven members—his mother, father, wife, and two girls aged 4 and 5 years, respectively. The family owns 10 acres of land and they grow sugar cane and toor dal on it. The family's annual income is Rs 3 lakh. In addition to land, the family owns livestock, including four cows, two buffaloes, four calves and 10 hens.

With acute shortage of green and dry fodder due to various reasons, Chandra, like other farmers, had started looking out for optimal techniques to provide fodder for his livestock. That is when he got to know about the Sujala-III project, which is sponsored by the Karnataka Watershed Development

"Both fodder enrichment and silage have been very beneficial for me. Summer months are especially hard for us. In addition to fodder not being nutritious enough, we don't get any during summer. So getting to have both is a boon. I can see the results and I am going to promote it among my fellow farmers." Department (KWDP), and about the livestock activities being implemented by KVAFSU.

Chandra's village, Badrapura, comes within the jurisdiction of the Rayapalli sub-watershed and the Badrapura micro watershed. It is one of the villages that have been considered for various

livestock demonstration and extension activities under Sujala-III. These activities, which include promoting enrichment of dry fodder and use of quality unconventional feeds, is being implemented by the Karnataka Veterinary, Animal and Fisheries Sciences University (KVAFSU), Bidar. The aim of these activities is to identify critical gaps in existing livestock farming systems and to demonstrate good practices that could help bridge the gaps and increase the quality and outcome of livestock activities.

Training Throws Light on New Techniques

Of the several activities, Chandra chose fodder enrichment and silage making by using silo bags because they were most relevant to him. Initially, Chandra did not have any knowledge of fodder enrichment, although he knew about the use of unconventional livestock feed. It was only when the KVAFSU training took place that he got to know about these techniques. According to the KVAFSU team, Chandra was chosen to take part in the training because he showed keen interest in the topic. After completing the KVAFSU training, Chandra started doing fodder enrichment by using urea and salt water on his own. He started using this method from June 2017. "I am quite convinced about this new technique and want to adopt it for fodder enrichment in future. I need to prepare two batches of fodder per day, and each batch weighs 100 kg. Each batch is enough to feed two cows, two buffaloes and two calves," explains Chandra. As per estimates, the quantity of urea that is required per day per batch is about 1 kg and the cost per kg of urea is Rs 40. He buys the urea and salt from outside and mixes them with the crop residue that is available from his farm land.

"I agree and believe that enriched fodder is nutritious for livestock. I see that the milk production in my household has increased, the resistance power of the livestock has improved and reproduction has been positive too. To me, this is good because it helps me financially and economically," says Chandra, adding that apart from enriched fodder, he gives the cattle dry fodder and chunni (enriched maize powder mixed with medicine and other ingredients), which is available in the market.

According to Chandra, he has recommended the use of this technique to three farmers so far. With a solution in sight for enriched and regularly available cattle feed, Chandra wants to buy more livestock and improve his livelihood.

Silage Making by Using Silo Bags

In addition to fodder enrichment, Chandra also chose to take up silage making by using silo bags because such fodder is helpful during summer when green fodder is not easily available. He was unaware of this technique before intervention by KVAFSU and also did not know that it was beneficial to chop fodder before feeding them to cattle. He learned all this when he participated in the department's training. Chandra was chosen for this training based on interest and other basic availability factors. Further, he is the village president and he would be a good role model to promote the use of this technique among the other farmers.

Silage is made by mixing salt, jaggery and other specified ingredients and a silo bag. The time required for preparing silo bags is 21 days. After 21 days, the fodder is ready for feeding to livestock. To prepare one batch of silage, 5 kg jaggery and 4 kg salt are required. These cost Rs 200 and Rs 40, respectively.

After the training, Chandra has been enthusiastic about using these silo bags for making silage. He wants 100 kg fodder per day and intends to prepare four batches per month (750 kg per batch) According to him, each batch of fodder can feed four cows and four buffaloes for seven days. Therefore, he wants to continue preparing silage through the year because he believes silage is good for livestock. For the sake of variety, he also feeds dry fodder and chunni (enriched maize powder) to the livestock. The intervention has helped him in that he used to get 8 litres of milk earlier, whereas now he gets 12 litres of milk. "My income has increased from Rs 240 to Rs 360/day. I am certainly going to promote this technique among my farmer friends," says Chandara.



Photo-1: Farmer Chandara is with silo bag cattle feeding



Photo-2: Enriched fodder ready for

6. Sujala Helps Farmer with SMC, Sparks a Dream in Him

Mahadev Prasad is a farmer in Ketahalli in Chamarajanagar district. Mahadev Prasad and his father, Basavanna, own five acres of land on which they grow maize, jowar, tomato, chilli, toor, *avarekai* and coconut. From the harvest and from the cattle rearing activity, the family manages to make around Rs 20,000 annually. Mahadev Prasad is 28 years old and has studied till class VIII. There are three members in his family, including his children and wife. The family is primarily into agriculture and animal husbandry.

On the five acres of land, Mahadev Prasad grows jowar and maize (3 and 2 acres, respectively) as the kharif crops, tomato and chilli (2 acres each) as the rabi crops, and toor and avarekai (0.20 gunta and 1 acre, respectively) as the summer crop. As the annual crop, he harvests coconut. He also has three cows and he earns Rs 10,000 to Rs 12,000 per month from selling milk.

According to Mahadev Prasad, short supply of water, soil erosion and depleting moisture content in soil has been affecting the yield of all the crops on his land. With water not collecting anywhere, there is not enough water during the summers for the crops or the cattle. Even though he has a borewell, which supplies water for irrigation, he has been facing difficulties with water due to groundwater depletion as well.

This is what prompted him to look for suggestions and support. "I was motivated by the interactions with officials of the Karnataka Watershed Development Department. They told me that Sujala-III was the solution for me because it introduces sustainable agricultural practices and structures that would help small and medium farmers like me who live in watershed "The water situation gets bad during summers and because rainwater does not get collected, groundwater is not recharged. So the water in my borewell is reduced and it affects my crops. Thanks to Sujala, I have the farm ponds and I can hope to have at least some additional water during the summer for my crops and cattle."



and rain-fed regions to improve crop productivity and soil quality and moisture content on their lands. They also told me that I did not have to pay anything," he says. The Sujala initiatives were implemented on his land in September 2018.

Farm Pond and Trench under SMC

Under the soil and moisture conservation programme of Sujala-III, Mahadev Prasad received help with a trench-cum-bund (TCB) and two farm ponds. The TCB spans 600 RMT and the farm ponds span 21x21x3 mts and 12x12x3 mts. "The Sujala team made a visit first and then inspected my land. They determined what would be the best solution for my land based on the soil type, land structure and water availability. They told me that it would be best to have a TCB and a farm pond where water could collect. This would both improve soil quality and enable moisture conservation, and also collect water," he explains, adding that he hoped this would reduce soil erosion and improve yield.

After the TCB and farm pond were made, the team has promised to return for a follow-up visit to check on the progress, quality and efficacy of these structures, and to determine whether any additional inputs are required in terms of maintenance. "There has not been any follow-up yet. But the team said that they would return in some time. For now, I am satisfied with the work implemented and the quality of work," says Mahadev Prasad, adding that there was no deviation from the original plan of the project. He also added that he did not have to make any contributions to the scheme.

After the structures were created, Mahadev Prasad started seeing significant improvements in the quality of soil and in the moisture content. "I am seeing great improvements, thanks to Sujala. Preventing water run-off has resulted in soil conservation and moisture conservation, and water storage and availability for plants and cattle. Improved moisture has helped in crop growth, which will show in crop yield. There has been significant improvement in moisture after the programme. Water has also started collecting in the farm pond. Now water is available for eight additional months, thanks to the pond. I have 20% additional water than before, which is great," says Mahadev Prasad.

Other additional benefits that Mahadev Prasad got under Sujala include a forest plantation. "Under forest plantation, I planted 15 silver oak, 15 hebbevu, 15 teak and 10 mango saplings. However, the mango and teak saplings did not survive. Now I have 15 silver oak and 15 hebbevu plants," says Mahadev Prasad, and adds that no other structures have been implemented, either under Sujala or any other scheme. The only other structure that I have is cattle shed, he says.

When asked about any additional support that he may expect from the department and from Sujala, he says that he wants help to improve cattle rearing and would like support for fodder cultivation. "It would be good to have a cutter, silo bags and chopper for fodder. I would also be grateful for any guidance on how to grow fodder" he says. So far, Mahadev Prasad has attended the Sujala training, which provided information about soil and moisture conservation and optimal crop production techniques.

In the distant future, Mahadev Prasad hopes that he set up an additional farm pond, a poultry farm, fish farm, integrated cattle farming unit, biogas setup, vermiculture and organic manure setup and more. "I want to explore a wholesome agricultural unit and make farming a profitable venture," he says.

7. Forestry Plantation, Bund for Mahadev Prasad Under Sujala

Mahadev Prasad lives in Harave village in Chamarajanagar district. He is a farmer by occupation like his father Madappa. Mahadev Prasad is 46 years old and has studied till PUC. His family consists of four members, including two children. His family owns 3.22 (3 acres 22 guntas) of land on which he grows tomato and turmeric. He gets an annual income of Rs 1 lakh from this crop.

Mahadev Prasad grows tomato on two acres during the kharif season and turmeric on two acres during the rabi season. His annual crop is turmeric. For Mahadev Prasad, despite planting only crops that grow on dry lands and require less water, the income has been less and the growing conditions difficult. Changing rain patterns and environment degradation has been playing truant with the returns and each year the harvest has been reducing. The water quantity in his borewell too has been reducing each year due to no groundwater recharge options. He was helpless until the time that the

"I HAVE MANY PLANS IN MIND. I WANT TO SET UP VERMICULTURE, AND A COMPOST UNIT, TAKE UP HORTICULTURE CROPS AND MORE. THAT I HAVE SO MUCH HOPE AND DREAM IS BECAUSE OF SUJALA."



Sujala watershed programme was implemented on his land, which, at the very least, gave him hope.

The Sujala watershed programme was designed with farmers like Mahadev Prasad in consideration. It aimed to support farmers who lived in watershed and rainfed regions and who were facing crop production problem due to decreasing soil quality and moisture. Under Sujala-III, various activities were designed to help improve soil conditions, enhance moisture content in the soil, prevent rainwater runoff and make water stand and percolate into the ground. It is known that this would help improve crop production and the livelihood of farmers in these regions.

Mahadev Prasad had heard of the Sujala programme from the Karnataka Watershed Development department. Naturally he was keen to implement the scheme and elated when he was chosen as one of the beneficiaries. "I was aware of Sujala and

had heard of it from other farmers too. I was anyway struggling to improve things and make ends meet. So this was a boon," says Mahadev Prasad.

Environment Conservation Through Forest Plantation

In 2016-2017, officials of the Watershed department inspected Mahadev Prasad's land and determined that forestry plantation would be the efficient method to implement here, along with soil and moisture conservation initiatives. Accordingly, Mahadev Prasad was given guidance and advice on what plants to grow and how to maintain them. "I wanted to take up forestry plantation as per the Sujala officials' suggestion because it would lead to environment conservation," says Mahadev Prasad, adding that he was motivated by the Forestry unit under Sujala to go for this technique.

As part of this plan, Mahadev Prasad has planted 200 saplings along the border of his land. Since his land has irrigation facility and he uses drip irrigation, the same setup has been extended to water the saplings planted for the plantation. "I have a 600 ft borewell and it is from this I get water to irrigate my plants. I have planted 200 neem trees along the border, on the bund. They have grown to a height of five metres. I have also applied 100 kg DAP and 2000 kg FYM as manure. Thankfully I have had no pest attack so far," says Mahadev Prasad.

After the plantation was completed, the department officials have been following up to see the growth of the saplings and to guide him on how to maintain the plantation, including watering and applying manure. "I am happy with what I have got so far. The Sujala team has done a good job and has not taken a penny from me for doing all this. However, it is early for me to expect returns from these plantations because the saplings are in the growth stage," explains Mahadev Prasad, adding that he is hopeful of getting good returns on them in about 10 years' time when the trees will be cut for timber.

In addition to forestry plantation, Mahadev Prasad has had soil and moisture conservation initiatives implemented on his land in the form of a trench-cum-bund (TCB) spanning 150 mts. He also has drip irrigation and fencing established. In addition to these, he wants to get into horticulture planting in the days to come so that it would fetch him income within a shorter period of time.

Mahadev Prasad has not participated in any training by the Krishi Vigyan Kendra so he is not aware of the LRI techniques nor has he implemented any on the land.

When asked about his future plans, he says "We already have 200 coconut trees planted. Now we have 200 neem trees. Drip irrigation is set up for all of them. We also have a fence to prevent grazing animals from entering. We want to establish a vermiculture manure unit in the days to come. For this, we want some funding help and also information and guidance, and I hope I can get help to become a model farmer," he says.

8. With Sujala Help, Nagendrappa Chalks Out Rich Future Plans

Nagendrappa is a resident of the Harave village in Chamarajanagar district. The son of Mahadevappa, Nagendrappa is 45 years old and has studied up to PUC. He lives with his family of five, including parents and children. Like the other farmers in the village, Nagendrappa took over the mantle of agriculture from his father who is a farmer too. The family owns 6.2 acres of land at present and their annual income is around Rs 15,000 per year.

Nagendrappa's land has a coconut plantation with 400 trees in them. Although there is a fair market for coconut, Nagendrappa has had to face hardship because of water scarcity and irregular rainfall patterns. Over the years, his yield started falling due to decreasing soil quality and lack of moisture in the soil. Further, with rainwater not collecting anywhere, groundwater levels were falling as well,

"I WANTED TO GET INTO HORTICULTURE CROPS BUT LABOUR IS COSTLY AND NOT EASY TO GET. PLUS WATER IS A PROBLEM. RAINS ARE NOT REGULAR AND WE DO NOT HAVE STORED WATER. THIS MAKES EVERYTHING DIFFICULT. WITH SUJALA INTERVENTION, I CAN HOPE."



affecting the availability of water in his borewell. The rich topsoil was being carried away too, thereby reducing the soil quality slowly.

"I was getting affected by many factors. I want to get into horticulture crops, but labour is not easy to get for the same and the labour costs are high. Additionally, water is not adequately available. So I went for coconut. But this plantation too needs care and water. Rain is erratic and my borewell is slowly drying up because of rainwater run-off and no groundwater recharge," says Nagendrappa.

Seeking a Solution

"That's when I heard the watershed development department officials talk about the Sujala-III programme. I heard of the benefit it could offer and

so I was interested. The idea was to at least get support for a bund and borewell and some horticulture plants so that I can think of income from alternative crops. I hope that this will give a solution to my problem," says Nagendrappa, adding that he was interested after listening to the Sujala officials talk about the initiatives. Sujala-III is the watershed development programme designed by the Karnataka Watershed Development department in order to support small farmers living in rain-fed areas to improve their livelihood and the crop production. The goal of the Sujala-III programme is to introduce sustainable agriculture practices that are both environmentally friendly and easy to adopt for farmers.

Subsequently, Sujala initiatives, including a trench-cum-bund (TCB) for soil and moisture conservation, and planting of horticulture plants and forestry saplings, were implemented in Nagendrappa's land. The plantation was taken up on four acres. "My land is irrigated from a borewell. When it rains, the supply is just normal. So to improve water conditions and also generate income from other sources, I have planted 150 mango saplings and 150 sapota saplings in a block plantation type. As of today, 130 mango and 140 sapota saplings have survived," says Nagendrappa, adding that the saplings have grown to a height of 0.6 mts.

Nagendrappa also admits to having applied FYM as manure for the saplings and having had a pest attack. He says that he had to apply a chemical pesticide to get rid of the infestation. "After we planted the saplings, the officials of the Watershed department and Sujala team have visited me again to follow up on the status of the plantation. During the follow-up visit, they gave me advice on watering, applying manure, and intervention during pest attack," Nagendrappa explains. He adds that he has not had any training such as the one that the Krishi Vigyan Kendra offers nor has he implemented LRI techniques on his land. "I am yet to attend a training on these practices, so I am not aware of any of them," he says.

Stating that he is happy with the initiatives implemented on his land, he adds that he could not have asked for anything better. "I did not have to pay anything or do anything. The officials visited and inspected the land, made a plan and implemented the initiatives according to plan. Because these are trees, it is too early to talk about yield and income but I believe that the yield will be good," he says.

Forestry

In addition to the horticulture plantation, Nagendrappa has also got a trench-cum-bund and a forestry plantation implemented. "The TCB is to promote soil and moisture conservation. The forestry plantation is for long-term income as part of which I have planted silver oak and neem. The TCB spans 500 metres. In the future, I want to set up drip irrigation so that there is regular and optimal supply of water."

In future, Nagendrappa wants Sujala support to get fodder nursery plants and seeds, training for vermiculture and a chop cutter to cut fodder for the cattle he owns under the animal husbandry scheme. He has plans to set up drip irrigation with a sprinkler system, vermicompost production and dairy farming. He also wants to take up organic and scientific farming. In all, he wants to get involved in comprehensive agricultural practices and become a model farmer.

9. Rame Gowda Dreams Big, Thanks to Sujala's Wholesome Support

Thirty-four-year-old Rame Gowda is from Kotegowdana Hundi in Chamarajanagar taluk and district. A farmer by legacy, Rame Gowda is the son of Javane Gowda and has studied up to class X. There are six members in Rame Gowda's house, including his parents and children.

Rame Gowda's family has been into agriculture for generations, producing crops on the 6 acres and 20 guntas of land that he owns. Currently, he makes around Rs 1 lakh per year from harvesting crops

Rame Gowda's crop pattern is given in the table				
Season	Crops	Area (acres)		
Kharif	Sunflower	4 acres		
	Maize (jowar)	1 acre		
	Channa dal	.20 gunta		
	Ragi	1 acre		
Rabi	Corn	2 acre		
	Green gram	3 acres		
	Coriander	1 acre		
Summer	Toor	8 rows		
	Avarekai	8 rows		
Annual Crops	Coconut	Planted now		

of sunflower, maize, channa dal, *ragi*, coriander, green gram, toor, *avarekai*, and coconut and from the milk he sells. He owns nine cows.

