



Impact Assessment of Anicut on Socio-Economic life of the Village Dhunsari, Chaksu- Block in Jaipur-District, Rajasthan



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Executive Summary

India's desert state Rajasthan supports about 5% of the country's population and 20% of livestock with less than 2% of the nation's surface and ground-water resources. The steep population growth trend has been putting exacerbated stress on the limited water resources. The paucity of rainfall and increasing uncertainty of monsoons owing to climate change have made matters worse. Availability of water from all sources has come down to under 800 cum per person per year and will soon reach a highly precarious level.

Amidst this background CECOEDECON an NGO working on the issue of water in Rajasthan has been working to enhance water conservation potential with the support of the rural communities in over 500 villages of Rajasthan. One such initiative was the construction of an anicut in the village Dhunsari in the Chaksu block of Jaipur district.

This report sheds light on the impacts of this effort and the benefits it has been able to generate for the people living in Dhunsari and the surrounding villages of Ganeshpura and Jatoni Dhani.

This report also includes testimonies of people involved in the anicut construction, of women and youth. This report will also help to understand the generational shift in the way people look at things.

This report has five different themes :

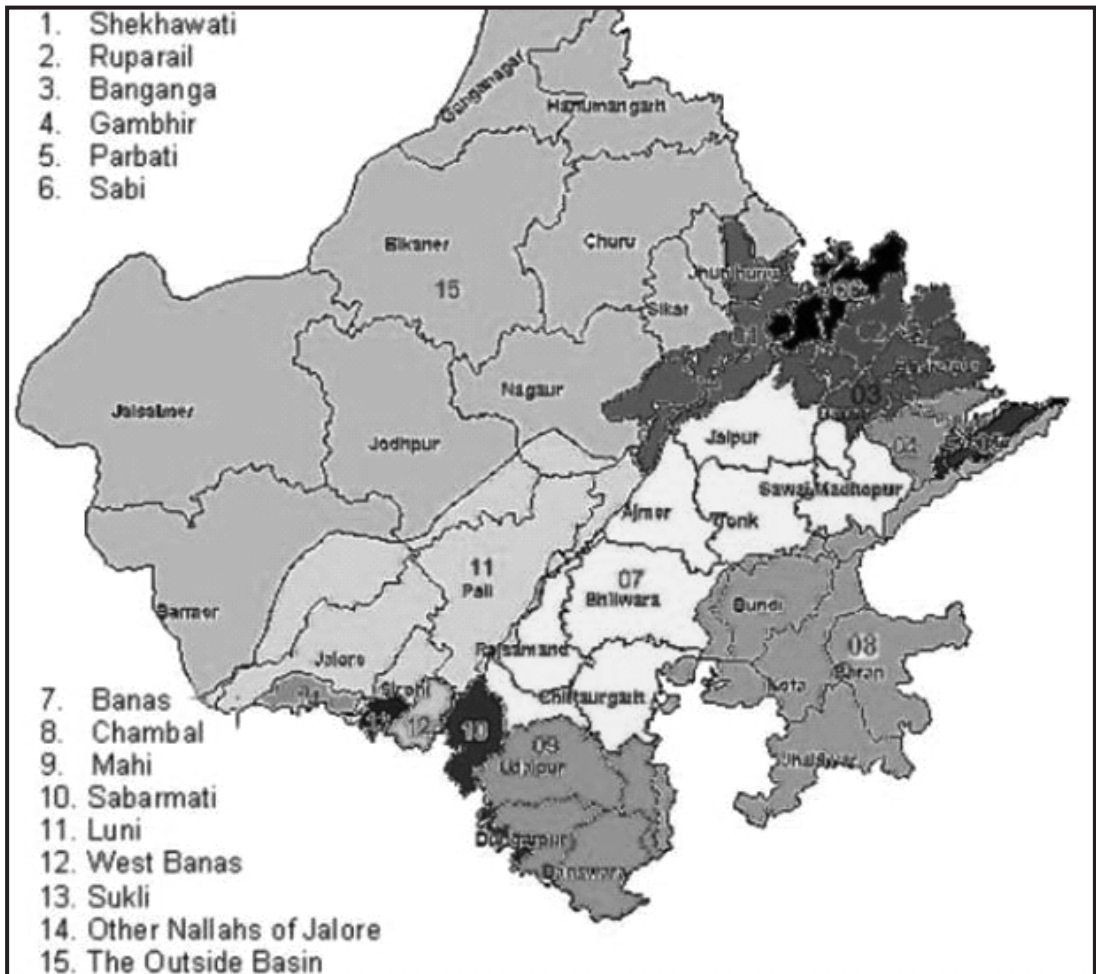
- Agriculture
- Wealth
- Women empowerment
- Biodiversity
- Education

Introduction

Water is an essential source of development in any civilization. History shows us that civilizations flourished on the banks of rivers. Mesopotamian civilization flourished on the banks of tigris river, Harappan civilization flourished on the banks of river Indus. While water is critical for the development of all civilizations it also has the power to completely wipe them out.

