

Long term utility and sustainable effect of soil and water conservation measures

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In this study, it was surprisingly observed that after the exit of All India Co-ordinated Research Project for Dryland Agriculture, there was an entry of a new generation of farmers in agriculture activities, village development process, and there was no adverse impact on soil and water conservation measures. Various measures that were constructed during 1991-2006, continue to support conserving soil and water, thus enhancing agricultural production and income of the farmers. Therefore, the hypothesis that measures implemented are not being maintained by farmers after the termination of the project and it no longer helps the farmers, is found to be invalid. It is a fact that with the help of technical guidance, soil and water conservation measures constructed at suitable site are effective in a long term.

Key words: Irregular gully, Malwa region, Ridgeline, Soil and Water conservation measures

UNDER All India Co-ordinated Research Project for Dryland Agriculture, College of Agriculture Indore, various works related to soil and water conservation have been carried out at farmers' fields as per the requirement during 1992-2006 in various villages of the Malwa region. The farmers were immediately benefited from the soil and water conservation techniques and they could enhance their income and productivity from their fields. Normally, it is believed that under any project, the constructed/developed structures are maintained during the project tenure due to co-ordination and attempts of scientists and farmers. As soon as the project is terminated and the scientists are not available regularly in the field, farmers disengaged themselves from maintaining the structures. Thus, soil and water conservation measures do not help the farmers after the termination of the project. With this hypothesis in view, All India Co-ordinated Research Project for Dryland Agriculture (AICRPDA)

College of Agriculture, Indore initiated a study during 2017-18 to assess the present status of the structures constructed by the project and to know how it is being managed by the farmers.

Utility of diversion drain

In the Malwa region due to its hydrogeological situation, various small and big ridgelines are available. Average rainfall of the Malwa region is around 957 mm. In this region, mostly black soils are available which produce higher runoff volume than other soils. Therefore, fields located adjoining the ridge-lines are prone to soil erosion due to non-existence of vegetation and soil. The runoff from these ridgelines enters in to the adjoining cultivated fields rapidly and fragments them due to the development of several gullies. This problem gets severe when a huge amount of after-collection at a junction point of several drain lines enters into a particular field. This process severely erodes the field and divides it in several parts and it is no

longer suited for any cultivation. Though, the solution to this typical problem is not easy, the problem can be solved to a maximum extent with the development of effective and efficient diversion drains on the basis of the existing field situation.

In 2005, a team of scientists of the *Operational Research Project*, College of Agriculture, Indore attempted to tackle such problem in a village Jaitpura, block Sanwer, district Indore. In this village, a farmer's shri Chhagan Lal was badly affected by this problem. His farm is located by the side of a *kachha* road and was fragmented due to uncontrolled runoff flowing down the ridgeline and other upper fields. During the monsoon season, the uncontrolled runoff used to run from his field, which caused to the development of various serpentine shaped and irregular gullies. The field was fragmented into several parts and was separated by small and medium gullies. Only 1/10th of his area was under cultivation with very low crop productivity because of continuous soil erosion. The only main and effective