With climate change and the fact that he was living in a rain-fed area, Rame Gowda noticed that his soil had reduced moisture and water was not collecting anywhere. He was noticing soil erosion as well. "Given that I was irrigating my crops by using water from a borewell in my aunt's land nearby, I wanted to plant something that would be beneficial to all of us, in terms of soil and moisture conservation and profits," says Rame Gowda.

"I heard about Sujala-III from the Watershed development department and the types of initiatives under it. I am glad I am a beneficiary, for now I have a plantation, a trench-cum-bund and a farm pond," says Rame Gowda.

Sujala-III is a watershed development programme designed by the Karnataka Watershed Development department to improve the livelihood of small farmers living in watershed regions by introducing them to sustainable agriculture practices that could enhance crop productivity. Several beneficiaries are selected and one such beneficiary is Rame Gowda.

Horticulture Plantation to Add to Income

According to Rame Gowda, the reason he adopted horticulture plantation under Sujala programme was to share some profits with his aunt from whose land he was getting water. "My borewell is completely dry. So I draw water from my aunt's land. I thought that if we planted some more coconut saplings on my unused land, we could share some profits between us. The horticulture unit staff and the NGO team that promoted Sujala-III among us encouraged me to go for this programme," explains Rame Gowda, adding that he has planted 28 coconut saplings on 20 guntas of unused land and set up flood irrigation.

After inspection, the Sujala team advised that it would be best to plant coconut in a block plantation type. So in 2016-17, 28 coconut saplings were planted in a block. "Currently, the coconut saplings



have grown to a height of 1.5m. I have applied FYM as manure and 300 kg of inorganic fertilizers. But I have also had to face attack from bees, ants and stem borers, so I used precautionary pesticides that I got from the Horticulture department," says Rame Gowda, adding that the Sujala team members did visit once to follow-up.

"When they did the follow-up visit, they gave me advice and guidance on watering cycles, application of manure, and plant maintenance. They also advised me on protecting against attack by wild animals such as wild boars,"

explains Rame Gowda, and adds that he is satisfied with the support he got from the Sujala team officials. "They did a good job. And I did not have to contribute anything from my side" he says. Although it is early to comment on yield and growth, Rame Gowda believes that this would turn out to be a good effort at generating income.

Many Benefits and Support

Apart from the horticulture plantation, Rame Gowda has a trench-cum-bund (TCB) on his field and 10 farm ponds. "The TCB is 150m. I have 10 farm ponds each of dimension 15x15x13 on my land. I have planted neem, curry leaves, and lime plants on the bunds near the farm ponds. I believe that this will improve water conservation and soil moisture and prevent soil erosion. It will also greatly help recharge the borewell from which I draw water," says Rame Gowda. He adds that there are no other structures on his land, except the plantation, TCB and farm ponds. In addition to soil and moisture conservation initiatives, Rame Gowda wants help to get a chop cutter to cut fodder for his milking cows.

"Under Sujala, I have received several benefits. From a horticulture plantation of coconut trees to a TCB and farm pond, I have got many good things. Further, I have even received training to understand these kinds of agricultural practices. Although I have not attended the Krishi Vigyan Kendra trainings, I am aware of some LRI techniques. I understand their benefits," he explains.

When asked about his future plans, he says that he wants to get a borewell through the Ganga Kalyan scheme and to adopt scientific methods to monitor and improve the overall agricultural and horticultural practices on his land. He also wants to expand his investment in animal husbandry and through the local panchayat get a cow shed constructed. "I have big plans. I want to set up an organic manure farm with earthworms and add fish to my farm pond. I want to be a model farmer for the agriculture sector and be self-reliant and show the other farmers," says Rame Gowda, looking to the future.

10. Farmer Adopts Fodder Enrichment and Composite Fish Culture for Sustained Farming

Hari is 42 years old, is educated, and works as a medical representative. There are four members in his family, including his father, Parthasharathi. Hari owns four acres of land on which he grows horticulture plants such as mango, chikoo and hebbevu. The annual income that Hari gets from agriculture is Rs 6 lakhs. Hari lives in Harave village, which falls under the Chamarajanagar taluk, Chamarajanagar district.

Despite having land and water, Hari did not have proper green fodder to feed his two cows. He was using the natural grass that was grown on his land to feed the cows. Further, the availability of this grass was very limited and whatever was available was not very useful to the cows. Therefore, he was searching for a better solution to the problem that he was facing.

"I have benefitted greatly from the training. By following the techniques that were taught at the training, I have been able to get more income and that too by using organic and eco-friendly practices. I certainly would like to do more and assist in farm and agriculture related research and practices. It would be great if I can support an integrated farm."



Participation in Training

Hari was a well-informed man and has completed his graduation. He reads newspapers and magazines and follows news on TV. Because he is into agriculture, he follows news related to animal husbandry, agriculture and horticulture. And it is through media that he became aware of the fodder crop festival being organized by the Karnataka Veterinary, Animal and Fisheries Sciences University (KVAFSU), Bidar. Hari's village comes under the Harave sub-watershed and Harave micro-watershed.

The KVAFSU has been organizing several livestock demonstration and extension activities in various watershed villages as part of the Sujala-III project, which is sponsored by the Karnataka Watershed Development Department (KWDP).

The aim of this project is to identify critical gaps in different livestock farming systems and to arrive at solutions that could bridge these gaps and promote quality livestock activities.

It was one such fair that Hari participated in. Motivated by the talk given by Mr. Bharath Raj of KVAFSU, he enrolled for a training programme on fodder enrichment and composite fish culture.

Fodder Plantation and Nursery

After the training, Hari started a fodder nursery on 20 guntas of land. The nursery was set up in September 2017. Currently, the varieties that are planted on his plot of land include COFS 29 (Fodder Jowar), Lucerne, Napier – CO3, Napier – CO4, Sasbania, Gini Grass and G2 Grass. Since planting these varieties, Hari has cut CO-3 thrice and Lucerne grass once.

"My two cows are fed with this. I cannot yet sell fodder because the quantity is not sufficient. Plus, I have planted traditional fodder such as grass and weeds that I use for my livestock. Initially I invested Rs 1500 towards ploughing the field and removing weeds and for manure. I had to also spend Rs 500 as cutting expenses," he says, while describing his attempt at creating a fodder nursery. "The good thing about having a nursery is that you get fodder, seeds and root slips," he adds. In addition to this fodder from his nursery, Hari also gives his cattle boosa (wheat bran), indi and dry fodder sticks.

"Before I adopted this new fodder preparation technique, I would get 7 litres of milk from two cows. Now I get 9 litres. Earlier I made Rs 36,750 per annum and now I make Rs 47,250 per annum. That is, I profit by Rs 10,500, which is very good," he says.

Although farmers under this benefit scheme are encouraged to share seeds and root slips, Hari has not yet been approached by anyone in this regard still. "But many farmers are interested in adopting this new technique because they have seen the success on my plot of land," he explains.

He adds that his future plan is to purchase more livestock, including sheep and goat. According to the KVAFSU team, Hari has been a model farmer, who has replicated recommendations correctly.

Composite Fish Culture

As with the fodder nursery, Hari came to know of composite fish culture techniques through the KVAFSU training. He was interested in this technique as well because he has a pond of dimensions 15X15 m² that was completed in June 2017 by the Agriculture department at no additional cost. In July 2017, around 350 small fish were introduced in the pond, including 200 Katla and 150 Amur fish. The fish are fed indi and rice bran by the farmer. They are also given the provided by the KVAFSU.

During the rainy season, rain water is filled in the pond, whereas during the other seasons, borewell water is pumped into it as and when required. Thus, in this technique, water is retained in the pond throughout the year. And whenever required, water is pumped from the pond to the fields. This is usually done once in two days when water is pumped to the plot of land that grows mango, chikoo, pomegranate, guava and so on. Water is also supplied to the fodder crops from this pond.

"I have invested approximately Rs 500 towards cow dung manure and Rs 200 for lime. The harvest time for the fish is approximately 8 to 9 months. Currently I have not sold any fish. I should be doing so in about a month's time," say Hari.

Enriched Water, Healthy Plants

Around the pond, Hari has grown moringa (drumstick), banana and chikoo. According to him, because he uses water that is enriched by fish, his plants look green and healthy. Further, expenses towards manure have reduced and there is no massive investment towards chemical fertilizers, he says.

"After seeing the improvements in plants with fish water, I believe that I should continue with composite fish culture. A few farmers (50 in number) from nearby villages visited my farm and they were greatly interested in taking this up themselves," explains Hari. With composite fish culture and fodder garden, Hari aims to make his farm an integrated farm where there is an aggregation of agriculture, horticulture and livestock and fish. "I would be very happy to make this a research-oriented farm," he says, speaking his thoughts.

According to the KVAFSU team, Hari is one of the model farmers who participated in the training on establishing fodder nurseries and who was convinced that this technique should be adopted by other farmers in the region. He was keen on following sustainable agricultural practices and has done well.

11. Farmer Thinks Ahead, Adopts Livestock, Horticulture Best Practices

Reddy Basavanagowda (Reddy Chandrashekharagowda) lives in Hallikere village in Davangere district, Harappanahalli taluk. Hallikere comes under the Alaganchikkere, Kanchikere and Shingrihalli



Fodder nursery grown in the field

"With the fodder nursery, my cattle have access to green fodder through the summer, which means that they are eating healthy. This results in more milk production and good income for me. And we don't have to invest anything at all. We just need to apply what we already are aware of, in a more standard and scientific way." sub-watershed and Hallikere-2 micro watershed.

Reddy Basavanagowda's father's name is Murugendrappa. Basavanagowda has studied up to class IX. His family has eight members, including his father, mother, and two sons. Both sons are married and one son has two sons who are going to school. His family's primary occupation is agriculture and the land-holding spans 30 acres. The family also runs an LPG gas agency. The annual household income is Rs 3 lakh. In addition to land and the gas agency, the family also has one cow and a calf.

With varying climatic conditions and disappearing green fodder, Basavanagowda was facing trouble finding good fodder for his cattle. Summer was particularly trying. While discussing these issues with other farmers, he became aware of the support and training offered by the

Karnataka Veterinary, Animal and Fisheries Sciences University (KVAFSU). He got to know that KVAFSU, in association with setting up fodder nurseries, adopting composite fish culture, silage making and so on. The aim of these activities was to improve the quality and outcome of livestock activities through tested best practices.

Using Existing Resources the Best Way

Basavanagowda knew the concept of a fodder nursery before intervention by KVAFSU. In the training by KVAFSU, he learned the standard practices that were to be followed while setting up a fodder nursery. According to the KVAFSU team, Basavanagowda was selected for the training because he was keen to take part and he had the required resources to set up a fodder nursery, which is land and water.

After the training, Basavanagowda used 2 guntas of land to set up a fodder nursery in 2017. He planted Lucerne, Sudan Cherry, COFS-29, African Tall Maize, Cow Peas, Velvet Beans, Hybrid Napier, Gini Grass, G2 Grass and Signal plant. Basavanagowda has not sold any fodder, seeds or root slips to the other farmers so far. He uses whatever he grows for his cow and calf.

"I invested Rs 500 for urea and Rs 300 for weeding. There has been no other investment towards this, which is the best part," says Basavanagowda, adding that a nursery gives you the benefit of fodder, seeds and root slips and improves milk production. He adds that in addition to green fodder, he gives his cattle 15 kg indi (groundnut cake) per month.



Forestry plants growing in the field

"Earlier I used to get 4 litres of milk per day

for 8 months. Now I get 6 litres per day for 10 months. My income was Rs 26,880 earlier. Now it is Rs 50,400," he notes joyfully, adding that he is greatly satisfied with his nursery. With regard to the nursery, his plan is to develop it further and also establish a dairy.

Forest and Horticulture Plantation

In addition to setting up a fodder nursery, Basavanagowda has also taken up the task of creating a horticulture and forest plantation. Following the training given by KVAFSU, Basavanagowda was motivated to also start a plantation on his land. According to him, he had the requisite irrigation support, so he could take this up. Currently, he has planted various species of trees on 5 acres. The selected land is irrigated by using drip and flood irrigation from the borewell. The type of plantation adopted includes bund, block, agro forestry (farm pond border) and intercropping.

Species Planted	Number	Number Survived	Average Height (ft)
Hebbevu	40	30	8
Silver	190	142	3 to 4
Teak	190	85	-

So far, Basavanagowda has not applied any manure. But after planting, the Agriculture department followed up with him and suggested the watering patterns to be followed and the mulching systems to be used. "I am satisfied with the work that the department is doing. That too, I did not have to make any contribution during the implementation. Plus, I also got the benefit of a farm pond under the Krishi Bhagya Yojane," he says. It is however early to expect yield from the horticulture plants, he adds, hoping he would get continued support from the department for his endeavours.

12. Bheemanagowda Gets Bund Plantation for Soil **Conservation Via Sujala**

Bheemanagowda is a resident of Ragimasalavada village in Harappanahalli taluk, Davangere district.

His father is Reddy

Hanumanagowda. Bheemanagowda is 62 years old and has studied till class V. There are four members in his family, including two children, who are also into agriculture. Bheemanagowda's primary occupation is agriculture and the annual income from this is Rs 85,000. Bheemanagowda's land holding spans 1.16 hectares. During the kharif season, Bheemanagowda grows maize on the three acres and as the annual crop, he grows arecanut in the watershed treated areas.

Living in a rain-fed region where farmers have to predominantly depend on rains for water to irrigate crops, Bheemanagowda was not earning any great income that could give his family a better life. Rains were washing away the top soil and causing soil erosion. To add to it, the soil was not retaining any moisture because water was not collecting during rains, resulting in depleting groundwater and slowly drying borewells. Due to depleting soil quality and loss of moisture, whatever little he was planting did give him a good yield.

Sujala Beneficiary

So when Bheemanagowda was selected as a beneficiary under the

"Without proper rains, my crops were dying and I was losing yield and income. We have no other source of water than rain and borewells. Without rains, even the borewells are drying up. It is a difficult scenario. Hopefully with Sujala things will improve."



Decimal Ragimasalawada Latitude 14.590194 14°35'24" N India

DMS

Sujala watershed development programme, he was happy to have found a solution for his woes. Bheemanagowda had heard of the Sujala-III project from the Watershed development department and knew that it offered simple and sustainable solutions for small farmers like him who lived in rainfed regions to improve crop production and in turn their livelihood. He had even attended the training offered by the Krishi Vigyan Kendra and a few other trainings, so he was aware of some best practices in agriculture and cropping patterns and so on.

Bund Plantation with Neem, Teak

First the Sujala team visited Bheemanagowda's land and determined the best solution to be implemented under the scheme based on land structure, slope, soil type and so on. Then the plan was put into action. As per this plan, a bund plantation was made on 1.16 hectares. "My land is irrigated from a borewell. I use drip irrigation because plentiful water supply is not possible in our region. In order to recharge groundwater, to prevent rainwater from running off and to improve moisture, the Sujala officials decided that a bund plantation would be ideal on my land. So we planted teak, silver oak and neem in July 2018," says Bheemanagowda. A total of 40 teak saplings, 10 silver oak saplings and 20 neem saplings were planted.

"Now, 38 teak, 9 silver oak and 18 neem trees have survived. The teak saplings have grown to a height of 2.5 mts, silver oak 1.5 mts and neem 3 mts. I was also advised to apply some manure to aid the growth of these saplings. So I have applied DAP and FYM as instructed. Thankfully, there are no pests so far," explains Bheemanagowda, adding that he has fenced his land as a preventive measure.

According to Bheemanagowda, the Sujala officials returned to visit his land and observe the status of the saplings on his land. "They came back to advise me on how to maintain the plants, what to apply, when to apply, what to do in case of pest attack and so on. They also told me about watering plants in the right manner," he says and adds that he is very satisfied with the work implemented so far. Vouching for the quality of work, he mentions that he had to make a beneficiary contribution of 5 percent (Rs. 297) of the total cost for saplings. "What I have got till now is quite good. I cannot have asked for better help," he says.

As far as the yield goes, it is too early to expect returns, says Bheemanagowda, because we have just planted the saplings. "I believe that the yield will be good in the long run when we cut the trees for timber. Till then, I have to maintain them," he explains. When asked about other benefits obtained from Sujala, he said that he has also made forest and horticulture plantations under Sujala.

Apart from the plantation, there are no other structures on his land. Bheemanagowda is also thankful for the training that he has received from KVK, which explained in detail about Sujala, about agricultural best practices, cropping patterns, watering techniques, soil quality and more. From the partial LRI techniques that he has learned, he has implemented some on his land, such as planting techniques.

When asked about the future, he said that his immediate goal would be to care for the saplings on his land and ensure that they grow to a good height and girth.

13. Sujala Adds a Farm Pond in Chinnappa's Land to Improve Moisture

Chinnappa lives in Kanchikere, Harappanahalli taluk, Davangere district. The son of Siddappa, Chinnappa is a 45-year-old farmer, who has studied till class VII. He manages a family of six, including his children and parents. With agriculture as the primary and main occupation, Chinnappa earns around Rs 65,000 per year from his three-acre land. This income comes from the maize that he grows on the three acres during the kharif season and the coconut trees that he has on two acres.

Chinnappa lives in a rain-fed area so the primary source of water for him to irrigate the crops is rain

"EACH YEAR MY BOREWELL WAS GIVING ME LESS AND LESS WATER. RAINS WERE NOT ENOUGH AND IRREGULAR. THE SOIL WAS DRY AND MY CROPS WERE WITHERING. I WAS AT MY WITS END WHEN SUJALA STEPPED IN. NOW I HAVE SOME HOPE."





and his only borewell. With the rains playing truant and being very irregular these past few years, Chinnappa has had to face a lot of hardship with reduced yield and less and less water in the borewell each year. Further the characteristic feature of watershed regions is rainwater run-off, which means that water does not collect anywhere. While the water runs off, it carries with it all the good top soil and progressively leads to soil erosion, and groundwater and moisture depletion. All this directly affects the crops, which depend on water, moisture and soil quality.