Water, a scarce economic resource and one of the most manageable natural resources is capable of diversion, transport, storage, and recycling that shows its great utility for human beings. Good water resource management at all levels can help countries to adopt flexible approaches that allow more people to meet their water requirement, while preserving the environment.

Rajasthan is the driest state in India with 60% of its geographical area characterised by arid region and 40% being semi-arid. In the arid region, the average rainfall is below 400 mm and in the semi-arid region the average rainfall ranges from 550 mm to 800 mm. The annual precipitation over most of the state is insufficient, resulting in scarcity of water even when a meteorological drought has not been declared. There is a very rapid and marked decrease in rainfall in west of the Aravalli range making western Rajasthan the most arid part. About 85% of the total rainfall is received during the southwest monsoon while the remaining during winter with the passing western disturbances over the region.



Water basin map of Rajasthan (source: <http://www.rajirrigation.gov.in>)

Cecoedecon's Natural Resource Management Efforts

For the past 39 years, CECOEDECON has been supporting the people to develop their natural resources through efforts including soil and water conservation, water harvesting, ecological regeneration, watershed development etc. The interventions have focused on “reducing soil erosion and increasing surface & ground water in the area” through comprehensive sustainable water use practices, helping the organization to build a common understanding on all the components related to the subject.

The actions under the Natural Resource Management program of CECOEDECON have helped in creation and maintenance of water harvesting structures and changing social behaviors for Conservation of natural resources specifically water. In order to enhance resilience, dry land farming and measures for water and soil conservation have been promoted. This is supported by transfer of technologies at the grassroots, having great relevance for minimizing the effect of drought on small and marginal farmers. This opens a variety of opportunities for the farmers with regard to improved farming practices, drought resistant crop varieties, improved seed varieties or bio-fertilizers use etc.

The organization has also constructed and revived a number of traditional water storage structures including anicuts, ponds, Nadis, tanka, earthen dam etc.

In the field of Water, CECOEDECON's primary approach has been to involve the communities in designing water management solutions; promoting and supporting local knowledge by providing requisite resources, training and technical knowledge. With the goal of enhancing capacities of grassroots communities, CECOEDECON initiated interventions like contour bunding, construction of water catchment structures, Check Dams, Gully plugs etc., with simultaneous plantation of trees to allow Micro and Macro level Water management.

This has resulted in gradual changes in the overall socio-economic scenario with farmers taking two or three crops in a year, and three times increase in milk production.

CECOEDECON developed and revived approximately 83 anicuts. The average additional water storage capacity per year from these anicuts is 170850 Cu.M, that benefited around 30000 families of more than 100 villages.

Introduction to the village

The village of Dhunsari is located 50 kms away from Jaipur in the Chaksu tehsil (block). It is under Gram Panchayat Kadera. At the time of the assessment, 200 families reside in the village. There are four major castes namely Jats, Gurjar, Brahmins and Yadavs. The village is divided in two parts with the anicut in the middle. Brahmins and the Gujjars members live on one side of the anicut while the other two castes, Jats and Yadavs live on the other side of the anicut.

The village covers a geographical area of 12-15 acres of land. Landholdings of most households are not concentrated and are scattered in different parts of the village. For eg. A family might have 3 acres of land close to the well and another 5 acres away from the well and water source that makes the agriculture in the village a difficult task to perform. Despite this agriculture remains the main source of income.

Apart from agriculture, animal husbandry is a critical economic activity for the people in the village. There is a visible transition in terms of types of animals reared. Prior to the construction of the anicut, goats were reared and milk was sold in the local market for additional income. However, post the construction of anicut, the villagers started rearing buffalos and cows due to abundance of grazing land. The rearing of cows and buffalos has not just resulted in increasing the wealth of the farmers but has also led to increase in manures and reduced the dependence on fertilizers.