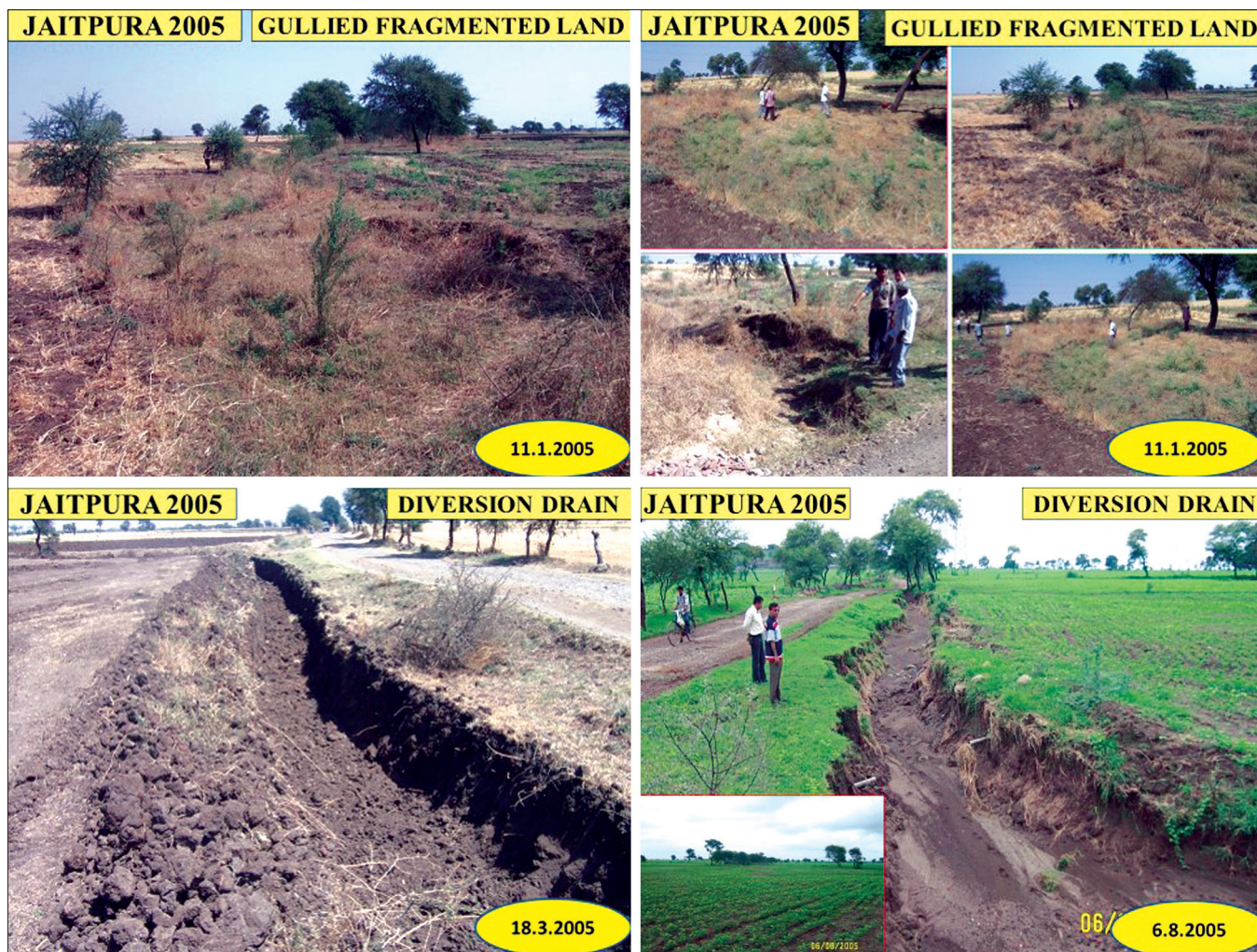


Fig. 1.a. Before (2005) the implementation of operational Research Project in the field of Shri chhagan Lal

solution to this problem was to keep away the entire runoff coming from upper areas and restrict its entry into the field and draining it safely. For this purpose, a JCB machine was used for excavating a 225 m long drain of 1.30 m depth and 1.20 m width at just outside the field. It was connected to a big natural drain so that this uniform sized excavated drain could divert the runoff from upper fields safely to the natural drain. Excavated black soil available during the excavation of the diversion drain was used to fill the gullies, drain lines and depressions to make this affected field leveled. This way a new area of 2,500 m² could be brought suitably for cultivation during March 2005.

Result of the development and construction of diversion drain was realized within 3 months i.e. in August 2005. Shri Chhagan Lal could sow soybean crop in the entire reclaimed field in the first week of July 2005. The area experienced 200

mm rainfall on 1 August 2005 with high intensity. A huge amount of runoff from degraded land was generated that could have entered into the cultivated field of Shri Chhagan Lal with very high velocity to damage it with severe erosion. However, the constructed diversion drain safely diverted and drained out the entire runoff safely without allowing its entry into a newly reclaimed field and that saved the cultivated field from getting damaged.

Shri Chhagan Lal was very happy as this diversion drain helped him not only save the soybean crop and soil of the field but also enhanced the market rate of his field by levelling up, which otherwise was fragmented into several land pieces with almost no use. The project provided ₹ 32,000 to develop and reclaim the fragmented field with the provision of diversion drain (Fig. 1.a). The rate of this field was enhanced from ₹ 1 lakh to 3 lakh due to its reclamation.

At the time, it was assessed that and levelling technique of soil and water conservation can be adopted in the Malwa region to tackle the problem of irregular gullies to enhance farm production which can bring a new area under cultivation by reducing the soil erosion process with the provision of drain diversion.

In 2019, a team of the project visited the area and found that a *kaccha* road is converted into a *pukka* road. However, the diverted drain constructed by the project during 2005 is still maintained by the farmer, which is working effectively to safely dispose-off the runoff water without any damage to the reclaimed field for the last 15 years. The same field is utilized by the farmer for higher yield production without any further damage and development of gullies (Fig. 1.b).