With such problems in consideration, the Sujala-III watershed programme was designed by the Karnataka Watershed Development department to implement solutions that are easy and sustainable for the farmers living in these regions. So agricultural practices and soil and moisture conservation programmes were created and implemented with the main goal of improved crop

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production and improved livelihood through generation of better yield. As part of Sujala, farmers were selected as beneficiaries and the initiatives then implemented.

Sujala Help Via a Farm Pond

Chinnappa was one of the beneficiaries selected under Sujala. "During my training sessions with the Watershed development department, I heard of the Sujala programme. I knew that this would be of great help for farmers like me. I am happy to receive some of the benefits under Sujala and hope to get more out of it," says Chinnappa. Subsequently, the Sujala team visited Chinnappa's land and studied the land structure and soil type to decide on what was the ideal solution for him. "It was decided that I need a farm pond that would ensure water availability for additional months and would improve the moisture content in the soil. So a farm pond of dimensions 21x15x3 mts was made in May 2018. My interest in a farm pond was to ensure that water got stored so that I can use it for irrigation when needed and to recharge my borewell," says Chinnappa.

After the farm pond was created, the Sujala officials visited a couple of times to observe the status of the farm pond and also to advise Chinnappa on how he should maintain the stored water. "I am satisfied with the pond and other guidance given to me by the team. It is useful and good," says Chinnappa, stating that he had to pay beneficiary contribution during project implementation. "But the original plan was implemented without modifications, which is good," he adds.

Positive Change in Moisture

Ever since the pond was set up and water started collecting in it, Chinnappa has started seeing significant improvement in the moisture content in the soil. "Some water has already collected in the pond, say 40 percent water. If it stays like this, I will have water supply for irrigation for four additional months," explains Chinnappa.

In addition to a farm pond, Chinnappa has had the benefit of attending the training given by the Krishi Vigyan Kendra about best practices in agriculture cropping patterns, soil quality, manure and fertilizer application and so on. He has implemented some of the LRI techniques taught in the KVK training on his land. He has also undergone the income generation activity training under the self-help group initiative.

"For now I have only the farm pond structure under Sujala, which I will maintain and use. But I would be happy and grateful to get support for horticulture and forestry plantations in the days to come. That way, I can think of some long-term income for my family," Chinnappa states with hope.

14. Maheshwarappa Gets Plantation Benefits and TCB from Sujala

B N Maheshwarappa is a resident of Ragimasalavada village in Harappanahalli taluk, Davangere district. His father is B P Nagappa. Maheshwarappa is 50 years old, and has studied up to class X. There are five members in his family, including his wife and children. The family is mainly into agriculture and small-scale business. Maheshwarappa owns four hectares of land, which is irrigated via a borewell. Along with agriculture, Maheshwarappa trades in food grains. The annual income from these sources of livelihood is around Rs 2 lakh.

Maheshwarappa who grows maize on two hectares and ragi on two hectares as kharif crops was facing a drier and drier land due to reducing moisture and soil erosion and rainwater run-off. This dry land situation was having an impact on the crop yield and it was becoming difficult for Maheshwarappa to make ends meet with the yield that he was getting.

While looking for alternatives that would help improve crop yield and not turn out to be expensive, he started interacting with officials of the Watershed development department. That is when he heard about Sujala. A programme designed by the Karnataka Watershed Development department, Sujala-III is a scheme that aims to improve the livelihood of small and medium farmers who live in watershed and rainfed regions in the state.

The key operational style of Sujala is to introduce sustainable agricultural practices and set up structures that can help get better crop yields at very marginal to no cost.

Sujala Information in Training

Maheshwarappa was regularly attending trainings given by the various departments seeking more information about improving crop yield. This is how he got to know more about Sujala. He was motivated to adopt the Sujala scheme, based on



"Even though I have a borewell, with erratic rainfall and water run-off, the groundwater levels started coming down. The soil was getting drier and all the good top soil was being washed away. I was not making much income from what I was growing. Hopefully, with Sujala intervention, things will

the information shared during the trainings received from Krishi Vigyan Kendra, District Agricultural Training Centre (DATC), and Integrated Farming System (IFC).

"The Sujala team convinced me that I could earn a better livelihood if I implemented their suggestions. They told me that it would help improve the quality of soil and retention of moisture and water, which would result in better crops. At that time, I did know of any other form of intervention, so I was ready to implement these suggestions," he says.

Following the information, he decided to implement horticulture plantation on four hectares of land. "My land has irrigation supply and water is supplied via flood irrigation. I have a borewell from which water is supplied. Under the horticulture plantation of Sujala, I have planted 180 mango, 220 sapota, and 40 lime saplings. The saplings were planted in July 2018 in a block plantation setup," he explains.

"Today, 172 mango, 198 sapota and 36 lime saplings have survived. The mango saplings have an average height of 1.1 mts, sapota an average height of 0.75 mts, and lime an average height of 0.60 mts. I did apply some manure to boost their growth," he explains, adding that he applied 10 grams of DAP and FYM for one plant, and implemented mulching. So far, I have not faced trouble from pests and other diseases, he says. After planting the saplings, the department officials followed up and gave suggestions and advice on what needs to be done for plant maintenance. "I am satisfied with the work implemented on my land. It is good. I had to make a nominal contribution in cash but that was not much," Maheshwarappa adds.

Long-Term Proposition

When asked whether the plantation has yielded any income, Maheshwarappa said that it was too early to get yield. "All the saplings that I have planted will take time to grow and start fruiting. So, I am looking at income in a few years from now. For now, I am required to only to take care of the plants and boost their growth, he says, calling it a long-term project. "But I am hopeful of some profits and income," he adds.

Under Sujala, Maheshwarappa has received support for setting up a forest plantation with teak and silver oak saplings, horticulture plantation, and a trench-cum-bund. "There are no other structures on my land. Not from Sujala or from any other beneficial schemes. What I have received till date is quite good. The TCB will take care of moisture and water retention. I don't need anything for some time. I will focus on taking care of what I have received," says.

"In addition to support on field, I also received training that has given me knowledge on how I should take care of these saplings and on what some of the best agricultural practices are. During the KVK training, I not only received information about Sujala initiatives, but also about LRI techniques, planting methods, mulching and other agricultural best practices for optimum yield and income. These learnings have indeed helped expand my knowledge and my plan for the future is, therefore, to leverage this knowledge and ensure good cropping," he explains.

15. Farmers Adopts Trench-Cum-Bund Method for Farm Land

Shankaralingaswamy owns 2.36 hectares of land in Yadehallisevanagar, Harappanahalli taluk, Davangere district. His primary occupation is agriculture and he earns an annual income of Rs 1.25

lakh. Shankaralingaswamy is 65 years old and he has studied up to class 4. His family includes his father (Somasundar), his mother, and his two sons and two daughters, who are all married.

His land comes under the Alaganchikkere microwatershed and Shankaralingaswamy grows maize and onion during the kharif season, groundnut during the rabi season, jowar during summer and sugarcane as the annual crop on the land. Over the years, he started facing soil erosion during the rainy season and low moisture retention after the rains. That is when he started looking for solutions to retain moisture and avoid soil erosion on his land. And when he heard of the trainings given by the Watershed Development department through publicity events by the department and through the Raitha Samparka Kendra, he decided to enroll in these trainings and get help.

Steps to Conserve Moisture

Following the trainings conducted by the Agriculture department under the Sujala-III project, Shankaralingaswamy was motivated to adopt the methods suggested by the department because he was facing similar problems as enlisted in the training. So he followed the recommendations given by the department and took the scientific help that was provided. "I am very satisfied with the work that has been implemented. After excavating the trench-cum bunds (TCB), the department also followed up, which is a good thing," says Shankaralingaswamy, adding that he did not have to contribute anything for getting the department's help.

"With the trench-cum-bund, I hope that my harvest will be better this year. I hope the soil quality will be better too. I am happy with the trainings and the methods implemented on my field. It has certainly been helpful. "



Trench-cum-bund (TCB) excavated on Shankaralingaswamy land



Jowar crop
The department, based on a plan drawn after prior assessment, excavated trench-cum-bunds (TCBs) on Shankaralingaswamy's land four months ago to prevent fertile soil and water from running off the land. This resulted in soil erosion control and moisture conservation during the primary rains that were received in the district. According to Shankaralingaswamy, the TCBs have brought about significant improvement in moisture presence on his land due to which he is expecting a 10 per cent increase in the current jowar harvest.

Under the Sujala-III project, several techniques and structures are implemented for soil erosion control and moisture conservation. In Shankaralingaswamy's case, a TCB was made and a farm pond made under the Krishi Bhagya Yojane.

Shankaralingaswamy has two borewells on his land. During rainy season, he used rain water and for the remaining seasons, he used borewell water. "Now with the TCB, I hope to rain water for one more month, instead of borewell water. Thus, I will have at least six months of rain water and six months of borewell water," Shankaralingaswamy says. In addition to these benefits, the farmer hopes that he could get some support for horticulture activities on his land. His future plan is to take up activities that would help improve the groundwater content on his land.

16. Kabalayakatti Pond and Borewells Get Renewed Life Under Sujala

Kabalayakatti village in Gadag district has a population of 854 with 129 families. The main occupation of the people in this village is agriculture and agricultural labour. The average annual income in this village is Rs 20,000 per household.

The village falls within a rain-fed, watershed region and it is largely dependent on rains for water. The total cultivated land area in the village is 878 hectares and the farmers grow maize, groundnut, foxtail millet, green gram, cotton, jowar and other vegetables on this land. As kharif crops, green gram, maize and groundnut are grown; as rabi crops, jowar and foxtail millet are grown; the annual crop is cotton.

Idea of a Pond

With the high dependence on rain, it was difficult for the farmers here to achieve optimal yield on their crops, which resulted in variable and very minimal income. So, it was decided that a farm pond would be ideal to make water available to the village and to enable better crop productivity. The village has a farm pond that dried up due to water not filling up. The Kabalayakatti pond is 30x30 mts in dimension and all it needed was desilting and rejuvenation.

Subsequently, this same pond, which comes under the Dindoora sub-watershed in Gadag taluk, was adopted by the Watershed development department as part of its Praveshadwara activities (entry activity point under the watershed project) and the Sujala scheme, for desilting and rejuvenation for community use. The opinions of the farmers and residents of the nearby villages were sought and a consensus arrived at before starting the rejuvenation activity. The Sujala scheme was jointly initiated in Gadag district in 2013-14 by the district and taluk watershed department and projects related to agriculture, horticulture, forestry plantations and animal husbandry were implemented under it.

Canals Cleaned for Easier Flow



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As part of the desilting work, the canals around the Kabalayakatti pond that were collecting water from elsewhere and feeding into the pond were cleaned and water now flows freely into the pond. After the Kabalayakatti pond was desilted and readied, the department officials visited the site again to monitor the progress and success of the project. According to the villagers, the project was implemented well, and has been useful for them. They said that they were satisfied with the work and its quality. They were also happy that they did not have to make any contribution towards the project. According to the officials, there has not been any deviation from the original plan.

With the pond ready and usable, the community has reaped multiple benefits, including increased groundwater, decreased soil erosion, and increased soil moisture. The water that has collected till now is currently being used as drinking water for cattle, sheep and goat by the villagers, and for daily use.

Improved Moisture After Revival of Pond

After project implementation, people have noticed improved moisture content and better groundwater levels. They say that water is now more regularly available in the pond and it is available for six months and more. It is used for drinking purposes and for animals and crops.

Following the pond's rejuvenation, the borewells that are in the village panchayat limits too have been revived and they now provide water for the village. There are three borewells in the village, which supply potable water to its residents. The villagers are very happy with the Sujala scheme, which has revived their pond and borewells.

In addition to the community pond, as part of the Sujala scheme, farmers have got support for soil and moisture conservation activities, forest plantation, income generation activities, farm ponds, bunding, check dam, horticulture plantation, forestry plantation, animal husbandry activities and more.

17. Ishwar Gets a Bund to Prevent Water Run-Off as Part of Sujala

Ishwar Neelappa Pujar hails from Nabbapur village in Gadag district. He is 60 years old and has studied up to class VI. His father Ishwar was, like him, a farmer. Ishwar Neelappa's household consists of his parents and one son, who is helping out with the farming.

For generations, the family has been dependent on agriculture to feed them. With a land holding of 17 acres, the family has been generating an annual income of approximately Rs 30,000 by growing maize and groundnut during the kharif and summer seasons.

With climate change and uncertain and decreasing rainfall, Ishwar Neelappa started to feel the pressure of income generation and finding success and profit in his occupation. "Earlier, we would get seasonal rains and we could manage with the water. But now, summer months are extremely difficult

"I HOPE THAT THE MANGO PLANTATION AND BUND WILL RESULT IN GOOD CROPS AND PRODUCTION, AND GENERATE GOOD INCOME. I SEE SMALL IMPROVEMENTS AND I AM HOPE OF A GOOD FUTURE." and with groundwater levels low and lack of regular rainfall, earning good income through agriculture has become a difficult task. Further, because there is nothing to stop water run-off, there is no chance of retaining water or recharging groundwater," says Ishwar Neelappa.

To help farmers like Ishwar Neelappa, the

Karnataka Watershed Development department launched Sujala-III, the watershed development project that aims to improve crop productivity and the livelihood of small and medium farmers in rain-fed areas. Like his counterparts in his own village and in others, Ishwar Neelappa too thought that this was good support to leverage and so he contacted the watershed department officials from whom he had heard of Sujala and set the process in motion.

Horticulture Plantation

MANGO PLANTATION PROCESS



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After a brief survey of the land and study on the best solution, it was decided that horticulture plantation would be the most suitable answer for quality production and greater income. "My land is irrigated and I draw water from a borewell, and I use sprinkler irrigation. After Sujala, we planted 100 mango saplings over three acres in October 2017, and the type of plantation was block," explains Ishwar Neelappa.

As of date, 80 saplings have survived and attained a height of 1.5 m. "I have just been doing basic and primary maintenance so far. I have not applied any manure nor have seen any pest attack till now. No precautions were implemented too," says Ishwar Neelappa, adding that the officials came back for a follow-up, and that he does get guidance when required. "I am satisfied with what they have done. Given that I did not give a penny, I cannot complain," he adds.

Sujala Benefits

While anticipating the future gains that his mango plantation would bring, Ishwar Neelappa lists the overall benefit that he received from Sujala, which includes a bund and forestry plantation on bund to improve soil fertility and prevent erosion, and crop demonstration. He adds that there are no other projects or structures on his land apart from those under Sujala and that he does not foresee any additional support requirement from his side. "I hope the bund will make water available for a longer time and the plantation will give me my due income," he says.

Ishwar Neelappa has also attended the training offered by the Krishi Vigyan Kendra and is aware of LRI techniques, including cropping techniques, fertilizer and micro-nutrient application, agriculture practices, types of crops and their maintenance and soil and moisture conservation. In fact, he has partially adopted them on his land. "We did the bunding and horticulture plantation as per the LRI techniques described," he explains.

When asked about his future plans, he says that he wants to increase the mango and other horticulture plantations and earn better income.

18. Sujala Bund and Pond Help Farmer See Better Soil and Moisture on Land

Manappa Singappa Nayak lives in Nabbapur village in Gadag district. His father's name is Singappa. Manappa is 63 years old and has studied up to class IV. His family has seven members and comprises his wife, children and grandchildren.

Manappa's main occupation is agriculture and animal husbandry. The annual income is Rs 20,000, which is generated from his land of 1.92 acres on which he grows maize as the kharif crop.

Living in a rain-fed and dry region, Manappa had to depend largely on optimal rains for his income and to feed his two cows. But times had changed since the time Manappa started working as a farmer with his father. The rains had become irregular, groundwater levels had reduced, soil was eroding and drying, and soil moisture was reducing. The changing times had changed the cropping patterns

and also the yield that he was getting. And given that he was living in a dry region, he could not imagine growing anything else as well.

With all these thoughts in mind and with a view to learn some techniques that could help him improve yield on his land and enable access to water, Manappa started attending some of interaction sessions organized by the Watershed departments. This is where he heard about the Sujala-III scheme.

According to the officials, Sujala-III was meant for small and medium farmers like Manappa who live in rain-fed and watershed regions and it aimed to help these farmers introduce sustainable soil and moisture conservation activities and structures on their land to enable better soil quality and moisture



"It was so difficult without water. Our livelihood depends on it in addition to daily needs. With the farm pond and bund, we have access to some water at least. Further, the plantations, if I maintain well, will get me some income in the future. That is some improvement from my earlier life.

content. It also aimed to introduce farmers to simple and sustainable agricultural practices using which the farmers could try and improve the yield on their land and thus their income. As part of this, Sujala provided assistance with setting up bunds and ponds, forest plantations and horticulture plantations.

After being chosen as a Sujala beneficiary, the Sujala team visited Manappa's land and determined the requirements and the solutions that would be ideal, based on the land and soil type. The team decided that Manappa would benefit greatly from soil and moisture conservation structures such as a trench cum bund and a farm pond, which would provide access to water. Subsequently, a TCB around the 1.92 hectares of land and a farm pond spanning 21x21 mts were made. A forestry plantation was also created with teak saplings as a long-term income generation plan.

In Search of Better Crop Yield

"For a long time, I have been finding it difficult to supply water for my crops. I had to fetch water from a distance and I had to depend on public taps and private borewells. There was hardly any water for my cattle too. I was trying hard to make ends meet and with Sujala help, I hope circumstances will change for the better. With the bund, I hope the soil erosion will reduce. The farm pond, I believe, will not only provide water for my cattle, but also improve moisture in the soil around the pond," explains Manappa. Manappa, however, has not undergone any training.