The major crops produced are wheat, barley and mustard. 80-85% of the villagers are involved in agriculture. Women are mostly involved in the household works and cattle rearing. Apart from this, the villagers also grow vegetables for self consumption in the family. Animal fodder like ranjka is also grown which has helped in increasing the fat content in milk.

The anicut has proved to be beneficial for the entire village, however, it is the Gujjar community that has reaped the maximum benefit out of it.

Process of Impact Assessment

The construction of Anicut in Dhunsari gaon was initiated in 1987, under the supervision of Late Mr. Sharad Joshi (CECOEDECON founder) and took more than a year to finish. The construction involved approx 11,200 labourers from the three villages namely, Dhunsari, Jaato ki Dhani and Ganeshpura. CECOEDECON has decided to conduct an assessment to assess the sustainability of the impacts created by this initiative and to see the transition of the change to subsequent generations of nearby villages, in general, and Dhunsari, in particular.

Areas covered

For a thorough understanding of the results, an area of approximately 4 km radius around the anicut has been covered. This is because the structural size of anicut covered an area close to this range. Three villages fall in the 4 km area, i.e., Dhunsari, Jaato ki Dhaani and Ganeshpura. The summarised information of these three villages including populace, agricultural land, livestock, number of wells etc. is shown in the table below :

Village	Families/Population	Livestock	Agricultural land	Wells
Dhunsari	200/ 1200	1000	1000 acres	18
Jaato ki Dhaani	15/ 300	100-200	75 acres	12
Ganeshpura	15/ 300	100-200	75 acres	5

Due to the topographic elevation one village (namely Jaato ki Dhaani) is located far away from the anicut. The capillary action of water cannot work at a large distance and wells remain discharged from anicut's water; hence, less impact was seen in the village.

However, field trips were made to the village as it was earlier a part of Dhunsari and villagers had actively participated in constructing the anicut. Also, the visit will give an overview of the prevalent situation in the entire area before and after anicut construction.

Methodology

To bring an ease in data collection, mixed data collection methods and tools were used.

1. Primary data was collected by the **in-depth interviews cum interactions** with the old farmers. In-depth interviews could establish rapport with the villagers and added in creating a comfortable atmosphere which can generate more insightful-responses. Also, it created space for collecting additional information, in gaining understanding of their perceptions, motivation etc. **Group interviews** covering randomly selected households were conducted including women, men, youths etc. to understand their perspectives on water availability and its associated positive impact, also how their tasks shifted from the time when the water was not available to its availability.
2. **Direct field observations**, insights have also been generated from physical observation of the agricultural fields as well as the houses and lifestyles of the villagers. This has helped in cross-checking the data collected.
3. **SROI (Social Return on Investment)**, tool was applied. It enables an organisation to measure how much change is being created by tracking relevant social, environmental, and economic outcomes. It involves assignation of monetary values to the amount of change created.

The Broad Village Level Insights

Specific data on the impact of anicut on selected critical areas namely agriculture, livestock, health, education, biodiversity, climate change etc. was collected from all the three villages and is summarised below.

Dhunsari

The closest village to the anicut is **Dhunsari** and which is why it was assumed to have the maximum impacts. There were 90 families in the village in 1989. The lack of water led to the frequent drought like situation in the village, leading the people to migrate as daily wagers. In the villager's words, the situation before the construction of anicut was terrible, with no or scarce water, there was limited agricultural produce, low availability of fodder for the cattle leading to small herds, more health-related issues and illiteracy (as the primary needs had to be prioritized). Apart from this, lack of water also affected social relations which resulted in the local men having poor marriage prospects as people refused to send their daughters to a water scarce area.

The local community members discussed their water woes with CECOEDECON in village level meetings called *Chaupal*. The organization motivated the community to collectively undertake large scale water conservation efforts in the village to attain water self sufficiency. The encouragement and financial support of the organization helped in mobilizing a strong local support. The initiative was planned in subsequent *Chaupal* meetings integrating the traditional knowledge of the people on the flow of water, topography, water collection etc. with low cost and context specific technical and financial inputs from CECOEDECON. This was followed by the construction phase which took about a year.

