

# Baseline investigation for environmental project- A scientific approach

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## ABSTRACT

Environmental sustainability is achieved through well versed research and analysis of the current and potential future issues under the defined sustainable development goals (SDGs). In this context, it is essential to establish a strategic formulation and implementation of activities/ projects that lead to sustainable development. An important segment to achieve this is availability of precise information regarding respective sectors, post which projects are formulated under CSR (Corporate Social Responsibility). This paper communicates the on-course flow of utilizing primary and secondary data in ascertaining and attaining different components of the research. The study presents the relevance of social and environmental data in understanding the ground level conditions and comparative analysis of selected environmental and social concerns in rural areas in the states of Jharkhand, West Bengal and Punjab.

**Keywords:** CSR, Comparative research analysis, Environmental data, Environmental sustainability, Rural development

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## 1. INTRODUCTION

Environmental data sets are relevant components of the policy formation and implementation for sustainability in the mentioned area[1]. Sectors involved in environmental policy, such as commercial, corporate, private and government, utilize these datasets in one way or the other, also involving rigorous data analysis[2]. Thus, these datasets are mandatorily required to be accessible, dependable/precise, effective and usable in a standard based common data format with relevant documentation[3]. Environment observations are significant resources in qualifying and monitoring environmental change. Based on this, decision making in environmental sustainability in terms of transformation, monitoring and adaptation is complex with dependable financial, social, and political suggestions[4]. Therefore, consistent and reliable details/information are the foundation of such decisions.

On a typical basis, data sets are accumulated through primary and secondary methods. While primary data is collected directly by the researchers from main sources, secondary data are already collected datasets that are made available to the researchers. Also, the secondary data is more dependable and precise as it is authenticated by multiple sources[5]. Often, the primary and secondary datasets are used as interlink ages to each other or as validating agents to one another. Precisely, as the primary data is collected and analyzed, the results can be validated by using respective secondary data in that sector[6]. Once the primary data is validated, it transforms into a potential secondary data for future researches[7].

A scientific research and implementation project is primarily based on the existing problem/issue in a particular locale. This forms the research problem and is later used in research and implementation (if applicable) of the project formed[8]. The available secondary data aids in identifying these research problems in a couple of regions and relevance of certain implementations in the region. Based on such data, a researcher is able to conclude upon the most inundated area in regards to the research problem and hence affixes that as the study area for implementation[9]. Subsequently, the data is also utilized in pinning the possible solutions in addressing the issue(s) within. Post these stages, primary data collected through different means, succors in understanding the baseline scenario in the study area[10].

Structure building of the project includes the strategic approach to be undertaken in taking the project forward[11]. This involves setting up goals and/ or objectives to be achieved and the methodological structure in terms of tools and technologies to be adopted in achieving these goals[12]. This also assists in establishing the deliverables and outcomes, both intermittent and final, under the projects[13].

Post these steps, a wide range of CSR (Corporate Social Responsibility) projects roll out to integrate a nexus of environmental and social concerns of the society[14]. At present, a large number of CSR projects are directed towards rural development, environment, education and health. This study unveils the progressive roadmap of comparative analysis of the ground situation of certain environmental and social concerns in rural areas in the states of Jharkhand, West Bengal and Punjab.

## **2. METHODOLOGY**

The methodology has adopted analysis of secondary data available on certain environmental and social concerns across India. To understand the characteristics of the study area at the macro-level, factors viz. source and pattern of geo – physical status, water utilization, cultivation area, cropping patterns, farm size, types of schools, education provided, facilities available at school and village level etc. were taken into consideration. In addition to this, to understand the ground conditions of unit of observation i.e. the aforementioned factors, collection of primary data has been carried out and confined within the limits of the identified study area.

In this process, development of sampling locations by identification of inundated States was done on the basis of research outcome and need assessment in terms of existing basic facilities at the village level (inclusive of schools) and current water availability at State level. Secondary literature/data in terms of the aforementioned parameters were culled out from government reports and portals and analysis was done in this process.