Therefore, it demonstrates that if soil and water conservation measures that are constructed with the technical

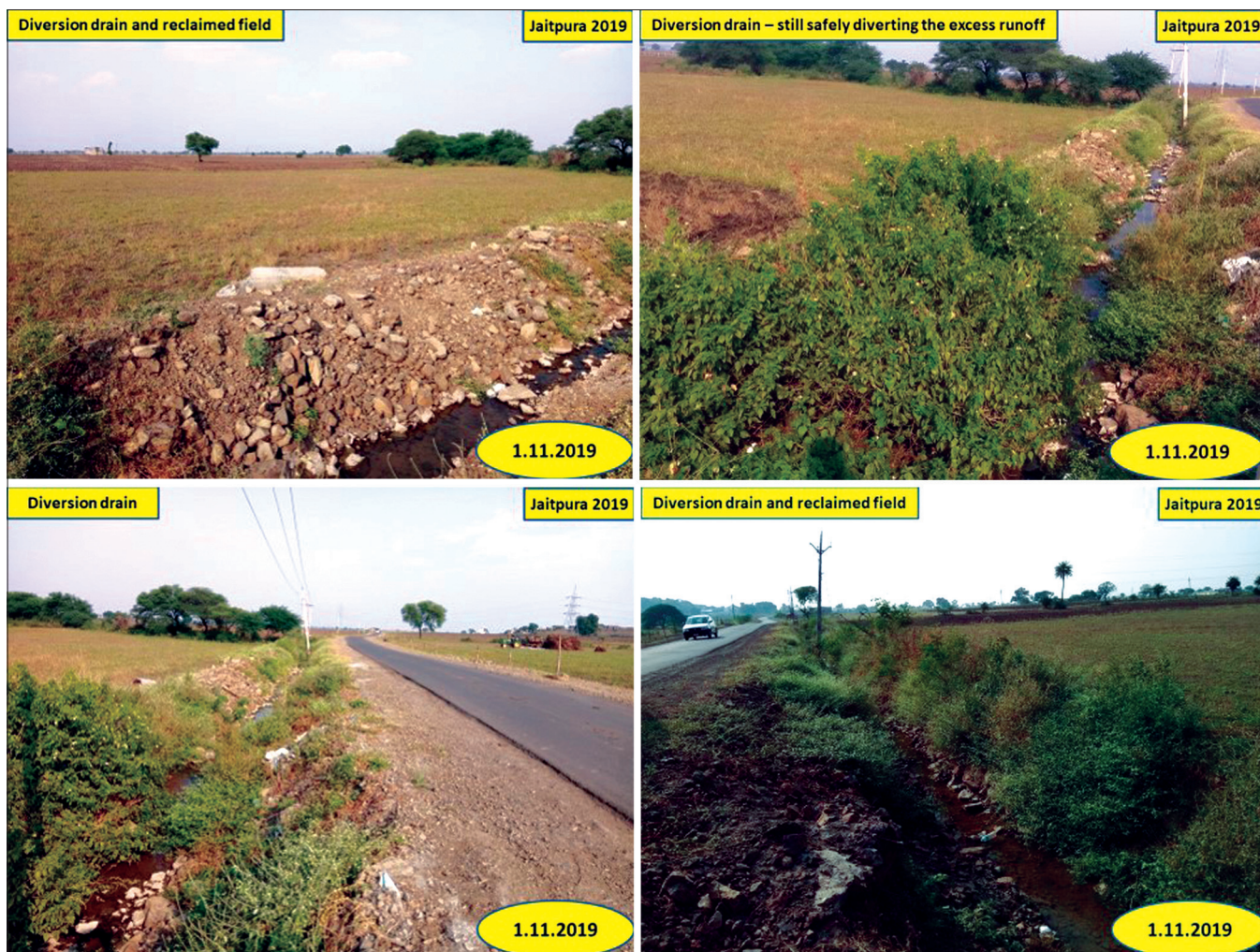


Fig. 1.b. After (2019)

guidance of scientists and with the coordination of farmers, the same can be maintained properly by the next generation-farmers even after the termination of a project to get its full advantage in the future. Many such experiences were observed by the project team in the study made during 2017-19. After the effective and successful project even after a decade, the farmers gradually have confidence in scientists and in their technical guidance.

Many more such successful demonstration exists in which many farmers were benefited (Fig. 2.a.b). Various structures *viz.* water harvesting tank, water-harvesting tank with gabion structure at outlet, percolation tank, and water storage tank with well-recharging system as per the site-specific requirement. Even today, these structures are maintained by the new generation-farmers and utilized for enhancing their farm production and income.

In this study, it was surprisingly observed that despite the exits of a project, entry of a new generation-farmer in agriculture activities and village development process was found, and no adverse impact was noticed on those structures. Various measures constructed during 1991-2006 continue to conserve soil and water, thus helped in enhancing agricultural production and income of the farmers. Therefore, the hypothesis that these measures are not being maintained by the farmers after the termination of a project and it no longer helps the farmers, is found to be invalid. Infact, with the help of technical guidance, the soil and water conservation measures constructed at suitable site are very effective in a long-term.



Fig. 2.a. Before (2009)



b. After (2019)

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