With the construction of anicut, the water could be retained even in cases of low rainfall. The soil around the anicut holds a good amount of moisture which has increased the agricultural production per unit area. The water retention during monsoons charges 18 wells of the village which fulfills water needs even in dry periods. This has decreased the drudgery of women, saving time and energy required for bringing water from long distances and allowing for participation in other development activities like education. Villagers also said that in case of fertiliser need, they pick up the soil from anicut and spread it in their field which increases the fertility and productivity of the field.

The area around the anicut has turned lush green, and used for catering to the fodder needs of the cattle in the village. Furthermore, people have started shifting from the large

goat and sheep herds to smaller herds of cows and buffalos. The resulting significant growth in dairy has helped in boosting the household income. This has had a strong impact on the empowerment process of the women as they are the primary managers of the livestock.

Farmers started taking two or three crops a year, few farmers have also started to grow vegetables (tomato, onion etc.) in their field apart from Rabi and Kharif crops making them self-sufficient. Also, the water is now available for both better public hygiene and sanitation leading to a healthy environment and good nutrition intake.



"I was there during the construction of anicut. We used to work and sleep at the site of the anicut. The anicut brought people in the village together for a common cause and that has improved the next generation."

- Narayan

Ganeshpura

Village Ganeshpura, located within the vicinity of Anicut, has only Gujjar population. It is a small village with only 15 families and a large youth representation of youth. The village was getting benefits from two anicuts, though the maximum benefit was coming from anicut built by CECOEDECON in 1989.

The availability of water has empowered the villagers but differently. Here people seemed more self-sufficient. Most of the women hold the responsibility of rearing cattles, managing agriculture, cultivating the crops, doing household chores etc. Every girl of the village was enrolled in education, while few of them have also completed their graduation from Chaksu.

With the improved access to water, they now grow three crops in a year, Rabi, Kharif and vegetables and fruits (guava, pomegranate etc). Every household grows vegetables for their self-consumption, while few also sell it.

Women were comparatively more empowered in this village, due to their higher enrolment in education and also their enhanced role in decision making.

The condition of youth is also comparatively better as most of them have been preparing to enter into the Government sector while few of them are already engaged in Government jobs. The youths enjoyed their right to vote and to choose the kind of life

they want to lead. All this came with the availability of water, as with water came self-sufficiency and they could think beyond their basic needs (food, cloth, shelter etc.).

The water conservation structure has tremendously improved the biodiversity in the village. The lush green atmosphere and the adjacent water bodies have invited the presence of innumerable peacocks. Duck, swan, buffalo, cow, goat and varieties of birds are seen in the village now. Also, health status and key nutrition indicators of the village have improved notably.

Jaato ki Dhani

This was earlier a part of Dhunsari village and later a separate village of Jats was formed. Villagers from Jaato ki dhani participated in constructing anicut, and described the situation prior and after the construction of the anicut. It was a drought-like situation in the 1980s, with no or very less water, people preferred to drink water rather than using it for other purposes. And, since the construction of anicut, they never faced water scarcity. They became independent and self-sufficient. Increased livestock rearing, improved health and education facility etc. were listed as the other few direct positive outcomes.

However, after forming a different village, they faced few challenges in water availability as the distance between anicut and the village has increased. The farmers in this village are wealthy, as they have more cattle. Also this village has a pond nearby which supplies water for irrigation. This village is not directly benefited by anicut, but the anicut helps in recharging the water in the village ponds and well

Findings (Qualitative Analysis)

The section below details the qualitative impacts of the Dhunseri water structure in the specific development areas:

1. Agriculture

The watershed development programs involve the entire community and natural resources and influence, productivity and production of crops, changes in land use and cropping pattern, as well as promote adoption of modern technologies etc.

a. The shift from Subsistence farming

The present study shows that after the construction of anicut the farmers have shifted their focus from subsistence farming to commercial farming. Earlier the produce was low. Hence the farmers did not have any surplus crop, the yields could only fulfill the subsistence requirements of the households.

b. From Single Cropping System to Multiple Cropping System

The agriculture in this region was solely rain fed. Earlier farmers used to grow only one crop a year because of scarcity of water. Farmers used to take only kharif crops but now there is water available in the anicut, also anicut recharges the wells so the farmers are in a position to grow more than one crop. In this region in the Kharif season farmers grow Bajra and in Rabi season farmers grow Wheat, Mustard and Gram. In some cases farmers also go for a third crop, it is usually a fodder crop called *Ranjka*. Availability of water has enabled farmers to grow vegetables. During our conversation with farmers we got to know that many farmers grow vegetables for themselves and in some cases for commercial purposes too.