Post identification of the study area, ground data on the selected parameters was collected using stakeholder perspective survey. Hence, a form of baseline survey to understand primary stakeholders' perspectives was designed and undertaken to assess and understand the current amenities, practices, knowledge and attitude of the stakeholders .i.e. the villagers (inclusive of farmers, panchayat members, school staff and students). This consisted of developing a sampling methodology along with development of a set of questionnaires, pilot testing and finalization of questionnaires for different stakeholders.

The method included developing set of different questionnaires to capture information on village profile, existing basic facilities at the village level (inclusive of schools) and current water use in agricultural sector, by categorizing village stakeholders into:

- Panchayat Members,
- School (Principals, teachers and students)
- Farmers

Post development, the draft baseline questionnaires were pilot tested and identified gaps were bridged.

The data analysis was based on contextual analysis of the survey locations in terms of existing basic facilities at the village level (inclusive of schools) and current water use in agricultural sector.

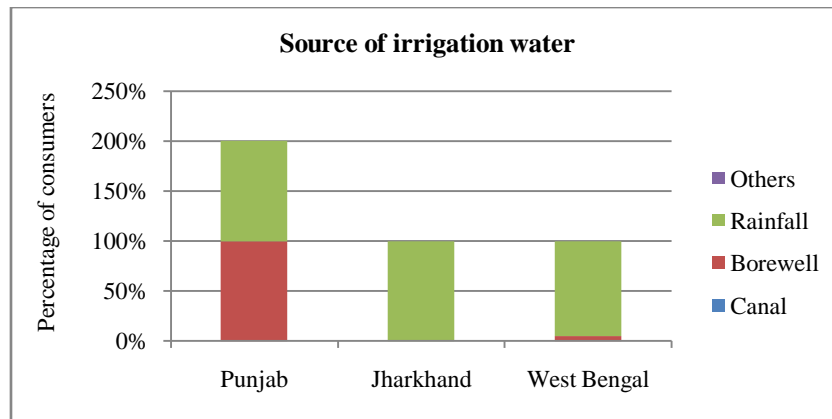
## **3. STUDY AREA**

Based on the secondary literature review and subsequent analysis in terms of state level water availability and basic level facilities (at village and school level), the inundated States were identified. At school level, the considered basic facilities were availability of drinking water, electricity, library, separate washroom facilities for boys and girls, playground etc. Primarily, the State level rainfall and groundwater data were analyzed. The shortlisted states were then analyzed for the above mentioned facilities. States with less than 95% maximum were finalized. Therefore, based on this analysis Jharkhand, West Bengal and Punjab were identified as the inundated States. Post the identification of the study area, the stakeholder perspective survey was carried out therein and the findings were consolidated.