"After the structures were implemented, the Sujala officials paid a visit to check on the progress and quality of the structures implemented. Some monitoring was done and they also advised me on what I should do as part of maintenance. I am glad they showed me some way. I sincerely hope that it would change things for the better for me. I am satisfied with what I have got and the quality of it. And the best fact is that I did not have to pay anything for all this," he says, adding that there has been no deviation in the work executed from the original plan.

With the SMC activity, Manappa says that groundwater levels are showing improvement and so has the moisture content in the soil. "The bund has helped contain water within the land and this has reduced soil erosion. After SMC was implemented, soil moisture has certainly improved. Water is also available in his farm pond. Now water is available for 15 days and more, and I use it for my cattle," he says. Apart from the Sujala schemes, Manappa has not received support from any other schemes.

In the future, Manappa wants to grow more horticulture plants if water is available in the farm pond.

19. Noorappa Prepares for Future with Sujala Help

Noorappa Pujar hails from the Nabbapur village in Gadag district. Following his father Eshwarappa's footsteps, Noorappa took to agriculture at a very young age, after completing education up to class V.

Noorappa is 53 years old today and he continues to till the six acres of land that they own in Nabbapur and harvest crops each year. His family consists of six members, including two children and parents. One of his children is studying and the other one is into agriculture, helping his father out.

With agriculture being the primary and main source of income for this family, Noorappa works hard at ensuring that he gets the best of what he plants. Every year, he grows cotton, maize and tomato. While cotton is an annual crop spanning three acres, he grows tomato during the summer and maize on two acres during the kharif season. With this, his annual income is Rs 40,000.

But since the time he started, till now, Noorappa has been seeing gradual changes in rainfall patterns, climate change, reducing moisture and water and reduced crop quality. This spelt bad times for him because his income depended on getting good crops. Worried about the future, he listened to what the Karnataka Watershed Development department had to say and decided to take up plantation on three acres of his land, hoping for a better income in the future.

Sustainable Solutions

"I couldn't go on like before. I had to seek help and find solutions. The world has advanced so much in science and technology. I felt that someone would surely know how to reduce the impact of such changes. I heard of the Sujala-III programme through the Agriculture department. I am glad that the Sujala project



uses a very simple technique for improving our lives," says Noorappa. The goal of Sujala-III is to introduce sustainable improvements in productivity and the livelihoods of small farmers living in rain-fed areas such as Gadag, Koppal, Bidar and others.

Noorappa's lands are irrigated and he has opted to use sprinkler irrigation to water them. He has a borewell from which he draws water for this purpose. "But with climate change and groundwater depletion, borewell water availability is not certain always. So it is good to find solutions early on," explains Noorappa, who has taken part in the training on cropping techniques, fertilizer and micronutrient application and types of crops and their maintenance conducted by the Krishi Vigyan Kendra.

After determining the best option for his land, Noorappa was asked to opt for block plantation. Based on this, he planted 100 mango trees, 50 sapota trees, and 50 lime trees in October 2017. At present, 80 mango, 40 sapota and 40 lime trees have survived, each having grown to a height of one metre. "I haven't applied any manure so far nor any pesticides. There has been no attack up till now. But we will have to watch out," he says. "The department officials too have been giving me guidance on how I should maintain them and what I should do when," he adds.

Awaiting Results

Noorappa is happy with the support he has received thus far from the officials and the department. "I got what I got without contributing anything," he says. With only a year having passed from planting the saplings, there has been no yield or income from these plants.

Noorappa also received help to create a trench-cum-bund and a farm pond to collect water for his land. "I was told that this is to prevent water run-off and soil erosion. It is supposed to help soil and moisture conservation along with water collection," he explains. With the TCB and other related soil and moisture conservation initiatives, the water yield in his borewell is showing steady signs of increase already.

"Although I have been instructed clearly and am giving guidance when required, I would like to get continued support from the department and its officials. In future, I want to install drip irrigation and possibly expand what I am doing," hopes Noorappa.

20. Surappa Gets a Check Dam and Bund Thanks to Sujala

Surappa Muniyappa Naik lives in Kabalayatkatti village in Gadag district. He is a farmer in this village, having taken the mantle from his father, Muniyappa. He is 45 years old and has studied up to class



VIII. His household comprises six members, including two children, his wife and parents.

With agriculture being the primary source of income, Surappa earns an income of Rs 30,000 per year from the 1.4 hectare of land that he owns. Each year, he grows maize during the kharif season. Being in a place that is rain-fed, Surappa had to face the impact of run-off water and soil erosion.

"We have a stream on my land, which takes away the rich top soil during rains. I could make out the depleting quality of soil from my harvest. Quality and quantity were steadily coming down due to these factors. And because rainwater was not collecting, groundwater was not being recharged and water availability in borewells and wells was reducing too. I had to look for solutions," explains Surappa.

Check Dam (CD)

Having heard of Sujala through the Watershed department, Surappa took the department's help in getting a bund and a CD set up on his farm land in December 2017. The CD is 26 m wide and 1.5 m high, whereas the bund runs along the 1.4 hectare. The idea is to improve groundwater recharge in the nearby areas and storage of excess rainwater. "I heard from the Watershed Department staff that this is very beneficial. So I

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readily agreed to have it set up on my land. What do I have to lose when I don't have to pay anything? The officials came and developed a plan according to what the most suitable thing for me. Then, based on this plan, they implemented the tasks. I am very happy with what has been done so far," he says, adding that the follow-up after implementation has also been good.

Speaking of the benefits that he foresees with Sujala, Surappa says that he can already see the soil quality and moisture content improving. "The bund ensures that the water doesn't run off. This



contributes, in turn, to groundwater recharge and moisture in the soil. Further, the top soil is retained too," he says.

Additional Water and Moisture

"With the check dam in place, rainwater has started collecting in it. This means that additional water will be available for me to use for my crops and moisture in the soil too. Although it is too early to start using it yet," he adds. Surappa does not have any other structure on his land that was set up via Sujala apart from the bund and CD.

Stating that he does not require any additional support, Surappa mentions that he had undergone the training conducted by the Krishi Vigyan Kendra in which he was taught about types of crops and their maintenance, fertilizer and micro-nutrient application, cropping techniques, agriculture practices, importance of soil and water conservation and more. He also added that he was partially aware of the LRI techniques and had implemented them partially on his land.

When asked about his future plans, he says that he has not thought about it in the newer context. "I would definitely want to find a better livelihood and income," he says.

21. Horticulture Crops for Basavantrao to Get Better Income Under Sujala

Basavantrao Narasappa lives in Dotikola village in Chincholi taluk, Gulbarga district. He is the son of Narasappa. Basavantrao is 50 years old and has studied up to class V. His family consists of 10 members, including parents, children, brothers and their children. Basavantrao's primary and main occupation is agriculture and his annual income from agriculture is Rs 2.5 lakh.

Basavantrao owns 5.86 hectares of land and grows toor, green gram, brinjal and chilli. During the

kharif season, he grows toor and green gram on 3 ha and 1 ha, respectively. During summer, he grows chilli and brinjal on one hectare of land. He supplies water to the horticulture plants from his own borewell. However, the water yield from his borewell does not meet the needs of all the planted areas.

In the past few years, Basavantrao has been seeing a drier land due to irregular rainfall and rainwater run-off. Soil was eroding, moisture was less and crops were drying up faster than was usual. His income was getting hit and he was at a loss as to what he should do to improve things. While attending some training and interactive sessions with the Watershed development department, he heard about Sujala-III, the watershed development programme of the Karnataka Watershed Development department.

Farmer Beneficiaries

Sujala was designed keeping in mind the small farmers living in watershed regions who were facing issues related to soil quality, moisture and yield. It includes sustainable initiatives that aim to improve crop production, soil quality and soil moisture content, and



"With the help of Sujala, the soil quality has improved and because soil moisture has also improved, my crops are doing better. I also got to plant guava saplings, which will give me better income during the yield months. I did not have to invest much to receive these benefits, so I am very happy and grateful."

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groundwater recharge. Under this scheme, farmer beneficiaries were selected and a team assisted the farmers in implementing simple, sustainable agricultural practices that would enable these farmers to conserve soil and moisture on their land.

Similarly, Basavantrao was selected as a beneficiary and to enable soil and moisture conservation on his land, the Sujala team inspected his land and determined that Basavantrao's land was suitable for planting horticulture crops.

"I was very convinced about adopting the Sujala schemes based on the information given by the Agriculture department. I heard that it does not cost much but that it can lead to greater yield and income. Sujala also introduced me to inter-cropping techniques, which would lead to diversity of crops. Further, I got access to good quality saplings. All this is very convincing and gave me hope to adopt the Sujala initiatives," says Basavantrao, adding that his land was assessed and the soil quality and type studied under what is called a Land Resource Inventory (LRI).

Subsequently, horticulture plantation was taken up on 1.60 ha of his land. His land is irrigated and flood irrigation is implemented with supply from a borewell. "Given the water supply setup and my soil type, it was decided that I should plant guava saplings. So I planted around 500 guava saplings in July 2017 in a block plantation setup. Today, 445 plants have survived and have grown to a height of 2 to 3 mts. Of course, I had to apply manure, which I did. But I have not had to spray any pesticide. I have not had any attacks so far. The fruits are at growing stage, with each tree having around 200 to 250 fruits, which are good yields. They are not harvested yet because they are still unripe," explains Basavantrao.

Simple Horticulture Plantation

"After the plantation was complete, the Sujala team kept in touch with me through phone and also made a spot visit to assess the health of the plants. They explained in detail about application of manure and how to tackle pests when they occur. They also told me about yield and maintenance," he says and adds that he is happy with the work and that the quality of implementation was good.

"The good thing is that I did not have to contribute anything for this. Also, given that the whole setup is so simple, I can maintain it without too much investment," says Basavantrao happily. In addition to the block plantation, Basavantrao also received the benefit for soil and moisture conservation. Apart from these, there are no other structures related to Sujala on his land or any other schemes implemented.

Although he is glad and happy with the initiatives implemented thus far, Basavantrao requests additional support to set up sprinkler irrigation. "I am grateful to Sujala for the help on my land. They gave me good training, taught me how to conserve soil, water and moisture and enabled horticulture crops on the land. I was also given the Krishi Vigyan Kendra training, which details agricultural best practices, manure and fertilizer application and cropping patterns and more.

The KVK training also gave me information about what type of crops can be grown on what type of soil," explains Basavantrao, adding that after this training, he became aware of LRI techniques and implemented some on his land as well. "As per the LRI method, I can take up horticulture plantation, which is what I have done on my land."

"My future plan is to maintain the existing crops. I want to grow them properly and earn a good income. I want to publicize more about horticultural activities and provide information. I would like to know more about these activities via the Watershed Development Department and make sure that I am taking the right actions in conserving the plants," says Basavantrao.

22. A Sujala-Rejuvenated Gokatte Brings Water to Two Villages

Dotikola and Moga are two small villages in Chincholi taluk, Gulbarga district. Dotikola has a



population of 1500 and Moga has a population of 2500. Both these villages are dependent largely on rains for water, with no other perennial source. Therefore, there was a dire need for some structure to collect and store water that could be used all year long.

The Karnataka Watershed Development department observed this need and under its flagship initiative, the Sujala watershed development programme, decided to create a community pond or a gokatte where water could collect for perennial use of the nearby villages.

Located two kilometres from the villages, between Dotikola and Moga, this gokatte is created on 30 acres of land owned by the state government and its dimensions are 36x36x2 metres. The community pond aims to reduce soil erosion in the nearby areas due to rainwater runoff, to enable moisture conservation, to provide access to drinking water for domestic animals such as cattle, sheep, goat and others. For years, there has been no source of water for these animals. This would be the first community pond in the area.

After the location was selected, the *gokatte* rejuvenation project was implemented based on a Detail Project Report and a Land Resources Inventory that were created in May 2017 by the Agriculture University and the Karnataka Watershed Development department. No deviations were made from the original plan while the project was implemented. No contributions were sought from the locals towards the project.

Multipurpose Community Pond

According to the villagers and officials of the Sujala team, there was a need for a community pond where water could be commonly accessible to everyone. It was made so that people could use it for cattle, for crops and other purposes, particularly in summer. The other reason for the *gokatte* to be created was to use the water to deliver pesticide and insecticide sprays for the urad, toor, and green gram crops that are cultivated in the nearby villages.

After the community pond was created, officials from the Sujala team came by and checked on the work to determine if any additional support was required to maintain the community pond. A site visit was done and it was noted that work has been done to satisfaction with good quality work.

Today, the *gokatte* has water that lasts up to 300 days, which would be around 90 percent. This water is being used by residents of both villages and as drinking water for nearly 200 cattle and 600 goat/sheep. It is also being used to deliver pesticide and disinfectants to toor dal and other crops in both villages, apart from general usage by the villagers for bathing and washing clothes.

23. Ibrahim Adopts Sujala Schemes for Soil, Moisture Conservation

Ibrahim Saab lives in Mogha village, Chincholi taluk, Gulbarga district. His father is Abdul Ahmed Saab. Ibrahim is 55 years old and has studied up to class X. His family consists of nine members, including his parents, children, grandchildren and sister. Ibrahim's main occupation is driving. In addition to driving, he is also into agriculture and dairy farming. His annual income is Rs 80,000 from all these sources, with Rs 30,000 earned from driving, Rs 30,000 earned from agriculture and the rest from animal husbandry.

Ibrahim owns 2.84 ha of land and he grows toor, urad and green gram dal during the kharif season. He grows these crops by using the intercropping method.

THE AGRICULTURE DEPARTMENT MOTIVATED US WITH GOOD INFORMATION TO ADOPT SUJALA SCHEMES. I THOUGH T THAT I HAD NO CHANCE AT INCREASING INCOME. BUT WITH SUJALA, I HAVE SOME HOPE. THINGS HAVE ALREADY STARTED LOOKING UP. Mogha is a village with agricultural lands that are predominantly rain-fed. So farmers in this village face the same problem that a watershed and rain-fed village would encounter: rain-water run-off, soil erosion, moisture depletion, withering crops and more. Ibrahim too faced these difficulties, along with the resulting income and yield reduction. Erratic rainfall was making adequate water supply difficult and lack of water was affecting crop and yield.

To help farmers like Ibrahim handle agricultural hurdles, the Agriculture department would organize help sessions and training during which solutions for such hurdles would be discussed. During one such interaction session, Ibrahim got to know about the Sujala-III programme that the Karnataka Watershed Development department had designed to tackle problems related to watershed areas. Sujala-III includes activities and structures that are implemented on agricultural lands that, in turn, are expected to help reduce the impact on yield and income. These activities are designed to be sustainable and low cost initiatives that can be easily implemented and maintained by farmers without external assistance.

Motivated to Adopt Sujala Through Information Sharing

Ibrahim was selected to be a beneficiary under Sujala and after an inspection of his land, initiatives that best suited the land type, soil type, resources available and Ibrahim's expectations were implemented. For Ibrahim, a soil and moisture conservation structure such as a bund spanning 3.50 RMT, a farm pond of dimensions 21x21x3 mts and a waste weir of 2 mts dimension were created in August 2017.

"The department gave us enough information to be motivated to adopt the Sujala initiatives. They clearly explained how the Sujala schemes could help improve soil quality and moisture content, prevent soil erosion, enable groundwater recharge and improve water availability during summer. The schemes seemed very easy to implement and it seemed possible to improve yield via simple interventions. This was what motivated me to adopt the Sujala initiatives on my land," says Ibrahim.

"I was told that rainwater run-off will be prevented and because it will stay and collect somewhere, it would help in water supply for people, livestock and cattle and the fields. This would then be a good initiative, wouldn't it," asks Ibrahim. After implementing the above mentioned structures, the Sujala team did a site visit again to check on progress, says Ibrahim, adding that since the quality of work implemented was good, things were moving as planned. "It depends on rain now and time," he adds.

Ibrahim states that he did not have to make any beneficiary contribution and that the original plan was implemented as is. "I have received benefits without having to pay any money," he says



happily.

From the time that the Sujala initiative was implemented, Ibrahim has seen significant improvement in soil quality, moisture content and water retention. "Things started looking up after these structures like bund and farm pond were created on my land. I have some water in the farm pond and I can see significant improvement in moisture in the soil too. Water sufficient to cover eight months has collected in the farm pond, which is about 80 percent more," says Ibrahim. The water from farm pond is used for horticulture and forestry plantation.

Training on Agri Practices

In addition to the initiatives for soil and moisture conservation, Ibrahim received training that educated him about some of the agricultural best practices that exist, cropping techniques, how to determine soil type and quality and other related topics. "I took part in

the Krishi Vigyan Kendra training offered by the Watershed development department. I learned a lot about my land, what could be grown on it, the advantages and disadvantages and more. It was very useful," explains Ibrahim, adding that he has implemented the LRI techniques that he partially learned about on his land.

Stating that there are no other structures on his land via any other scheme, he says that the only ones are via Sujala. "I have partially implemented the LRI techniques on my land such as a bund, waste weir and a few cropping techniques. But I hope I can get some additional support to set up a pump and some pipes so that irrigation can be taken care of," says Ibrahim hopefully, thinking about the future.

"In future, I want to make use of the water in the farm pond and work towards generating more yields from my crops. I also want to maintain the bund. During summer, I want to grow horticulture crops and generate income through them. I want to also ensure that water can be supplied four cross breed cattle to the farm pond," he explains.

24. Check Dam and Trench on Nirmalabai's Land Under Sujala

Nirmalabai is a resident of Dotikola village in Chincholi taluk, Gulbarga district. Her husband is Vittalrao Kulkarni. She is 50 years old and has studied till class X. Her family consists of five members, including three children. Nirmalabai's family has been into agriculture always. They own

5.99 hectares of land in Dotikola. Nirmalabai's family generates an annual income of Rs 2 lakh via agriculture activity.