c. Adoption of new technology

Availability of water has increased the farmers income which enables them to buy machinery. Currently, in the three villages that were studied, 75 percent of households have tractors, every village has at least 2 households with threshers. The households who do not have a tractor have the capacity to rent the required machinery.

d. Soil Conservation

In agriculture, soil erosion refers to the removal of topsoil by the natural

physical forces of water and wind at a rate greater than the rate of its formation, or through forces associated with farming activities such as tillage. Erosion removes the topsoil first and once this nutrient-rich layer is lost, the potential of soil to sustain plants is reduced. Without soil and plants the land becomes desert like and unable to support life. (Bashir and Bibi, 2017). The present study shows that the anicut has prevented the runoff of soil during heavy rainy seasons. Earlier because there was no fencing the soil used to be carried away with water runoff.

e. Climate Change Adaptation

Agriculture production has a high dependence on climate change and weather vagaries. The changes and uncertainties in temperature, precipitation and CO₂ concentration due to climate change will have a major impact on the agriculture sector. Rainfall in India has a direct relationship with the monsoons which originate from the Indian and Arabian Seas. A warmer climate will accelerate the hydrologic cycle, altering rainfall, magnitude and timing of run-off. Warm air holds more moisture and it will result in an increase in evaporation of surface moisture. Climate change has a direct impact on crop evapotranspiration (ET). In arid regions of Rajasthan state an increase of 14.8 per cent in total ET demand has been projected with increase in temperature. The study further indicates that even a marginal increase in ET demand due to global warming would have a larger impact on the fragile water resources of the arid zone ecosystem of Rajasthan (Kumar and Gautam, 2014). Therefore, change in climate will affect the soil moisture, groundwater recharge, and frequency of flood or drought, and finally groundwater level in different areas. The effects of climate change will affect the water cycle having consequences on the availability of water. In the context of present study the presence of anicut adds to adaptation capacity of farmers with respect to climate change by enhancing water security. The community members agreed that even in long dry spells the water conserved in the anicut reduced the risk of drought in the villages significantly allowing for a buffer protection from climate risks.

2. Women empowerment

The objectives of each watershed development project are promoting economic development, the restoration of ecological balance, and giving “special emphasis to improve the economic and social condition of the resource-poor and the disadvantaged sections of the watershed community such as the assetless and women”.

Rural women have multiple roles, from being the primary managers of household needs, to the main source of manual labour in the farming sector. Earlier the lack of adequate water added to the woes of the women of the village. They had to walk for miles in order to fetch water for household works and drinking purposes. The construction of anicut

has resulted in the upliftment of ground water table which enables the villagers to make borewells and handpumps in close vicinity of their houses.

Consequently it resulted in women having some leisure time. This luxury helped the young girls to get enrolled in a regular school. The enrollment rate of women in education depends upon many other factors too. However the availability of water has had a remarkable impact on the education of girls.

Women are the ones responsible for cattle rearing. Earlier when the ground water level was low, women had to bear the brunt of walking miles to bathe the cattles and make them drink. Availability of water has helped the villagers to grow more crops and fodder on the farm itself. The villagers now keep a higher quality breed. Also both the agricultural and animal husbandry byproducts provide additional inputs for preparing manure, cattle feed etc. which reduce their overall costs.



"The anicut has changed the life of the village, especially women. Earlier, we used to rear cattles but now we have buffalos, cows and goats that add to our family income. This increase in income has helped in bearing the marriage expenses of my children and increased our status in the society".

- Sunita

3. Education

The availability of income generation avenues within the village have helped in reducing forced migration which has consequently increased the number of school-going children and education retention. Parents now send their children to school since they do not migrate for work. Besides, they can afford it as they are now earning sufficiently to do without the income-augmenting activities which children undertake, such as sheep and live-stock herding, providing the children a more conducive environment to learn and develop.



"I have always worked in the fields. Now, I don't want my children to do the same work that I have done. I am trying to educate myself. I read whenever I get time. I will not let my children work in the field and will always motivate them to study".

-Sheila

4. Biodiversity

The availability of water ensured the availability of food for many birds and animals. It was repeatedly admitted by the participants that peacocks were not seen before the construction of the watershed, however currently you can see a number of peacocks roaming around. There are a number of species that have become extinct from the eyes of villagers, it includes, Eagle, Vulture, and Wolves. Among the species of birds which started coming to the village are ducks and swan. The locals also reported a change in the flora around the village. The water conservation efforts increased the vegetative cover in the area, reduced runoff, soil loss, and land degradations and improved biodiversity improving the overall ecosystem of the area.