## **4. RESULT & DISCUSSION**

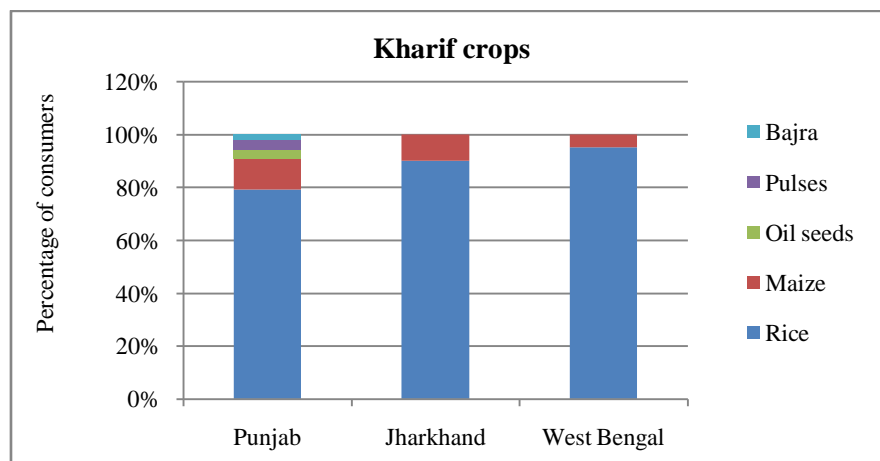
### **Agriculture**

Almost all the farmers in Punjab are dependent on ground water i.e. pumping water through borewell for irrigating their fields. While they also depend on rainfall to a small extent, they do not rely on the rainfall completely. Since the agricultural electricity is free in the state of Punjab, majority of the farmers use autostarters in their fields which has eventually lead to depletion of groundwater table in these areas. Jharkhand being a rainfed state, almost all the farmers depend on rainfall for the source of irrigation water. Similarly, since most of the farmers depend on rainfall, the area does not show the need for a separate electricity connection for agriculture. This dependency on rainfall also explains the absence of autostarters in the farmlands for agricultural pump operations. Farmers in West Bengal are dependent upon both rainfall (95%) and borewell (5%) for their irrigation needs (Fig. 1). However, borewell water is mostly required by the farmers due to unreliability on rainfall in case they take up second and third crop on their farmlands. Also, farmers in this area use domestic electricity connection for agricultural purposes.

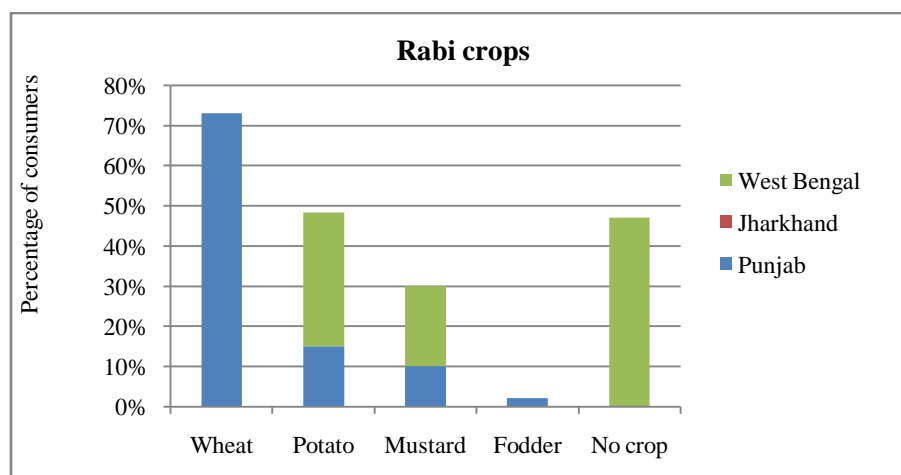


**Figure 1: Source of irrigation in three states**

In Kharif season, while majority of the farmers in all the three states cultivate rice in their farmland, some farmers also take up other crops such as maize, bajra, pulses etc. (Fig.2). It is due to the rainfed conditions of the area that Jharkhand records highest irrigation water productivity of 0.75 Kg/m<sup>3</sup> at all India level [15]. This justifies the fact that rainfall suffices the requirement of applied irrigation to a great extent. Similarly, in Rabi season, while majority of the Punjab farmers cultivate wheat, the West Bengal farmers cultivate potato and mustard in their fields with rest of them leaving the fields unseeded to regain soil characteristics for the next season (Fig. 3). On the other hand, majority of the farmers in Jharkhand do not take up any crop cultivation in the Rabi season due to less rainfall in this season. Apart from these two seasons, farmers sometimes cultivate a third crop which mostly consists of vegetables, fodder and sugarcane (in case of Punjab) (Fig. 4).