Nirmalabai and her family live in an area that falls in a watershed and rainfed region where water does not collect easily. In most sloped regions, rainwater runs off, taking with it the loose top soil and causing soil erosion. Since water does not collect, groundwater is not recharged and thus borewells and wells progressively get dry, making irrigation of crops difficult. All this leads to a reduction in income and this was a common problem for all farmers in the region.

With this thought in mind Nirmalabai and her family agreed to implement the schemes for soil and moisture conservation under Sujala-III, the watershed development initiative of the Karnataka Watershed Development department. Sujala-III includes simple and sustainable agricultural best practices that are aimed at improving the quality of soil, improving moisture, and improving crop production. It includes activities that could help farmers generate better income with the resources that they already have.



Useful Schemes

When Nirmalabai heard about Sujala from the Watershed development department and got to know of the benefits it could offer, she readily agreed to adopt the schemes. The Sujala team first came and inspected the land to study the land structure and soil and such, and to decide on the best possible solution. Then they said that it would be ideal to have a check dam constructed and to have a trench-cum-bund and a waste weir. "The reason we agreed is because it is part of the Detailed Project Report, which is prepared by the department in association with the partner's PR plan. A check dam would certainly be helpful in collecting water for the villagers' and farmers' benefit. It would also result in borewell and groundwater recharge. Also, the team told us that it was possible to make a forest out of land that is barren or not suitable for agriculture. All this motivated us to say yes," says Nirmalabai.

Subsequently, a check dam of dimensions 18x1.35 mts was made in October 2017, along with a trench spanning 3.50 RMT. The waste weir was made to be 2 mts in size. "The goal of the Sujala

programme is to enable water supply to farmers in livestock maintained by the farm pond is used to such as jowar. This water is forestry and horticulture implemented under Sujala. water available to farmers Nirmalabai, adding that untillable land that they forestry and to conserve

"Thanks to Sujala, we are getting to use some of the barren we had. We are also getting water, which can be used for various purposes, through the check dam. With water, we can grow some trees, crops and feed our cattle. Villagers too can use the water." adequate and required the region and to the farmers. Water from the irrigate agriculture crops also used to irrigate the plants, which are The check dam will make during summer," explains some of the barren and owned could be used for the environment.

Following construction of the check dam, trench and weir, officials of the Agriculture department and the Sujala team returned to check on the status of these structures. "The officials came back to do a field visit. They checked on water collection in the dam, soil quality improvement and moisture collection in the soil following trench construction," says Nirmalabai. She says that the family is happy with the work by the Sujala team and the quality of work. She vouches that there has not been any deviation from the original plan.

Benefits Thereafter

When asked to list the benefits they received under Sujala, Nirmalabai says that soil erosion has reduced. With moisture improvement, crop production has become better. Some forestation has also been tried. "We have tried to green the land we hold. Now with the check dam, some water has collected, which can be used later. I would say that water worth one year's supply has collected in the check dam, say around 80 percent. Water from this check dam is being used for washing clothes, for drinking purposes so on. In addition to the check dam, we have a trench and waste weir, which are helping improve moisture and soil quality," explains Nirmalabai, adding that they also received training on best agriculture practices. "We also took part in the training offered by the

Krishi Vigyan Kendra about crop production, land and soil type and structure, crop maintenance and more. It was very useful. In fact, we have adopted some of the LRI techniques that we were introduced to in the training," she says.

As part of forestry plantation, Nirmalabai planted 400 saplings on their land, including honge, Jammu, Tamarind and so on. There are no other structures, however, related to Sujala or any other farmer-related scheme implemented on their land. "Now that we have something to hope for, we would request some additional help to set up a compound wall to protect the forest plantation. Later, in the future, we would like to make good use of the water collected in the check dam towards forestation and horticulture crops. The water would also be useful for livestock and cattle during summer," says Nirmalabai.

25. Sujala Helps Shamarao Use Barren Land for Forestry Plantation

Shamarao is a farmer in the Dotikola village in Chincholi taluk, Gulbarga district. He took over the farming reins from his father, Hanumanthappa. Shamarao is 62 years old and is not educated. There are five members living with him, including children and a grandchild.



"Sujala gave me a chance to use my barren land and plant something. It gives me a chance to earn some income, even though not immediately. I am happy."

Shamarao's primary occupation is agriculture and on days that he has no work on his field, he works as a daily wage labourer. The annual income that he gets from all this is Rs 25,000. The main sources of income for him are agriculture and daily labour. His land-holding spans 2.12 hectares. Shamarao's land was predominantly arid and barren. So he could not grow any crops like many of his counterparts. "I had no real use for my land because it is barren. I thought that it would be of no use at all. But all this changed when Sujala came into the picture," says Shamarao.

Shamarao heard about the Sujala-III watershed development programme of the Karnataka Watershed Development department during his interaction with the department office near his village. He knew that Sujala had helped many other farmers implement sustainable agricultural and soil and moisture conservation initiatives on their lands. He was also aware that farmers got a chance to invest in horticulture

crops or forestry plantations that could give them hope for a better yield, income and future.

Free Chance to Make Things Better

"The Sujala programme was aiming to make things better for us free of cost and investment. For me, it was giving me a chance to use and reuse the barren land that I own. This was motivation enough for me to adopt its initiatives. Further, the information that the watershed development department shared with us was encouraging enough to at least give the initiative a chance," explains Shamarao.

"After implementing the Sujala programme, I hope that the land will become suitable for cultivation and enable me to earn an income from it in the future. Under the scheme, my barren land gets used and the soil on my land gets studied and inspected. I am updated about what I can or cannot grow on my land and I am given support to attempt to grow something. So I was keen," adds Shamarao.

After preliminary inspection and research, Shamarao set about creating a forestry plantation based on the Sujala team's suggestion. "I went for forestry plantation on all 2.14 ha. My land is not irrigated and I have no source of water. So there was not much choice for me. But I am happy that I am getting to grow at least these," he says.

In August 2017, Shamarao planted 75 tamarind saplings, 300 jamun saplings, 25 amla saplings and 15 honge saplings in a block plantation setup. Of these, 415 saplings have survived so far. "The saplings are 1.02 mts tall as of today. I have not applied any manure nor have I had any pest attack. I believe that the Sujala officials gave me the best suitable option. So I am very hopeful about this plantation," he says.

After planting the saplings and the initial instruction on maintenance, the Sujala team members paid a visit subsequently to Shamarao's land to follow progress. "There were a few site visits. Guidance was provided over phone as well. I am happy with all the help and support I have received. Everything went as per plan; work is good; and I did not have to pay anything," notes Shamarao.

Given that the saplings were planted only last year, Shamarao has not got any yield yet. "These are long-term plantations. So it is too early to expect yield and income from them. When the trees are grown and mature, I can think of income via sale of timber and any yield from fruiting trees," says Shamarao.

Staggered Trench

In addition to forestry plantation, Shamarao also received support to improve soil and moisture conservation on his land. "They advised me to create a staggered trench, which is expected to stop rain water from running off and prevent soil erosion. It is also expected to improve moisture," he says, adding that there are no other structures on his land via any other project.

When asked about any additional help that he may seek, Shamarao said that he wanted help to set up a compound wall around his land and assistance in setting up a borewell. "I have already received many benefits in the form of training about best agricultural practices, forestry plantation and structure for soil and moisture conservation. Although I have not attended any Krishi Vigyan Kendra training, I am aware of a few LRI techniques and I have adopted them on my land. It relates to the forestry plantation that I took up under Sujala," explains Shamarao.

As future plan, Shamarao aims to maintain the forestry plantation and ensure that the saplings thrive and grow. "I will do everything to reuse the barren land that I have. I want to take up greening activities that would help afforestation and environment conservation, and also take up activities through which I can earn more income," says Shamarao.

26. Plantation Shows a Way Out of Low Income for Holeyappa

Holeyappa Gunnal belongs to Kavalakeri village in Yelburga taluk, Koppal district. His father is

Holeyappa. Holeyappa Gunnal is 65 years old and has not been educated. His household consists of four people, including two children. Like many farmers of the region, his main occupation is agriculture. Through his land that spans 5.35 acres, he earns a meagre sum of Rs 10,000 per year and he has no other source of income other than agriculture.

For many years now, Holeyappa Gunnal has been growing green gram as the kharif crop on his land. Since his land is rain-fed, he has been unable to earn more than this sum each year. Attempts to grow other crops to earn a better income have been futile because these crops would require more water and water was scarce in these regions. Green gram was the one crop that required minimal water and was, therefore, sustainable.

But this crop was not giving him enough income to sustain his family. So he had to look for other sources of income, which he did. One day, he heard of the Sujala watershed programme from the watershed development department, which promised to help farmers better their livelihood through farming and water conservation projects. He also heard of the soil and moisture conservation (SMC) programmes that was being implemented under Sujala, along with forestry and plantation support.

In search of better income

He was interested and gladly accepted the Karnataka Watershed Development department's offer to make him a beneficiary. Soon enough, he received support from the department like so many other farmers. "Due to various factors, my income from my crops has been very low. I was unable to manage my household with what I was getting. That is when I heard of Sujala. With the future in mind and a hope of "My land and crops survive only on rainwater. And rains are irregular and scarce in our region. So it is difficult to think of growing crops that require a lot of water. Add to this, the rainwater runs off without collecting anywhere. With it, it takes all the good top soil, and causes erosion. All this affects our crops. I did not have very many choices until I got all the help from Sujala. I hope things get better."





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making things better, I was advised to take up block plantation on my land," says Holeyappa Gunnal.

Currently, Holeyappa Gunnal has taken up plantation on two acres out of the five that he owns under rain-fed conditions. The plantation is of the honge tree and around 350 were planted in March 2018. "Till date, around 281 of them are surviving. They have grown up to a height of about 0.8 mts. I am yet to apply manure or treat them for pests. So far, they have survived a pest attack," says Holeyappa Gunnal.

Plantation and Follow-Up

Soon after the plantation was completed, the officials of the Watershed department visited several times and ensured that the plantation was taking shape as planned and that the saplings were growing as intended. "They came every month to check on the status. It is very good of them because I have not undergone any training such as KVK training. I am very happy with the way they did everything. The work is good. The follow-up is good. And to top it all, I did not have to pay anything," says Holeyappa Gunnal, adding that it is too early to expect a yield from his plantation.

While confirming that there is no other structure implemented under Sujala or adoption of LRI methods, apart from creating bunds to prevent rainwater run-off, he hopes that he would continue to get support from the department to take up other horticulture projects as well. "For now, my plan is to maintain the plantation and ensure that my attempt does not go waste. Later I want to take up horticulture with the department's help and grow more plants and vegetables," he explains.

27. Sujala Helps Iramma Increase Soil Moisture

Iramma Mudalapur and her husband Ramanna own 1.3 acres of land in Muthal village, Yelburga taluk, Koppal district. They grow maize and channa during the kharif and rabi seasons, respectively. The land is the main source of income for this family, which consists of five members, including three children. The annual income from this land is Rs 20,000 and agriculture is the occupation on which they depend for income.

Iramma is 45 years old and has studied till class V. She has been doing agriculture all her life. But with changing environmental conditions, she started seeing changes in the output on the field and

thereby in the income. Rains were less and any rain that occurred washed away all the good top soil on her land, causing soil erosion and dryness.

Water Scarcity

Distressed by the depleting water tables, reducing water availability and lack of moisture in the soil, she started looking out for help options that would enable them to change their existing quality of life. She had, by then, heard of the Sujala watershed programme from the watershed development department. She knew that the schemes under Sujala would help her tackle soil erosion and enable soil and moisture conservation.

"I heard that Sujala was meant for small farmers like us who live in rain-fed regions. I am aware that Sujala aims to improve crop production via sustainable and simple agricultural and land practices and thus improve our livelihoods," says Iramma. "With Sujala help, I have the means to improve the soil quality on my land and I also have a neem plantation. I cannot complain now that I have at least something to look forward to."





Based on the land structure and sloping, the Watershed Development department officials came up with a plan to implement a trench-cum-bund (TCB) in April 2017, which would not only prevent rainwater runoff but also increase moisture and soil quality.

Bund Making

Her idea was to take up everything possible to improve the moisture content in her field and to recharge ground water. She knew that this, in turn, would improve the quality of her crops and the harvest. So the bund was created for rainwater to collect. After the bund was created, the officials visited once a month to see progress and determine the success of the implementation and if any additional tasks were required. "The WDD members have done a good job. They stuck to the original plan. Everything went off as planned. We did not have to contribute anything from our side, yet we have received plenty of benefits," says Iramma.

Listing the benefits that they have received, thanks to the Sujala project, Iramma says that the moisture content on her field has improved significantly, and she hopes that this would lead to better crops in the years to come.

Plantation of Neem

In addition to bunding, she has also got the support to set up a forest plantation under Sujala. Under this, they planted around 50 neem saplings, which have now grown up to a height of 1.5 mts. But apart from SMC and forest plantation, there are no other structures on the land. "The plantation is something new for us. So we hope to get some support until we can stand on our own. So far we have got good support from the department," says Iramma, adding that in future, the family would like to expand into growing mango and lime as horticulture plantation crops.

28. Livestock Owner Sets Up Green Fodder Nursery for Improved Livestock

Basavaraj is a resident of Shiroor village in Yalburga taluk, Koppal district. A farmer by profession, Basavaraj also owns a dairy with four cows. His land holding spans four acres and the annual income of the family is around Rs 50,000. Basavaraj is 48 years old and has studied up to PUC. His family comprises five members, including his father Andanareddy, wife and two daughters. His daughters are 23 and 20 years old, respectively. One of the daughters is studying B.P. Ed and the other is studying BSc second year.

Although Basavaraj manages to get fodder during other months, when the summer season begins, it is difficult for him to find green fodder and take care of feed for his cattle. This had direct impact on the milk produced by the cattle and on his income. Then he got to know about setting up fodder nurseries from the neighbouring villages. However, he was not able to set up a nursery based on

what he heard attended the establishing by the Animal and University he learned in nursery and to had could have



alone. Subsequently he awareness program on fodder nurseries organized Karnataka Veterinary, Fisheries Sciences (KVAFSU). It was here that detail about how to set up a maintain it so that his cattle regular supply of fodder.

Following this,

he also participated in a

training session on fodder enrichment that was again organized by KVAFSU. Several such livestock demonstration and extension activities are being held in watershed villages by KVAFSU as part of Sujala-III, which is a project sponsored by the Karnataka Watershed Development Department. The objective of such sessions is to demonstrate good practices related to livestock and fisheries that could, in turn, improve the quality and outcome from livestock activities.

Awareness Through Knowledge Sessions

Basavaraj's village, Madinoor, comes under the Bedavatti sub-watershed and Shiroor microwatershed. It is one of the villages selected for implementation of livestock extension activities. After the awareness sessions, Basavaraj became motivated to adopt the practice of setting up fodder nurseries, mainly because he also owned a dairy. In the training session that he enrolled in, he learned about preparing the land, collecting root slips, sowing fodder seeds or planting root slips, applying manure, harvesting and other activities related to fodder nurseries. All initial root samples and seeds are provided by the KVAFSU. In addition to setting up fodder nurseries and training to enrich fodder, Basavaraj had the option of learning to make silage using silo bags. But he was selected for fodder nursery establishment because he owned land and had water to maintain such a nursery, which are some key points based on which farmers are selected for the training.

Green Fodder All Through the Year

Today, Basavaraj has 10 guntas of land under fodder plantation. The nursery was established a year ago and has Kudarimate, COFS-29, CO-3, CO-4 and Sasbaniyaa planted. Basavaraj has cut fodder nearly four times since the samples were first planted, and has used it to feed his cattle. "At present, I don't sell any fodder to the villagers because what I get is just about enough for my cattle, but I have invited farmers to see the fodder nursery on my land so that they could establish such nurseries themselves by borrowing root slips from his land," says Basavaraj.

"I invested Rs 5,000 towards the fodder nursery. I find that there is not much regular maintenance and cost associated with this technique. The only thing that I am required to do regularly is apply farm yard manure annually and weeding out every two to three months, which is good. And it provides fodder easily. Apart from this fodder, I give indi and dry fodder to my cattle," he says, adding that earlier he used to get four litres of milk and now he gets six litres. "My income has increased from Rs 120 to Rs 150 per day," he says.

Till date no other farmer has bought seeds or root slips from him. But five farmers have shown interest in taking up this programme, which is one of the main objectives of the intervention—creating awareness and demonstrating availability of green fodder. According to Basavaraj, the fodder nursery has helped him economically and socially. He now intends to expand the fodder nursery and reach out to other farmers in the region as well.



Photo1: Fodder nursery of Basavaraj

29. Devendrappa Taps Sujala Help to Solve Soil Moisture Woes

Devendrappa Desai is the son of Mallappa and is a farmer like his father in the Chikkamyageri

village in Yelburga taluk, Koppal district. He is 48 years old and has studied up to class III. The family, which consists of six members, including school-going children and parents, owns 3.3 acres of land. Their primary occupation is agriculture from which they get an annual income of Rs 25,000.

On this land, Devendrappa has been growing channa dal (Bengal gram dal) during the kharif season. Over the years, Devendrappa started feeling the impact of living in a watershed region when he noticed soil quality falling and water availability dropping. Being a dry region, all rainwater runs off and nothing much is retained each monsoon. This has resulted in depleting moisture content in the soil and in soil erosion. Further this has also affected groundwater availability for irrigation and in turn his crops whose production started dropping several notches.

"All the rich top soil is being washed away. For me, this resulted in reduced quality of crops and income. And I was facing water issues during summer when I had to irrigate my crops. I was desperate to find a solution when I heard of the Sujala watershed programme through the watershed development department," says Devendrappa. "I got a farm pond, bund, and a forest plantation. I did not have to pay a penny. They did all the planning and set up. I just had to watch and help here and there. I am looking forward to better days ahead, thanks to Sujala."