5. Health

This is a direct consequence of enhanced nutrition, access to clean drinking water, improved living conditions, basic knowledge of promotive health and prevention of diseases and access to basic facilities. The local community members shed light on the improvement in availability of water especially for drinking purposes, enhanced food security, as well as the increase in income from enhanced agricultural productivity and allied activities. They also believe that the economic status has enabled them to access health services and focus on improving their health and hygiene practices which were often neglected earlier.

Quantitative Analysis

Social Return On Investment (SROI)

Village: Dhunsari, Chaksu,

Jaipur

In order to understand the impacts of the water conservation structure through a quantitative perspective the participatory monitoring tool of Social Return on Investment (SROI) has been used.

SROI is a measurement and quantification tool that helps in assigning monetary value to the social, environmental or economic change created through an organization's activities. The tool uses traditional cost-benefit analysis in a social setting allowing for the involvement of the people in assessing and understanding the value of change.

The anicut construction started in the year of 1987 and got completed in the year 1989.

The SROI for the village was conducted by a team of three students from Tata Institute of Social Sciences (TISS), Prasun Mathpal, Nargis Ansari and Gazala Parveendone under the supervision of Mr. Chittarmal Jat and Mr. Bajrang.

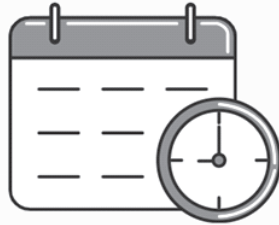
Process of SROI:

During prior discussions on the benefits and significance of the anicut built by the organisation in collaboration with the people, it was decided to conduct a Social Return On Investment to analyse and quantify the economic and social benefits.

Group discussions were organized with the village residents to conduct the exercise. The participants were told about the process in brief and easy to understand language following which the quantification process was undertaken. Discussions, agreements and disagreements were noticed throughout the conduct of the activity which indicated the interest of the participants and their ownership of the initiative. Efforts were made to involve the women specifically during the discussions. Separate conversations were also held with the women to reduce their discomfort and include their views.

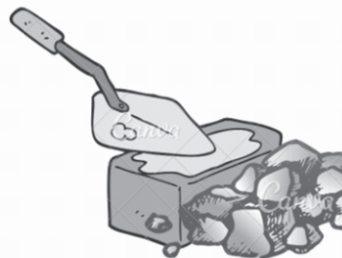
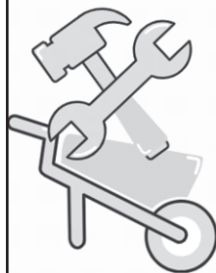
A breakdown of the cost of anicut built was ascertained through a participatory discussion and finalised after the agreement of the villagers. The same is depicted below:

COST CALCULATIONS



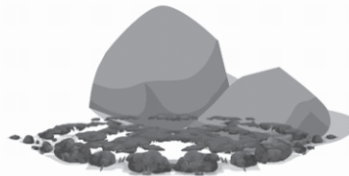
CONSTRUCTION PERIOD
2 YEARS (APPROX.)