**Figure 2: Crops grown in Kharif season**



**Figure 3: Crops grown in Rabi season**

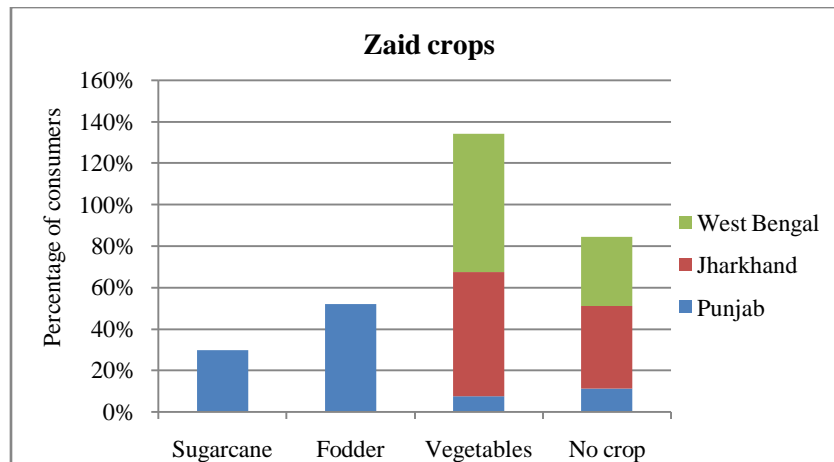


Figure 4: Crops grown in Zaid season

### Village level facilities

Amongst all the three states, the basic facilities available at village level are water supply, electricity, pucca roads, sanitation infrastructure, and availability of health centres (both private and government) (Fig. 5). In Jharkhand and West Bengal, there are also functional anganwadi and SHGs. The major activities undertaken by SHGs in Jharkhand rural area are microfinance, mushroom, duck rearing, stitching, papad and achar making and microfinance, mushroom cultivation, weaving, goatery, weaving bamboo mats etc. in west Bengal. The villagers have also enrolled in government schemes/projects such as gramini sadak yojna, dhova nirman and jal shakti abhiyan (Jharkhand), krishi krishak bandhu and Jal Dhara Jal Bhara (West Bengal).

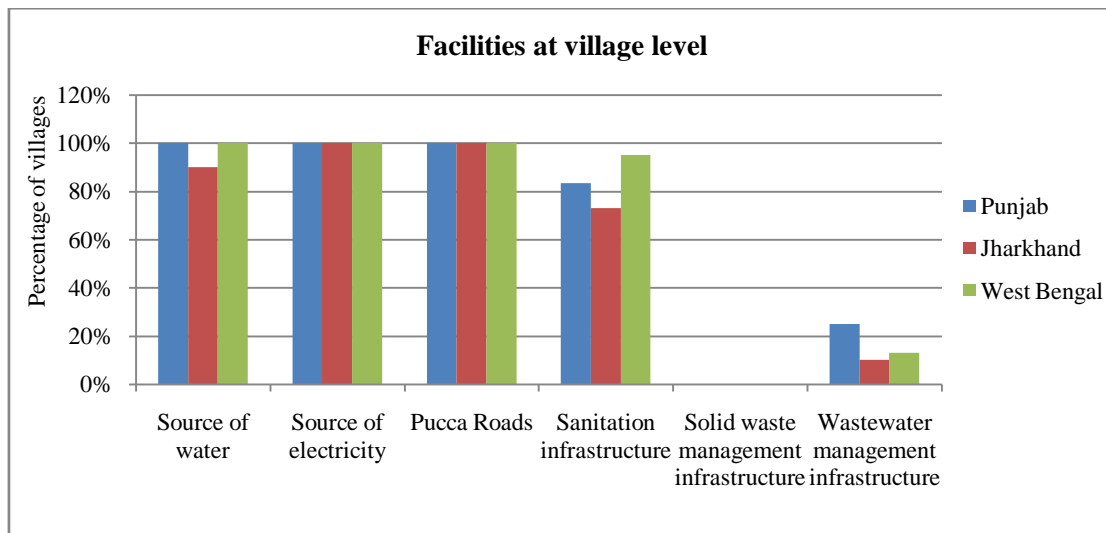


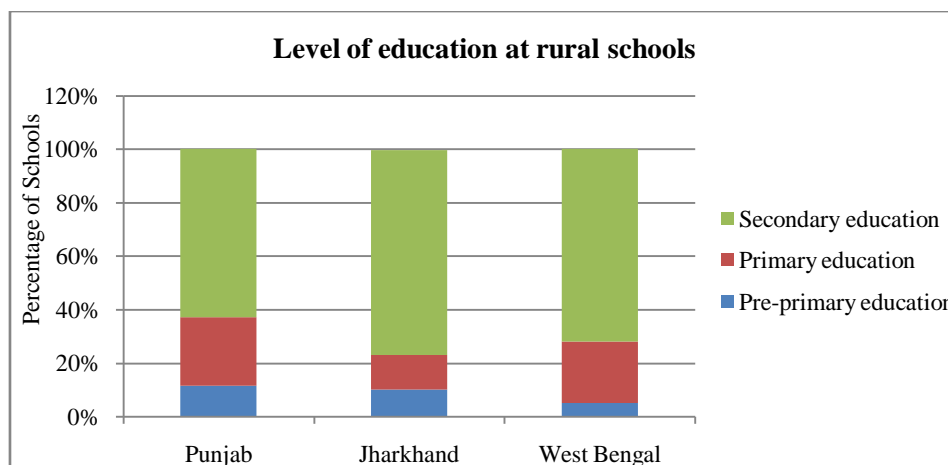
Figure 5: Facilities available at village level in all the three states