Sustainable Changes

Under Sujala-III, the Karnataka Watershed Development department was trying to make sustainable improvements in productivity and livelihood of small farmers who lived in rain-fed areas. The WDD officials were helping people like Devendrappa to implement solutions for soil and moisture conservation on their lands so that crop production and soil quality improved.

"When I heard of Sujala, I was naturally very interested. I wanted to try anything that would help and this was something simple and did not involve any cost. So I contacted the officials and we started off by making a plan. The officials decided that it would be ideal to create a farm pond and a bund on my land because those are the best for soil and moisture conservation. This was in July 2017," explains Devendrappa. Following this, a bund of size 120 mts and a pond of dimensions 18x18x3 was created.

Regular Follow Ups

After completing these tasks, the officials came around once every month to determine progress. "They did a good job so the progress too was good. They stuck to plan and did not draw me into contributing anything," Devendrappa says, sharing that with water collecting the quality of soil and moisture content started improving. "It was evident from the growth of the plants and saplings on my land," he adds.

Stating that his farm pond is also filling up slowly, he said that he is yet to use the water because it is not much to start using already. "It is not enough to irrigate the entire crop. And I still have to set up a unit to pump water," he says, adding that the water in pond will also be used for cattle, sheep, goat, and other animals during the grazing period in the future.

In addition to SMC, Devendrappa was also a beneficiary of the forest plantation scheme of Sujala. Under this, he was able to plant 120 silver oak saplings on his land. "The trees are my investment for the future. I hope to take care of them and maintain them well so that I can earn a better income from them," he says, hoping that he would receive continued support from the department for maintaining the plantation. But there are no other structures on my land, he adds.

"In future, I want to invest my time in horticulture plantation as well. When it is possible, why should I not do it? I hope the department helps me out with the horticulture plantation too. Their advice is very valuable," he says.

30. Nagamma Gets Bund, Plantation Under Sujala to Improve Moisture

Nagamma Gunnal wanted to ensure better lives for her family. So when she found that her land was

not generating enough income, she decided to test out other options that were available. And that was how she became one of the beneficiaries under the Sujala watershed programme.

Nagamma Gunnal is a resident of the Kavalakeri village in Yelburga taluk, Koppal district. Her father is Bimappa. Nagamma is 55 years old, and has studied till class II. She now helps her husband on the field. Her household consists of six members. The main occupation of the family is agriculture and they make approximately Rs 25,000 per year from their



"I have not completed any training so I was not aware of the scientific way of doing these things. With Sujala, I hope water will stand and thus increase moisture on land and recharge groundwater. This will help the nearby water sources and in turn us farmers. For me, I hope the plantation helps us earn a better income for the future."

harvests. Their land holding spans two acres and the primary crops that they grow are maize and groundnut. Maize is grown during the kharif season and groundnut during the rabi season.

Search for Getting Better Income

Over the years, the harvest did not yield as much income as they had hoped and so Nagamma had to think of finding alternative ways to earn income. When she heard of the Sujala watershed

programme that targeted farmers living in watershed regions and sought to improve their farming lives, she was happy and very eager to implement the activities suggested. "I heard of Sujala from the Watershed development department here. We depend on rain and water from borewells in other nearby farm lands to irrigate our crops. This is not a very sustainable or profitable method. In our region, rainwater runs off carrying with it the top soil. So we don't have water collecting and additionally all the good soil is being carried away. That is why Sujala seemed like a good option because it was creating a solution to make water stand," says Nagamma.

The Sujala watershed programme is an initiative of the Karnataka Watershed Development department to help small farmers in watershed regions to earn better income and establish better livelihoods than what is currently prevalent. It supports farmers



through sustainable activities that help to improve crop productivity and thus their income.

"At first, the officials came over and assessed our land. Then they made a plan and told us how it would be implemented. Then they came and helped us create the plantation with mango and lime trees. They told us that bund forestry would be the best option for us so we set up bund forestry over two acres," explains Nagamma Gunnal. Although the land is not irrigated, Nagamma manages to water the saplings to ensure their optimal growth. The source of water to irrigate her land is located 150 mts away.

According to her, 25 mango saplings and 20 lime saplings were planted April 2018. Of these, 19 mango saplings and 14 lime saplings have survived and grown up to a height of 0.7 mt without adding manure or treating for pests and diseases. "After we completed the initial planting, the department officials followed up once in a month and made sure that the plants were growing



properly. It was good of them to come back and check even though the work implemented was good in the first place. We are very happy with what was done and we did not even have to contribute anything," says Nagamma, adding that now they have to wait for the plants to grow into trees and give them a yield and income.

Soil and Moisture Conservation

In addition to bund forestry, Nagamma also opted for soil and moisture conservation on her field. Apart from this there have been no other

structures on the field. For the future, Nagamma wants support and help from the Watershed department to take up horticulture cultivation on her land. She adds that she has not taken up KVK training or adopted LRI techniques, but with the help of the Sujala officials has been able to understand a little bit.

Her future plan is to maintain the existing plantation and to ensure that the saplings grow and can yield. "We are doing this with an idea to generate more income. So it is important that we take care of what we have planted," says Nagamma.

31. Farm Pond for Continuous Water Supply and Moisture Retention

Purushayya is 65 years old and has studied up to class 7. His father is Eerayya and his family includes his father, mother, two sons and their wives. One of the sons has two children: a son who is in class III and a daughter who is in class I. Purushayya belongs to Thavarekere village in Tumkur taluk, Tumkur district. His village comes under the Thimmanayakanapalya micro-watershed.

Purushayya's primary occupation is agriculture and his family owns 3 acres and 20 guntas. He grows mulberry on 1 acre and 10 gunta and coconut on 1 acre and 10 gunta. The remaining one acre of land is uncultivated where grass for cattle is grown and the farm pond has been excavated. The annual income from this land is Rs

50,000.

Purushayya heard from the watershed development authority about soil and moisture conservation (SMC) and about farm ponds. After he attended the training conducted by the Agriculture department, he was inspired to have a farm pond made on his land and believed that it was good to invest in SMC with an eye on the future. So he agreed to implement the department's suggestions. The Watershed development department then created a farm pond of dimensions 12 ft X 12 ft on his land. The pond work was implemented a few months ago, under the able guidance of Watershed Assistant Mr Murthy.

It was found that the scope for retaining run-off water was good because his land was situated in the natural water way. After the farm pond was excavated, the department members followed up and gave suggestions based on progress.



"I can see that water has already started collecting in my pond. If water is available continuously in the pond, my dependency on the borewell can be significantly reduced. This is a very good thing and the best fact is that we don't have to pay anything at all."

According to Purushayya, he is satisfied with the work done by the team, which is of good quality. It is commendable that he had to make no contributions to get this done, he said and added that there were no deviations from the original plan.

Reducing Borewell Dependency

Stating that there has been significant benefits from the original plan for him, he says that the water that is collected and stored can be used to water existing crops. Further, he intends to use the water to grow crops on the uncultivated land. "If water is available continuously through this project's technique, my dependency on borewell water can be reduced," says Purushayya. For now, water is available for 3-4 months in his farm pond, he adds and states that the water, however, has not yet been used for irrigation. After the project was implemented, there has been good improvement in the moisture on Purushayya's land. Purushayya owns two milch cows and three calves, which drink water from this pond. He hopes that he can use rain water optimally for growing mulberry leaves and to cultivate the 0.5 acre of waste land that he has.

Apart from this, he has not obtained any other benefit under the Sujala watershed project nor has there been any other work structure implemented. In future, he only wants help in relation to setting up drip irrigation on his land. He also wants stabilize the farm pond bund by using grass and fodder grass.
32. Block Plantation for Gangaiah to Overcome Rain-Fed Area Woes

Gangaiah lives in Narasapur village in Tumkur district. He is the son of Nayakappa. Gangaiah is a farmer by occupation and hails from a family of farmers. He is 63 years old and has studied up to class II. In his house, there are three members, including wife and one son.

Apart from a land-holding of two acres, Gangaiah also owns a shop in his village. Through his shop and agriculture, Gangaiah earns Rs 10,000 per year. He grows ragi and horse gram during the rabi season on 1.5 acre and 0.5 acres of land, respectively.

Narasapur village is one of many villages in Tumkur district that comes under a rain-fed area. The main characteristic of rain-fed regions is that it is highly dependent on rains and has no other source of water. When it rains, the crops get water but the water does not collect or stand; it runs off and carries with it the loose topsoil, resulting in soil erosion, reduced soil quality and reduced moisture.

Interaction Introduces Sujala

With erratic rainfall and depleting soil quality, farmers like Gangaiah started facing problems in yields annually and thus in their income. During their interactions with the Watershed development department in the training sessions and at other times, their only concern was how to better their livelihood, how to increase crop yield and how to improve soil moisture and water availability.

One such interaction led them to information about Sujala-III, the watershed development programme designed for small farmers living in rain-fed regions who face problems related to soil and moisture and erosion. Sujala was designed such that it was easy to implement, maintain and sustain. And it did not require large investments. It implemented simple initiatives that aimed to





"I am hopeful of getting a good yield when the trees mature and via mango harvest. With no source of water, this is the best I can expect. I am grateful for what I got and hope to take good care of the plantations."

improve crop production and yield for farmers, which in turn translated to better livelihood.

Therefore, when Gangaiah was selected as a beneficiary under Sujala, he was thrilled. Finally, some solution was being offered for his problems. "I wanted to implement the Sujala initiatives voluntarily after hearing the department officials speak about it. By doing nothing, things were not going to get better for me. Sujala would at least be a simple attempt," says Gangaiah. After being selected, the Sujala team members visited Gangaiah's land to assess the soil quality and type so that they could determine the solution that would be most ideal for him.

Horticulture and Forestry Plantations

Gangaiah's land was not irrigated. So it was decided that block plantation and forestry plantation was ideal for him and the species chosen include mango and hebbevu. "The block plantation was made in August 2017. We planted 150 hebbevu and 90 mango saplings. Today, the hebbevu sapling has attained a height of 2 mts and the mango is about a metre in height. I have applied 200 grams of DAP as manure for the saplings. And thankfully, I have not had any pest attacks so far," explains Gangaiah.

After the block plantation was completed, the Sujala team visited Gangaiah again to check on the status of the plantation and to advise Gangaiah about maintaining it. "They gave me information about what I should do in case of pest attacks and how I should apply manure. They also checked on the health of the saplings," says Gangaiah, who has also completed the Krishi Vigyan Kendra training that covers crop production techniques, application of manure, LRI techniques, fertilizer application and more.

Stating that he was satisfied with the task implemented and its quality, Gangaiah says that the team had done good work. "Although I had to contribute a minimal amount towards beneficiary contribution, I am happy with what I have got. It is at least some solution," he says. Gangaiah also confirmed that he had implemented some of the LRI techniques that he had learned about in his KVK training.

With only a year having passed after planting the saplings, Gangaiah has not had any yield so far. "It is very early to get yield on the plantation. But I am optimistic about getting a good crop from mango and good timber from hebbevu. What Sujala has suggested seems to be the right direction," says Gangaiah, adding that he has no other structure via any other project. His future plans are to maintain the existing plantation and ensure that he gets good yield.

33. Krishnamurthy Benefits from Sujala's Farm Pond and Bund

Krishnamurthy is a farmer in Doddaguni village, Tumkur district. The son of Kempa Shanaiah, Krishnamurthy is 40 years old and has studied up to class X. There are 10 members in his family, including his children, parents and brothers. With a total land-holding of four hectares,

Krishnamurthy earns an annual income of Rs 1 lakh by growing coconuts, arecanut and mango as annual crops on 10 acres. He is a big farmer.

But Krishnamurthy believes that he could grow more and generate more income than he is doing right now, if he had access to more water. Because he lives in a rain-fed area, his access to water was only during the months that it rains. After the rains, he has to depend on a borewell. Moreover, because rainwater in these rain-fed areas runs off and does not collect anywhere, the soil was eroding due to all the good topsoil being washed away. Moisture too was being lost. And all this was not helping Krishnamurthy in any way.

Simple Solutions from Sujala

So when the Watershed Development department introduced the concept of Sujala and its initiatives to Krishnamurthy, he was very keen to know more. "I was interested in adopting the initiatives under Sujala based on what the officials told me. I believe that the solutions are simple and will help produce better crops and thus better income," says Krishnamurthy.

Sujala-III is a watershed development programme

"As per the inspection under Sujala, my land is suitable for growing coconut, arecanut and mango. Now with the farm pond and bund, my land is expected to have better moisture, along with fairly regular water supply from the pond. My hopes are high."



aimed at small farmers living in watershed and rain-fed regions in the state. Under Sujala-III, farmer beneficiaries are selected and initiatives that are likely to help crop production and improve the livelihood of these farmers are implemented. These activities deal with improving soil quality and moisture content, and groundwater recharge, and preventing soil erosion, all of which directly contribute to better crop yield and income.

After being selected as a beneficiary, Krishnamurthy received a visit from the Sujala team to inspect his land and study the soil structure and quality in order to implement the most suitable solution. Following this, it was decided that a farm pond and a bund would be ideal to solve the soil and moisture problems that Krishnamurthy was facing. "In May 2018, the team helped create a bund of dimension 500 RMT and a farm pond of dimension 10x10x10. Now water has slowly started collecting in the farm pond," says Krishnamurthy.

With the pond and bund created, the Sujala team members paid a follow-up visit a couple of times to assess the progress of work. "The team members returned to see whether any water had collected in the pond and whether the soil quality and moisture content had improved due to the bund. During their follow-up visit, they gave me instructions on what I should do for maintenance and other relevant advice," explains Krishnamurthy, adding that he was happy with the good quality work that had been implemented on his land. "I had to pay a small share of cash towards beneficiary contribution, which I was happy to give. They did all the planning and implementation as per the original plan. So the minimal contribution that I had to make does not bother me," he adds.

Better Moisture

"Thanks to Sujala, I have received many benefits. The moisture content on my land has improved. I now have a means to conserve soil and all the nutrients and richness in it. Plus additional water is getting collected in the pond that I can use to irrigate my coconut trees," says Krishnamurthy, adding that the farm pond currently has collected one month's worth of water.

"Further, during the Krishi Vigyan Kendra training, I got to know more about my land, the type of soil it has and what I could grow on it. I was told that my land was suitable for growing coconut, arecanut and mango. They also taught some of the agricultural best practices as part of LRI techniques and some of it is implemented on my land," he says. Krishnamurthy does not have any other structures implemented via Sujala on his land or through any other project and hopes to get better yields in the days to come.

34. Sujala Grants Shanaiah a Bund and Farm Pond for SMC

Shanaiah is a farmer in Chikkamalalavadi in Tumkur district. He took over the farming reins from his father Dodda Shanaiah after completing his education up to class X. With a family of five to take care of, including parents and children, Shanaiah earns only around Rs 25,000 per year from his

With the farm pond, about 40 percent water has already collected after the rains. This would be enough to supply water to the coconut plantation for about a month. Plus I can also try to do intercultivation for crop variety and good income.



primary occupation, which is agriculture. He owns 2.0 acres of land.

As the rabi crop, Shanaiah grows ragi (finger millet) on 0.5 acres and he has a coconut plantation on 2.0 acres from which he gets an annual yield of coconuts.

Similar to the problems faced by many small farmers, Shanaiah too encountered difficulties with water supply for his crops, what with erratic rainfall, groundwater depletion and lack of moisture in the soil. This was directly affecting the crops and his income and Shanaiah was at a loss as to what he should do to make things better. During his interactions with the Karnataka watershed development, one day, he heard about the Sujala watershed development programme.

The Sujala-III watershed development programme is an initiative of the Karnataka Watershed Development department, which is implemented in rain-fed and watershed regions of the state. As part of Sujala, small farmers are selected as beneficiaries and sustainable agricultural practices that would help generate better yield and improve water availability, soil moisture and soil quality were

introduced on their lands. The objective was to improve crop production and the livelihood of these farmers at minimal to no cost.

Being a farmer from a rain-fed area, Shanaiah was selected as one of the beneficiaries of Sujala. At first, the Sujala team visited Shanaiah's land and studied the land structure, soil type and moisture content, and so on to determine the best form of solution that can be implemented. Then it was decided that a farm pond and a bund would be ideal to both improve moisture and to collect water for irrigational purposes.

Bund and a Farm Pond

Subsequently, a bund spanning 150 RMT and a farm pond of dimension 12x12x12 were created on Shanaiah's piece of land in April 2018. "Although I was aware of Sujala and the benefits received from its schemes, I was convinced to go for the SMC and farm pond schemes by the department officials. They were very optimistic that these schemes will improve a lot of things for me," says Shanaiah.

"After creating the bund and farm pond, the Sujala officials returned to see the progress of these interventions. When they returned, they checked the quality of the bund and farm pond and also gave me advice on how I should maintain them," explains Shanaiah, and adds that he is happy with the interventions on his land. "I think they have done a good job. They came up with a plan and ensured that the plan was put into action as per the original without any deviations," he adds.

Thanks to Sujala, I can look forward to improved soil and moisture content in the soil and availability of water via the farm pond. I can be involved in soil and manure conservation activities and benefit from additional water supply for my coconut plantation," he explains enthusiastically.



He happily adds that he was already noticing an improvement in the soil moisture content and in the water collection in the farm pond. "Till date, about a month's supply of water has collected in the farm pond, which is about 40 percent and which I can use for my plantation and crops," says Shanaiah. In addition to SMC, Shanaiah also got to create a forest plantation as part of Sujala.

"I think that the idea of forest and horticulture plantation is good. These initiatives, I believe, will improve soil quality and moisture

content. They will help improve yield and thereby our income. It will also help greening the environment," explains Shanaiah, adding that he has planted silver oak and neem on the bunds. There are no other structures implemented under Sujala other than these two, confirms Shanaiah.

Although Shanaiah has not participated in the training offered by the Krishi Vigyan Kendra, he has implemented the LRI techniques on his land because he is aware of them. "For example, I know that my land is suitable for growing coconut trees," he says. In the future, Shanaiah wants to get a good yield of coconuts and attempt to do intercropping for crop diversity.