90 FAMILIES AT THE TIME OF
THE CONSTRUCTION PROVIDED
10 DAYS LABOUR FREE OF COST
AND WERE PAID FOR THE REST.



TOTAL COST OF
CONSTRUCTION

RS. 10,63,480

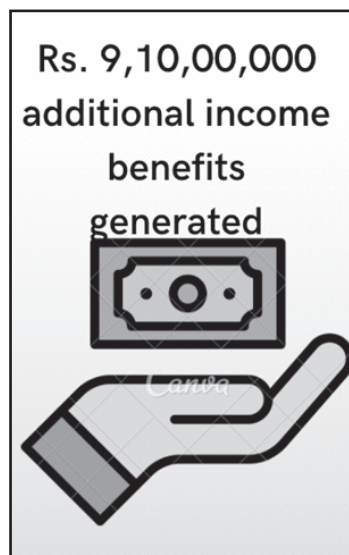
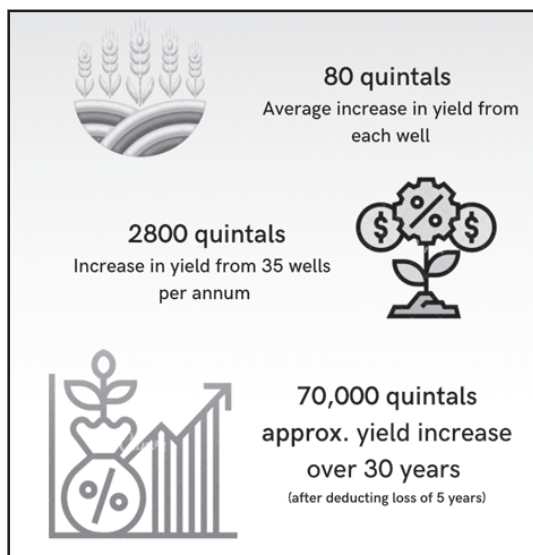


* INCLUDING ADMINISTRATION COST AT 10% OF THE TOTAL

Benefits generated for the local Community

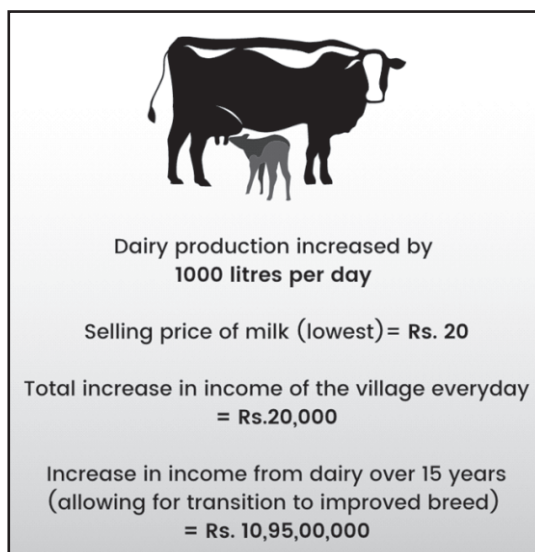
AGRICULTURE RETURNS

Water levels increased in about 35 wells due to the anicut (60% in Dhunsari and 40% in Rubas and Ganeshpura)



*Cost of per quintal of yield (on an average) = Rs. 1300

RETURNS FROM DAIRY SECTOR



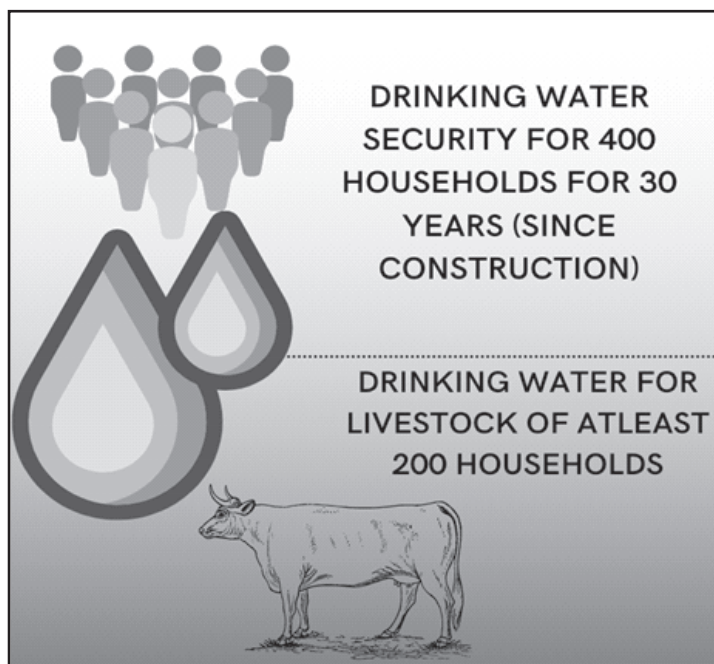
DIVERSIFICATION OF LIVELIHOODS

YOUTH in the village have diversified from agriculture to alternative sources of income

Engaged Government Jobs 10

Shops in Chaksu (tea, sweets) 10

WATER SECURITY (DRINKING WATER AND WATER FOR LIVESTOCK)



BASED ON THE LIMITED QUANTIFICATION IN THE AGRICULTURE AND LIVESTOCK SPACE

EACH 1 RUPEE SPENT

HAS GENERATED A VALUE OF OVER

RS. 178

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Where Action Speaks Louder Than Words



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