Collectively, the villagers in all the three states extended that there is a need for water conservation structures and strategies in their areas as the available ponds/ other water structures are unclean and have negligible water recharge due to its extensive use. Thus there is a need to carry out pond rejuvenation in these areas as the ponds are used for wide variety of uses.

### Rural school level facilities

As depicted in Fig. 6, in Punjab, schools in the surveyed areas are majorly government funded (54%), while rest of them are private (40%). A minute proportion of these schools are also semi-private (6%) i.e. certain activities are government funded. In these areas, majority of the schools (83%) provide education for both male and female students and largely offer secondary level of education in schools. On the other hand, in Jharkhand, almost 77% of the schools are providing secondary education while rest of the schools are up to primary education level. Amongst these schools, almost 84% of the schools are run by government and have education provision for both male and female students (Co-education schools). Here also, the female students are 1.5 times the male students which signify that education provision is available to female students in this part of the State. In West Bengal, majority of the schools are government funded

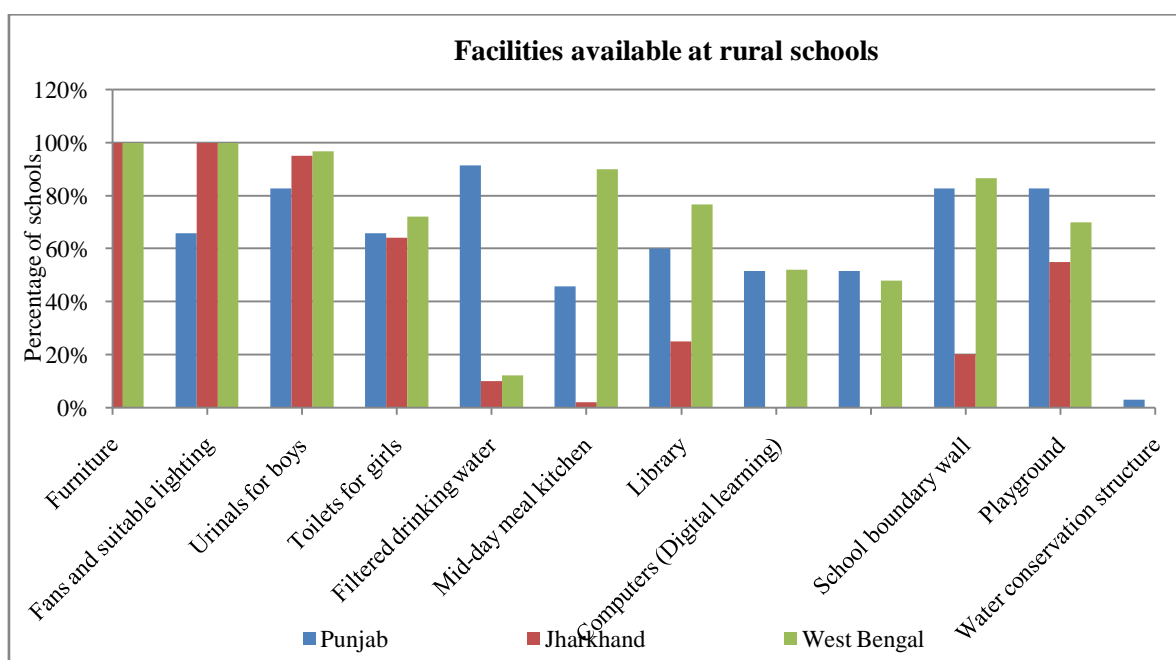
(71%) and provide education for both male and female students. Amongst these schools, mostly schools provide secondary education while remaining are up to pre-primary and primary education level.