35. Sujala Helps Venkatesh Bring Back Moisture and Green to His Land

Doddaguni is a small village in Tumkur district. Venkatesh is a resident of this village and he is a farmer. His father is Thimmanaik. Venkatesh is 43 years old and he has studied up to class X. There are four members in his family, including his wife and children.

Hailing from a family of farmers, Venkatesh also took to farming after completing his class X because that was the family's primary and main occupation. From the 1.25 acres of land that he holds, he earns Rs 25,000 per year by growing cow peas, toor dal, ragi and paddy. He grows green gram dal and cow peas during the kharif season on 0.10 acres of land and ragi and paddy during the rabi season on 0.40 and 0.10 acres of land, respectively. As revenue crops, he grows coconut and arecanut.

Like many other villages in Tumkur district, Doddaguni also comes under the jurisdiction of a watershed and rain-fed region, which is characterized by rainwater run-off, soil erosion and no water collection post monsoons. For Venkatesh, this was causing a lot of trouble. After rains, the only source of water for his crops was a borewell, which was also drying up slowly due to lack of groundwater recharge options. Further, the soil on his land was getting dry and eroded because the rainwater was washing away all the topsoil. Add to this, because water was not collecting anywhere, the moisture in the soil was becoming less and less.





"I created a plantation with neem, lime and coconut saplings. The Sujala team members told me that my land was suitable for these plants and also for forestry. I hope to get into forestry in the future. But for now, I can look forward to some income from these horticulture crops."

Getting to Know About Sujala

Venkatesh knew that his other farmer friends too were facing similar problems. One day, while speaking with the Watershed development department officials along with his farmer friends, Venkatesh came to hear about the Sujala-III watershed development programme. He became aware that Sujala was made to help out farmers like him tackle issues related to soil and moisture conservation and crop productivity. He also got to know that the programme did not need him to invest much and that the solutions were pretty much simple and sustainable agricultural practices. Subsequently, Venkatesh was selected as a beneficiary following which officials of the Sujala team came to inspect his land to study the best solution that could be implemented from their bag of solutions. "I was motivated to adopt the practices suggested under Sujala by the Agriculture department officials. My land is irrigated and I use flood irrigation via a borewell. But of late, the water quantity in the borewell is reducing due to no groundwater recharge. When I was talking to the officials, they told me that Sujala has the right solution for my problem," says Venkatesh.

"It was decided that we would do a block plantation with coconut, neem and lime saplings. The planting was completed in August 2017. So far, 50 coconut, 15 neem and 3 lime saplings have survived and have grown to an average height of 1.30 mts. As per the officials' suggestion, I applied 10 kg of NPK manure. But thankfully, I have had no pest attack so far," explains Venkatesh.

Once the plantation was complete, the officials returned to check on the block plantation on Venkatesh's land and to assess the growth of the saplings. They also gave him advice on plant maintenance and other related aspects. "They explained how I should maintain the plantation and updated me about watering rules, applying manure and other such details. I am satisfied with what has been done. The quality of work is good," says Venkatesh.

Early for Results

Stating that it is too early to expect yield and income from the horticulture plantation, Venkatesh says that he is hopeful for the future. "In a few years' time, if things go well, I will start getting yield and income from these trees. Till then I will have to focus only on maintenance. But I am very hopeful and think that I am on the right track," he says.

In addition to the horticulture plantation, Venkatesh has received help for soil and moisture conservation on his land by way of bunds. "These bunds are to prevent rainwater run-off. If water stays in for a while, it will get sucked into the ground and recharge groundwater and also improve soil quality and moisture content," he adds.

Although the benefits that he has received till now are no less, Venkatesh hopes that he could get some more help in the form of a forestry plantation or association with some other department. "For now, the moisture content in my land has improved and this has helped growing fodder for three cows. But I wish I could get some more additional help so that my life becomes much better than this," he says.

Venkatesh has participated in the training offered by the Krishi Vigyan Kendra, and is aware of the LRI techniques. "In the training, we were told about simple agricultural best practices, crop production, soil quality and type, application of manure and fertilizers and other similar aspects. They also urged us to promote afforestation to help green the drying and barren earth and protect the environment. After this training, I have implemented some of the LRI techniques that we were taught," explains Venkatesh, adding that during the training, he learned that his land was suitable for a forest plantation.

36. Akhandaiah Aims for More Income, Gets Lime Plantation Under Sujala

Akhandaiah Hiremath is a resident of Malaghana village in Basavana Bagewadi taluk in Bijapur district. His father is Sanganabasaiah. Akhandaiah Hiremath is 53 years old and has studied up to class II. His household has five members, including his two children and one parent. His children are involved with him in agriculture.

Akhandaiah and his family have been into agriculture for generations. It is their main occupation. Currently, the family gets Rs 1 lakh as annual income via agriculture, which is also their only source of income. Akhandaiah owns eight acres of land at present. On this land, he grows the crops detailed

Season	Crops	Area in acres
Kharif	Onion	1
	Maize	3
	Vegetables	2
	Lime	2
Rabi	Sugarcane	2
	Lime	2
	Onion	1

in the table here.

Income and Alternative Crop

According to Akhandaiah, the reason that he adopted a couple of the schemes under Sujala was to earn better income and to grow horticulture plants. "I live in a rainfed area. So we are very dependent on good rains to feed our crops and for a good harvest. But over the years, the rains have become less and groundwater levels are depleting. Water run-off is a big

problem in our areas, which is the main reason for lack of moisture in the soil and groundwater depletion. While interacting with officials from the Watershed development department, I heard about Sujala and the benefits farmers could get from it. So I was welcome to idea of implementing the Sujala schemes on my land," says Akhandaiah. He has also undergone training conducted by DATC on Sujala and the watershed development initiatives.

Sujala-III is a watershed development programme under the Karnataka Watershed Development department that aims to bring sustainable improvements in productivity and the livelihoods of small farmers in rain-fed areas.

Two Acres for Plantation

"Under Sujala, I was given the advice to adopt horticulture plantation. I have used two acres for horticulture plantation currently. My land is irrigated with water sourced from a well and I use flood irrigation to water my crops," explains Akhandaiah. As part of horticulture plantation, Akhandaiah planted 200 lime saplings in December 2017. "I was advised to go for block plantation. So I did as suggested. Today, all the 200 lime plants have survived and each plant has grown up to three feet. I have not applied any manure so far nor has

any pest attacked the lime. So it is good so far," he says, adding that no precautionary measures have been undertaken as well.

"In all this, the department officials really helped me. They planned out the whole thing and even came back to check how the plantation was doing. When they returned, they gave me good advice and suggestions on how I should take care of my plants. I am very happy with their functioning. I did not have to contribute anything for this. So I don't have anything to complain," says Akhandaiah.

Optimistic

When asked if the plants had started fruiting, Akhandaiah said that it was too early still and that they were



young. But the growth has been fair so I am optimistic, he says. As for any additional benefits obtained under Sujala, Akhandaiah stated that he had not got any further help, except a bund on which forest planting seeds have been sown.

"So far I am happy with what I have got. I don't want additional support. If I want help or guidance, I will certainly approach the officials," says Akhandaiah. "In future, I want to grow mangoes and sugarcane and better my income.

37. Mallikarjun Gets TCB for Soil Moisture Conservation Under Sujala

Mallikarjun Akalawadi takes care of the 3.04 acres of land that he owns in Kalagurki village in

Basavana Bagewadi taluk, Bijapur district. His father, Lakkappa, farmed the land before him. Mallikarjun's family has always been into agriculture, which is their main source of income. Mallikarjun is 37 years old and has studied up to class VII. His household consists of four people, including two children.

Mallikarjun grows toor dal on all 3.04 acres during the kharif season. With the crops harvested on their land, the family gets an annual income of Rs 25,000. However, lately, Mallikarjun noticed that there was less and less moisture on his land and that the quality of soil was dropping. All this was having an effect on the quality and quantity of crops he was harvesting and on the income he was generating from these crops.

Rainwater Run-off

He realized that this was because rainwater was running off without standing and washing away all the good top soil with it. "We live in sloped areas. So this is a common feature for

us. But now, with rains also becoming irregular, getting good crops has become difficult. I have irrigation facilities for my land and the source of water is a borewell. Nowadays my borewell too is yielding less water each year. I had to look for alternative methods of water supply and solutions to recharge my borewell," explains Mallikarjun.

The Karnataka Watershed Development department's flagship programme, Sujala-III, is designed with these specific factors in mind. It is designed to introduce sustainable improvements in crop productivity and the livelihoods of small and medium farmers in rain-fed regions of the state. Through the Karnataka watershed development, Mallikarjun heard of the Sujala-III watershed programme when he was undergoing the DATC training.

"I heard of this programme from the Watershed development department. When I heard of the benefits that I could get from Sujala, I was keen. It looked like the programme had some answers to the troubles that I was facing. That is why I supported the department in implementing it on my land," says Mallikarjun.



"We live in dry, sloped areas. Water does not stand due to which the soil is very dry. This is not good for crops or getting income from crops. I hope with the TCB things will change. I too want to make a living."

TCB for Water Retention

As part of Sujala, Mallikarjun got a trench-cum-bund (TCB) made on his land. The TCB spans 495m. His aim is to retain more moisture in his land to enable borewell and groundwater recharge, and to ensure that he can get good yield on crops. Stating that the officials have not yet visited his land after the TCB was made, Mallikarjun said that he was satisfied with the implementation. "They followed the original plan and did a good job. I did not have to make any contributions while the project implementation was going on, which is a blessing for me," he says. However, it is too early to expect moisture and soil quality to improve because the TCB was created only recently.

No other structures or water conservation activities have been implemented, says Mallikarjun. "I hope that with the TCB, the quantity of water available increases. This will help the crops and the yield. My goal is to take the necessary steps to increase income from my land," says Mallikarjun. If he can receive additional support, he hopes to get into forestry plantation. He has already received the seedlings for forestry plantation that he can sow on the bunds.

38. A Check Dam and Bund for Water Recharge for Naganagouda

Naganagouda Basanagouda Dani is a farmer in Kalagurki village in Basavana Bagewadi taluk, Bijapur district. Naganagouda owns 19 acres of land, spread across three locations: 14 acres at one location, 4 acres at one and 1.08 acres at another one. He earns Rs 70,000 annually from the crops on these lands. Two acres of the land Naganagouda owns have irrigation facilities and the remaining land area is rain-fed. Naganagouda's primary source of income is agriculture, which is the main occupation.

Son of Basanagouda, Naganagouda is 38 years old and has studied up to class VII. There are seven members in his family, including three school-going children and two relatives. Naganagouda grows

Season	Crop	Area (acres)
Kharif	Wheat	1.08
	Maize	1.08
	Toor dal	12
	Onion	1.08
Rabi	Wheat	1.08
Annual	Toor	1.08

the following on his land during the two cropping seasons (see table).

When Naganagouda noticed that the groundwater levels on his land was dropping, he was worried. This would mean that his source of water would soon dry up and the moisture content would go down.

"We live in watershed areas where rain

water runs off. This has resulted in low groundwater levels over the years and soil erosion due to lack of moisture. My main source of income is agriculture and if I don't have water to irrigate my crops, I would have no way to live," says Naganagouda. So he started to find ways in which the situation could be improved.

"I WANTED SOMETHING THAT WOULD RECHARGE THE GROUNWATER LEVELS HERE. THIS WOULD MEAN MY WELL WILL BE FULL AND THERE WILL BE MOISTURE IN SOIL FOR BETTER CROPS AND YIELD."



Sujala Support for Change

While asking around, he came to know from the Watershed development department about the Sujala watershed development programme where farmers were able to get several sustainable benefits. He got more details and when he found the programme to be to his advantage, he was only too happy to be one of its beneficiaries. Sujala-III is the Karnataka Watershed Development department's flagship scheme to introduce sustainable improvements in productivity and farmer livelihood in rain-fed regions.

"After being selected as beneficiary, members of the Sujala team visited my land (of all the land he owned, 1.08 acres comes under Sujala scheme) and came up with a plan to create a bund and a check dam on my land. The bund spans my land area, and the check dam is 16m long and 5m deep. I want to replenish and recharge groundwater levels so that my open well has water for many more months. After the check dam was constructed, I noticed that there was increased moisture in the soil and the crops were not withering as quickly as before," explains Naganagouda.

"Later the officials promptly came to check on the status of water collection due to the bund and check dam. They also came back to provide suggestions based on progress of what was implemented. The quality of work is good and I am satisfied," says Naganagouda, adding that he did not have to make any contribution during the implementation.

Looking Forward

Observing that the department officials stuck to the original plan, he said that he believed that he was the one to have received several benefits. "Imagine what it would be to have water available during summer months and always. Plus the moisture content would be better too when water stands for a while. My crops are likely to do much better with all this," he indicates.

Naganagouda has not received any other scheme benefits apart from the bund and check dam. There are no other structures as well that were set up under Sujala. For now, he does not anticipate requiring additional support from the department. "Although I did not attend the KVK training and am not aware of LRI techniques, some LRI techniques have been adopted on my land. The department officials did that," he says.

39. Nala Bund for Ningappa Under Sujala to Recharge Groundwater

Ningappa Pandeppa Sirur lives in Kalagurki village in Basavana Bagewadi taluk, Bijapur district. He

is 70 years old and has studied up to class X. His father's name is Pandeppa. His household has six people, including children and grandchildren.

Ningappa has always been a farmer, following the footsteps of his father. The family's main occupation has been agriculture all these years. In the recent times, Ningappa has managed to earn Rs 1 lakh as annual income from the crops on his land. Ningappa and his family do not have any other sources of income than agriculture. The family owns 22 acres of land in Kalagurki.

Ningappa grows sugarcane, maize, toor and onion on 2, 3.20, 5 and 5 acres of land, respectively, during the kharif season. He grows sugarcane, toor and onion as the annual crops on 2, 5 and 5 acres of land, respectively. Ningappa irrigates his crops with water from the borewell and open well that he has on his land. However, of late, he noticed that the quantity of water was reducing in the borewell and open well, directly impacting water supply for his crops.

Changing Rain Patterns

"The rain patterns have changed these days. Further, because we live in a watershed region, water does not stagnate anywhere. All rainwater runs off and carries with it the good top soil. "I was interested in initiatives that would help recharge my borewell and open well. The land is sloped so water does not stop or collect during rains. I hope with the nala bund things will change and I can see a fuller borewell and well and better crops due to this."





This has resulted in soil erosion over the years and is affecting the quality of crops," says Ningappa. "I was seeing the effect myself in my harvest. But I was not sure what should be done that would be helpful and sustainable. Then I heard of the Sujala watershed programme from the Watershed development department," says Ningappa, who attended the training conducted by DATC in which farmers were given information about Sujala, including agriculture practices, cropping techniques, fertilizer and micro-nutrient application and such.

Sujala-III is an initiative of the Karnataka Watershed Development department that seeks to help small farmers living in watershed regions to improve crop productivity and to improve their livelihoods by adopting sustainable agriculture and soil and water conservation practices. Under Sujala, beneficiaries are selected and initiatives that are suitable for their respective lands are implemented via a plan.

Nala Bund

"The Watershed development department officials make an inspection and design a plan based on my needs, the nature of my land, and the area in which I live. Then they implement the plan. For me, it was decided that a nala bund would be suitable. So a nala bund of 72m length and 9m height was made. I wanted to ensure that groundwater was recharged so that the borewell and open well don't dry up so a nala bund was created," explains Ningappa.

After the nala bund was made in December 2017, the officials came back to check on the status of the nala and the amount of water it was collecting. "They have done a good job and I am satisfied with it. As for water collection, it is a bit early to determine because we have not had good rains for it to collect and recharge. I am sure it takes time but I believe that it will be helpful in the long run," says Ningappa. He added that he did not have to contribute anything during the implementation and that the original plan was maintained. "Some of the LRI techniques were adopted on my land based on what was suitable. I am not fully aware of these techniques but I know a little bit," says Ningappa. The training that is usually provided by the Krishi Vigyan Kendra is yet to be given to Ningappa.

Although currently he has no other projects or structures implemented on his land as part of Sujala apart from the bund, the department has provided seeds of forest plants to be sown on the bunds. For now, Ningappa hopes for a better future and better income, and hopes that he can get into horticulture crops to improve his existing harvest and income.

40. Siddaramappa Gets a Bund to Recharge Groundwater Under Sujala

Siddaramappa Garasangi lives in Malaghana village in Basavanabagewadi taluk in Bijapur district. He is 77 years old and he has studied up to pre-university. His father is Sangappa. There are five

members in his family, including children and grandchildren. Like many other farmers in this region, Siddaramappa's primary and main occupation too is agriculture. With this, he earns Rs 1.5 lakh per year as income from all sources, including agriculture.

Siddaramappa owns 9.30 acres of land. He grows maize, toor dal and onion on three, two and four acres of land, respectively, during the kharif season. These are also his annual crops.

Of late, with the changes in climate, the irregular monsoon patterns, and soil erosion, the groundwater levels have started falling and soil moisture has reduced, which has led to a lot of concern among the farming community.

Reducing Water Levels

Likewise, Siddaramappa too started seeing dropping groundwater levels, which led to drier borewells and reduced availability of water for irrigation. This was affecting his income so he started to



"My borewell and open well were having less and less water each year. The rains too have not been good and if water in these wells also dries up, where will farmers like me go? It is a godsend that I got a bund through Sujala. I can hope to see more water being recharged into the wells and borewells."

look for solutions that could help him. He had heard of Sujala-III through the Watershed development department officials and had heard that they had some solutions for soil and moisture conservation and water recharge, particularly in rain-fed regions of the state.

Sujala-III was initiated by the Karnataka Watershed Development department to help improve crop productivity and the livelihoods of small farmers living in rain-fed regions by introducing locally sustainable techniques. Under this, several beneficiaries were selected and initiatives that were individually suitable were introduced on their land for soil and moisture conservation, water conservation, groundwater recharge and water availability.