**Figure 6: Level of education at rural schools**

In the State of Punjab, as depicted from the rural schools survey results, around 40% of the schools lack basic facilities such as furniture in classrooms, fans and suitable lighting, washrooms for female students/ staff members and functional kitchen for mid-day meals. Apart from these, 50% the schools do not have digital learning facilities in place i.e. unavailability of computers and/or specific instructors for the same. Also, almost all the schools lack water conservation structures. Thus there is an urging need for filling this gap and implementing better tangible facilities.

On the other hand in Jharkhand and West Bengal, in the surveyed area, most of the schools have furniture, fans and suitable lighting available. While the survey has shown that there is a fair percentage of schools with sanitation facilities, on ground, these sanitation infrastructures physically exist but majority of them are not-functional. This makes these equivalent to non-existent for both male and female students. Apart from these, a very small percentage of schools in Jharkhand villages have the basic facilities such as filtered drinking water, kitchen for preparing mid-day meals, library, boundary wall, playground etc. Also, digital learning and water conservation facilities in both Jharkhand and West Bengal villages are completely unavailable at schools in these areas, which generate a special demand of introducing the same here for development. Unlike rural areas in Jharkhand, West Bengal villages have higher percentage of schools with library facilities and digital learning in place. There is also higher percentage of schools with boundary wall and playground in place (Fig. 7). Therefore, there is a great need for increasing these percentages in order to provide better and uniform educational facilities to the students in the area.



**Figure 7: Facilities available at rural schools**

## CONCLUSION

Through a series of analysis, it has been established that villages in all the surveyed locations in the three States are comparable in terms of the facilities available at village level, primary occupation, health centers, school types and education and basic farming practices.

In the study areas in all the three States, cropping pattern in Kharif season is similar i.e. rice cultivation. While this cultivation is sustainable in rain fed areas like Jharkhand and West Bengal, it is affecting the water table in the areas of Punjab due to comparatively lesser rainfall and higher contribution of rice production to the focal pool of the nation. Therefore, States like Punjab, despite having higher land productivity and nearly 100 per cent irrigation cover under rice report, a low irrigation water productivity indicating the need for a shift in their rice based cropping pattern as well as improvement in the efficiency of irrigation water use. On the other hand the states like Jharkhand and West Bengal must be encouraged for rice production owing to their suitability in terms of land as well as water productivity. Also, since the farmers in surveyed areas in West Bengal are marginal, it is important to increase rice production to provide economic stability to them.

Apart from the cropping pattern, it is also important to introduce water efficient irrigation methods such as drip and sprinkler irrigation to increase the water productivity of the crops. This can especially be done for the water guzzler crops and in areas with higher dependency on groundwater for irrigation purposes.

Another important scenario of non-functional/poor conditioned sanitation facilities for both male and female students have come up especially in the surveyed areas of Jharkhand and West Bengal. While according to both primary and secondary data, sanitation infrastructures are in place in these areas, they are mostly non- functional and hence require immediate action. Unavailability of sanitation infrastructure is not only a constraint for students, but also for the teaching staff and thus it becomes a hindrance for them to attend school on daily basis. In addition to, unusable kitchen for mid-day meals and unfiltered drinking water also resists the students, parents and teachers for continuing in the schools or create unavoidable health issues for the school attendees.

With the motto of 'digital India', it is now important to include aspect of digital leaning in schools and teaching institutions at rural level. From the survey results, it is depicted that facilitation and support is required in the surveyed areas in all the three states. Since digital learning is accompanied by technology or by instructional practice that makes effective use of technology, it encompasses the application of a wide spectrum of practices including: blended and virtual learning. With the inclusion and implementation of digital learning in schools at village level, there will be adaptive and analytical learning with the help of e-textbooks. Further, livelihood strategies need to be developed to augment income generation.

Therefore, with these research outcomes and need assessment there shall be an effective implementation framework of projects in CSR to establish environment sustainability and sustainable development.

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