For Siddaramappa, a bund spanning his entire land was created to prevent rainwater from running off and carrying with it all the rich top soil. "I wanted to get help in recharging groundwater and also in recharging the open and bore wells on my land. So the officials came and inspected my land to design a plan that was best for me based on local conditions. It was then decided that a bund would be the ideal solution. So a bund was created in December 2017 around my land as per the original plan," explains Siddaramappa.

Official Follow-Ups

After the bund was made, the officials made some return visits after the rains to check on the status and whether anything else had to be done. "The officials came back to check and to give advice on how I should maintain the bund for best results," Siddaramappa says, adding that he is happy with what has been done and the quality of it. He is also happy that he did not have to contribute anything to get the bund on his land.

Siddaramappa believes that the bund would be certainly beneficial in improving the groundwater levels and recharging the wells on his land. "The bund was made recently. So it is early to comment on its success and whether soil and moisture content have improved. But I believe that it will help me a lot. I have heard of its success elsewhere," he says.

Apart from a bund, seeds of forest plants have been sown on the bund around his land to create a bund plantation, but no other initiatives have been implemented. In the future, Siddaramappa wants to take up activities that would get him more income and make his life a little better than now, such as horticulture plantation.

41. Hanumantha Seeks Sujala Help to Save Soil Quality on His Land

Hanumantha is a resident of Jinakeri village in Yadgir taluk, Yadgir district. The son of Nagappa Bhaavura, Hanumantha is 59 years old. His family comprises six members, including his three children and parents. The family's main occupation is agriculture and the land holding spans four acres.

With agriculture as the primary occupation and source of income, the family's annual household income is Rs 15,000 per year. The crops that the family has grown this year are cotton and groundnut. But during the previous year, the family harvested toor, onion, groundnut, jowar and

"I don't have access to any water source so it becomes difficult during summers and when there is no rain. With no moisture and low quality soil, crop production becomes tougher. I am farmer and I couldn't think of another way to earn income. Until Sujala stepped in to help improve our lives and income."



cotton. During the kharif season, they usually cultivate cotton and groundnut because black soil is conducive for these crops.

For farmers such as Hanumantha, who live in rain-fed areas, the primary source of water is rain. There is no other perennial source of water and if any borewell or well exists, these are prone to drying due to rainwater no collecting. The lands are sloped so

rainwater usually runs off without staying or percolating into the earth, which affects groundwater recharge and availability. Further the run-off rainwater washes away the rich top soil, leading to soil erosion and moisture depletion, all of which have significant effect on the crops that depend on soil and moisture for growth.

Getting to Know Sujala

During his interactions with the Karnataka Watershed development department , Hanumantha heard of the

Sujala-III watershed programme, which is designed by the Karnataka Watershed Development department to improve crop production in rain-fed regions by introducing agricultural practices that are sustainable, eco-friendly and capable of bringing in more income to better the livelihood of these small farmers.

Hanumantha was having problems with his crop production due to lack of moisture and bad soil quality. He also did not have access to irrigation supply and had to depend on rain entirely. So he was seeking solutions for his troubles when he heard of Sujala. When he was selected as one of the beneficiaries, Sujala team members visited his land and determined the best solution to be



implemented. According to Hanumantha, it took the officials a few months to plan and implement the project based on the specific requirements of his field.

With the help of officials, Hanumantha adopted the soil and moisture conservation (SMC) measures that would help improve the quality of soil and enable retention of run-off rainwater, including a farm pond and bund plantation in May 2018. "My hope is that it will make the soil less dry and the pond will ensure that there is water for some additional months," he says, explaining that because there is no bund, water just runs off during the rains. "It carries away all the good top soil too, causing erosion," he adds. And after

implementing all the tasks per the original plan, the department officials promptly followed up to check on progress and efficiency.

"I am grateful and very satisfied with the good work implemented," says Hanumantha, quickly adding that he did not have to make any contributions from his pocket for this programme. "I have been given training in agricultural practices, application of manure, cropping patterns, maintenance and related tasks, including land and soil structure during the training offered by the Krishi Vigyan Kendra. That is very helpful. We have used the LRI techniques on my land," he adds.

Additional Water Due to Pond

Listing out the many benefits that he received under this programme, Hanumantha says that water has now collected in the pond. "There is more water for the plants and crops on my field. The moisture content has improved and soil does not also run off," he says happily, adding that he can bank on having water for irrigation for three additional months, thanks to the farm pond.

In addition to the farm pond, Hanumantha also took on forest plantation under Sujala-III. No other structures have been created under the scheme apart from this. But despite having years of experience in agriculture and crop production, Hanumantha feels that getting some technical and scientific advice from the WDD officials would certainly help. "I want to branch out into doing more. Perhaps horticulture or floriculture. For that I would certainly need their support and guidance," says Hanumantha.

42. Mallikarjun Sets Up a Plantation and a Bund With Sujala Help

Mallikarjun, son of Hanumantha, is 36 years old and has studied till class VIII. He lives in Lingeri village in Yadgir taluk and district. His family comprises five people, including his wife and children.

Mallikarjun's family is primarily into agriculture and they grow cotton as the main and only crop.

Their land-holding is four acres, and cotton is grown on the four acres as both kharif and annual crops. The annual income from agriculture is Rs 25,000. In addition to agriculture, when the cropping season is over, the family members also work as daily wage workers.

Seeking Change

Wishing to change the way things were and the minimal income, Mallikarjun started attending the information sessions organized by the Agriculture department to learn more and to take advantage of any help he may get. Further, he, like many other farmers in his region, was facing extensive soil erosion and loss of moisture due to rainwater runoff. The high dependence on rain and the lack of access to regular water supply was affecting the yield he was getting and any of the attempts he was making to grow something else. "I wanted to try growing something else. Something that could give "We live in a dry, arid region. So, our dependence is very high on rains. And these days rainfall is erratic and very less too. Even if I want to try to grow something else on my land, I cannot because of erratic rainfall and lack of adequate water sources and supply. Therefore, Sujala is a kind of saviour because it is showing at least one way that could work under existing conditions."



me more income. But with loss of moisture and soil erosion and my dependence on rain, it wasn't likely to work," says Mallikarjun.

So, when he heard about Sujala-III from the Karnataka Watershed Development department and the Horticulture department, he became interested. When he was chosen as a beneficiary under this scheme, he readily agreed to implement the activities and structures as part of it. Sujala-III is a watershed development programme by the Watershed department and it is implemented in association with the Horticulture department. It is designed to help small and medium farmers in rain-fed and watershed regions to implement simple and sustainable agriculture practices that would result in improved crop production and income for them, while at the same time improving soil quality and moisture content and preventing soil erosion. "Sujala is showing some way and I hope it will work out. We all look forward to a good life," says Mallikarjun.

Suitable for Plantation

When the Sujala team members inspected the land, they found it suitable for forest and horticulture plantations. The team then helped Mallikarjun set up a plantation on 18 guntas as per a plan that was drawn up after the initial inspection. Because Mallikarjun has no access to water supply, the area selected for plantation is not irrigated. "I planted 25 mango and 25 lime saplings in a block plantation form. All the plants have survived so far. At present, the average height of the mango plant is 1 metre and that of the lime is 0.5 metre. I applied some urea and manure to improve the health of the saplings," he says, adding that he is lucky that no pests have attacked the saplings so far. "I did not take any precautionary measure to ensure that plants don't get affected by diseases. They have survived without it," he says.

After implementing the plantation, the Sujala team members made a follow-up visit. "During the follow-up visit, they tell us about making bunds for the saplings, supplying water, clearing leaves and waste around the sapling. I am satisfied with the advice and suggestions given to me to set up the plantation and I have not had to make any contribution for this," explains Mallikarjun.

However, Mallikarjun says that he has not had any yield yet because it is only one month since he planted the saplings. "It is too early. These saplings need to grow into trees and only then will they start fruiting. I will have to wait patiently and take care until then," he says.

In addition to the horticulture plantation, Mallikarjun has received support from the Sujala team for implementing a soil and moisture conservation structure such as a trench cum bund and for setting up a forest plantation with saplings of neem, silver oak and hebbevu. "I have not taken part in any other scheme nor have I set up any other structure under Sujala," says Mallikarjun. But he hopes that he could get additional help from the department to procure fertilizers, pesticides and so on.

"So far, from Sujala, I have got help for forest plantation, horticulture plantation, and TCB. I have also got training on good agricultural practices, techniques to get optimal crop yields and such. In future, I plan to maintain the structures that I have got now. I will think of something more once these stabilize," he says.

43. Mareppa Benefits from Bund and Forestry Plants Under Sujala

Mareppa Purasabayyanavar is a resident of Mustoor village in Yadgir taluk and district. His father's name is Bhimasappa. Mareppa is 58 years old and he is not educated. There are three members in

his family, including his wife and children. The family's main occupation is agriculture and the landholding is eight acres. The family grows cotton primarily as the kharif and annual crop. The annual household income is Rs 25,000 from this crop. The family has no other sources of income.

Mareppa lives in a villages that comes under a rainfed region, which means that crop production and other related activities are heavily dependent on rains. And of late, the seasonal rains have become erratic, leading to great difficulties in supplying water for the crops. Further, with rain-water not collecting anywhere and running off carrying the rich topsoil, soil erosion has been a serious issue that Mareppa and other farmers like him have had to contend with.

Having studied such issues related to soil and moisture and agricultural practices, the Karnataka Watershed Development department started giving out information about crop production techniques and soil and moisture conservation activities that could be taken up in a sustainable manner to tackle these problems. The Watershed department in association with the Agriculture university designed the Sujala-III project as part of which sustainable agricultural and soil and moisture conservation practices were implemented on the lands of farmers who were selected as beneficiaries.





"We have struggled so much for water for our crops and cattle. To see water in the farm pond is such a joy. Thanks to the pond, we have water for a few more months and thanks to the TCB, the soil holds some moisture too."

Convinced to Use Sujala

According to Mareppa, "The Watershed department officials shared a lot of information and convinced us to make the best use of Sujala. I got a trench cum bund (TCB) of dimension 100 RMT and a farm pond of dimension 18 ft x18 ft as part of soil and moisture conservation (SMC). I wanted to try interventions that would help improve water percolation into soil and improve moisture in the soil. I knew that this would help improve crop yield and the quality of soil on my land. So, I was interested in implementing the supportive structures."

After implementing the Sujala project, the department officials came for a follow up visit regularly. "When they came back for a follow-up visit, they gave advice and suggestions on what I should do for maintaining the farm pond and bund," he says, adding that he is satisfied with the work done and its quality. He also added that he did not made any contribution towards the initiatives.

"Thanks to Sujala, I got a bund, a farm pond, forest plantation saplings and horticulture crop seeds. After the farm pond and the TCB started holding rainwater, I am seeing great improvement in the moisture content on my land. It is showing in the growth of plants," says Mareppa. He adds that water is now available for three additional months. Under forestry plantation, Mareppa has planted neem, tamarind and hebbevu saplings.

Apart from these implemented structures, Mareppa has not implemented any other structure on his Sujala nor sought help from any other scheme. He has not undergone any training as well. In the future, he wants to focus on maintaining the farm pond and taking care of forestry plants. Towards this end, he wants help in procuring manure and fertilizers to help the plantations.

44. Sambaiah's Trial with Soil Moisture Conservation

For many farmers like Sambaiah, soil erosion and lack of moisture in soil had become a harsh truth. So too the lack of water during harsh summer months to irrigate the crops that they had planted. So it was often a fight to save the crop and get good income, particularly for farmers completely dependent on rain to irrigate the crops.

Sambaiah is the son of Mallaiah Kullal of Jinakeri village in Yadgir taluk and district. He is 38 years old and his family consists of six members, including school-going children. Like the others in the

village, his main occupation and source of income was agriculture. From the six acres that he owned, he earns about Rs 25,000 from the cotton crop or other crops that he plants. Crops that grow on black and arid soil are selected because any other crops would require adequate supply of water.

Dry and Eroded Soil

"This year we had cotton for the entire six acres. Last year, we planted both cotton and jowar during the kharif season. But progressively, we were seeing that "I did not have any other options so it is good that I heard of Sujala and got to implement some of the scientific techniques for soil and moisture conservation. Otherwise in a few more years, I would be left with no yield and no income and nowhere to go because I am farmer at heart."

the soil is getting dry and all the good top soil is getting washed away because of the lack of bunds to stop the water. This caused a problem and started affecting the yield and income each year,"

explains Sambaiah, indicating the reason that he had to take help under Sujala.

"I heard of Sujala-III from the Agriculture department. I knew that this was precisely what I wanted. So I met up with the officials and sought their assistance and advice. Subsequently, I was chosen as a beneficiary and plans to adopt methods for soil and moisture conservation were developed. Plans for income generation too were made. The implementation started in May 2018," says Sambaiah.



Sujala-III is an initiative of the Karnataka Watershed Development department that aims to support small and medium farmers, who are chosen as beneficiaries by nature of land, by introducing agricultural practices that are sustainable and that can generate fair income for them with good crop harvests. Farmers are trained in adopting these simple practices that don't require heavy investments and are eco-friendly.

MELD for KWDP 2 (Sujala 3) - Case Studies

Plantation with Varieties of Trees

"The Sujala team members inspected my land and based on its structure and nature, they determined the best course of action for me. It was decided that I should go for forestry plantation with 25 tamarind, 35 neem, 42 *honge*, and 54 *sagavani* saplings. This plan was then carried as per the original design. I have not applied any manure till now and the saplings seem to be doing fine. I have not noticed any pest attack too because the saplings have just been planted and are too young still," he says, adding the officials have promised to return to check on the health and status of the saplings.

Stating that it is too early to comment on the quality of work implemented, he says that the good thing is that he did not have to contribute anything. "We will have to see how the plants do. They are young still so I cannot say anything for now," says Sambaiah, hoping that the plantation will indeed be his key to a better livelihood.

Stating that he got a few other benefits for soil and moisture conservation (SMC) such as a bund and a farm pond, Sambaiah says that there are no other structures established through Sujala. "The farm pond will be very useful after it fills up because it would provide us with additional water when required. The bund will help the pond fill up and improve the moisture content in the soil. If the moisture content improves, I can think of getting into horticulture crops





too. But I will have to wait and watch," he explains hopefully. "I do hope that I get continued support from the department for what is implemented on my land and for any future actions that may be required," he says, adding that he has not undergone any training such as that by the Krishi Vigyan Kendra (KVK) or aware of techniques such as LRI that could provide more improvements and knowledge.

For the immediate future, Sambaiah hopes that he would get help in procuring fertilizers for the saplings planted under Sujala. Later he dreams of getting into horticulture crop production, which could fetch him additional income and make life a little better for his family.

45. Shekrappa Tackles Moisture Conservation with Sujala

Shekrappa, his father Nyama Jadava, and his forefathers have all been farmers, which has been their primary occupation for generations. The family owns 1.5 acres of land on which they have been growing cotton as a kharif crop on the black soil for several years. This is their only source of income.

A resident of Jinakeri Tanda in Yadgir taluk, Yadgir district, Shekrappa makes around Rs 20,000 per year from his harvest. He is 45 years old and is not educated. Shekrappa's family consists of five members, including his children and parents.

Over the years, Shekrappa noticed that the moisture content in his soil was depleting and that the quality of crops was going down due to the arid soil. He also noticed soil erosion during the rains because of the watershed region in which he was living. Further no water was collecting due to water run-off in the sloped region. "I BELIEVE THAT THE FARM POND WILL BE OF GREAT HELP WHEN OTHER SOURCES OF WATER ARE NOT AVAILABLE. I CAN LOOK FORWARD TO FOUR ADDITIONAL MONTHS OF WATER IN SUMMER."

While worrying about his crops and the reduced moisture content that was affecting his crops, Shekrappa came to know of the soil and moisture conservation (SMC) programme that the

Karnataka Watershed Development department (WDD) was implementing in the watershed regions of the state. Having heard of the benefits of the Sujala programme from the Agriculture department, including that of improved moisture and soil conditions, he decided to adopt the initiatives under Sujala, including a farm pond.

The Sujala watershed programme was designed by the Watershed department to introduce sustainable agricultural practices for small farmers living in rain-fed areas that would help them improve crop production and also to improve their livelihood. As part



of this programme, beneficiary farmers are selected and the Sujala initiatives implemented on their land according to suitability. Shekrappa is one such beneficiary.

MELD for KWDP 2 (Sujala 3) - Case Studies

"As part of the SMC work, the department officials decided that a bund plantation and a farm pond of dimensions 15x15 ft would be a good option for us based on soil structure and land slope. I too thought that it would be good if water is made to stagnate and to collect somewhere. Then there will be additional water available for the crops," says Shekrappa, hoping that this would improve the situation on his farm.

After the SMC work was implemented in May 2018, the department officials followed up to check on how things were and whether water was being retained and moisture retention was getting better. "The officials came by regularly to check on what they had done on my land. They did good



quality work and supervision, at no cost for me. That is the best part," explains Shekrappa, adding that he is very satisfied with the work. "I am willing to do all that is required to enable moisture conservation, soil erosion and crop health," he says.

SMC and Bund Plantation

Indicating that there has been significant improvement in moisture retention after SMC implementation, Shekrappa says that water would now be available for four months after it starts collecting.

In addition to the farm pond, under Sujala, Shekrappa also got to implement forest plantation on his land. His choice was to do bund plantation. But apart from a pond and plantation, no other structures have been raised on the land. "Although the initial work has been completed as per plan, I feel I need more support to continue improving this.

I have not participated in any training offered by the Krishi Vigyan Kendra nor do I know about the LRI techniques. But I want to continue doing the tasks assigned properly and ensure that I can earn better income than I do now," he explains.

His future plan is to use the water in the farm pond and cultivate horticultural crops, which he believes would be a good source of income. I hope that I get the same amount of support from the department and Sujala team, he adds.