



# Hydro-Poverty To Hydro- Resilience: Rethinking Pathways

**Corresponding Author-** Adyasha Sahoo

**Second Author-** Prof. Navaneeta Rath

Department of Sociology, Utkal University, Bhubaneswar, Odisha

## Introduction:

### **Water: For sustainable life, sustainable development & sustainable community**

Sustainability has become a catchphrase in the development dictionary since the publication of the report Our Common Future (World Commission on Environment and Development, 1987). To quote Lele (1991) and Korten (1992), sustainability has appeared as a standard component of development rhetoric. Sustainability is defined as the capacity to maintain some entity, outcome, or process over time (Basiago, 1999). However, the advocates of the neoliberal economy and globalization critique it on the ground that it leads to constrained economic growth (Batie, 1989:1084). But the critics of this constrained growth theory challenge the theory by making a proposition for Resource Maintenance Approach and the deep ecology perspective. Deep ecology aims at appealing to people to understand and appreciate the intrinsic value of the natural environment and all life forms with a vision to satisfy basic needs rather than fulfilling desires. It gives a clarion call to end consumerism, minimize private property; and, use simple and appropriate technology whenever possible (Naess, 1995). These propositions if translated into action can ensure proper resource management.

Sustainable development appeared as a new paradigm in the development discourse and occupied the centre space in the global development policy agenda. It is a development paradigm that calls for improving living standards without jeopardizing the earth's ecosystems or causing environmental challenges such as deforestation, water depletion, and air pollution, bringing catastrophe to the human community. (Browning & Rigolon, 2019). The concept of sustainable development is an offshoot of the concept of sustainability and is closely related to it as a "means-end" relationship. Sustainability is the assumed goal or endpoint while the process to achieve it, is labelled as the process called sustainable development (Diesendorf, 2000). In the same vein, Gray (2010) defines "sustainability" as a state and SD as the process for achieving this state. This paradigm of development got attested to and accepted by the nations with the adoption of the SDG in 2015.

The threat to the natural resources of the society was pointed out by Malthus as early as 1789. He postulated that the human population tended to grow in a geometric progression, while subsistence could grow in only an arithmetic progression, and for that matter, population growth was likely to outstrip the capacity of the natural resources to support the needs of the increasing population (Rostow & Rostow, 1978). In gist Malthus clearly, could forecast that measures were needed to check the rapid population growth rate to protect the earth from exhaustion or depletion of natural resources, resulting in misery for humans (Eblen & Eblen, 1994). Starting from the Brundtland report to the Rio Earth summit and the Johannesburg summit sustainable development was evolving as a paradigm of development. With the United Nations (UN) identification of it as one of the five key priorities in 2012, the SDG was adopted in 2015, strengthening sustainable development not as a concept or paradigm, but as a desirable practice for nations.

However, sustainable development is impossible without sustainable communities. The idea of a sustainable community has started gaining currency in the context of the fast depletion of resources and the deficits encountered by millions of communities on the planet earth. Depletion and deficit have started plaguing the communities due to the lack of prudent use, and socio-demographic transitions, followed by natural changes starting from climate change to disaster. A sustainable community can be defined as a community that has the capacity to manage its human, natural, cultural, and financial capital to meet the current needs of the members adequately while reserving abundant resources for future generations. In a broader sense ecological integrity, economic security, leadership accountability, and responsibility added to social well-being are chalked out as the marked features of a sustainable Community. Sustainable communities need to fulfil four criteria. They are resilient in terms of satisfying the basic needs of their population, inclusiveness increasing access to everyone to the available resources and opportunities, productivity enough to ensure engage all its members, and are environmentally safe and rich.

The most discernible feature of a sustainable community however is the sustainable life of the living beings. When living beings i.e. Humans, animals, and plants have physical or existential security then sustainable life is possible in a community. Sustainable lives make up a sustainable community. Sustainable communities facilitate sustainable development.

However, water lies at the foundation of sustainable life. Water is said to have played a key role in the existence of life on earth. It is an important life support system. Two quotes can be placed here that depict water as the essence of life.

**“If there is magic on this planet, it is contained in water.” — Loren Eiseley**

## **Access to safe water is a fundamental human need and therefore a basic human right. -Kofi Annan**

The quotations placed above from Loren Eiseley and Kofi Annan are vocal about the significance of water for all. Survival of the living beings on this planet is enjoined upon the availability and accessibility to water and that too clean water. Added to this the overall socioeconomic development of a community is dependent on the availability of water. Vulnerability decreases and resilience increases with water security. Water is key to human health, socio-economic development, and biodiversity protection. So, in a single line, it can be encapsulated that water is the supreme need for sustainable life, a sustainable community, and sustainable development.

### **1.2 The Water Situation Today: From Global to The Local**

Water security ensures the steady and sustainable development of society. But the world today witnesses an acute shortage of water. Consumption and collection of water tend to decide the quality of life of a population. But now the scenario is such, that the shortage of the basic resource of life has put the overall livelihood at stake. Three syndromes signalize the challenges related to water. They are water scarcity or water stress, and water conflict which set the bedrock for a new form of marginality i.e. water poverty.

To bring clarity to these three dimensions operational definitions are developed.

- **Water stress or scarcity** occurs when the demand for safe, usable water in a given area exceeds the supply (Kloubucista & Robinson, 2022). Simply speaking there is a large discrepancy between the demand and supply, while the supply falls much behind the level of demand. This scarcity of the basic resource occurs when supply is insufficient, or the concerned infrastructure is inadequate. Schutz (2014) differentiates between water scarcity” and water stress. To him, water scarcity refers to the volumetric abundance and the subsequent lack thereof, of water supply. This is typically calculated as a ratio of human water consumption to available water supply in a given area. Water stress on the other hand is an inclusive concept that brings into coverage water scarcity, but also water quality, accessibility to water, and environmental shortfalls. To quote the UN-Water, 2021 when a territory withdraws 25% or more of its renewable freshwater resources it is said to be ‘water-stressed.
- **Water conflict** refers to the war, overt or covert that takes place between interest groups i.e. countries, communities, groups, and individuals for the common resource of water resulting in strengthening the underlying power dynamic.
- **Hydro/ Water Poverty** refers to a condition of where there is a dearth of water in terms of quality and quantity for a household on a sustainable basis.

The water resources are under fast depletion. Over 2 billion people in the world lack access to safe drinking water (Evidence, Action, 2022). To be more specific, 2.1 billion people globally do not have access to clean, safe drinking water (WHO Lives, 2022).

The problem is particularly grave in poor rural spaces and among the marginalized groups whose access to water is still more constrained. Social affiliations and economic identity interplay with the lack of this basic resource and aggravate the situation. Unsafe water takes the lives of more than 3.4 million people every year by causing infectious diseases and exacerbating malnutrition (WHO,2022).

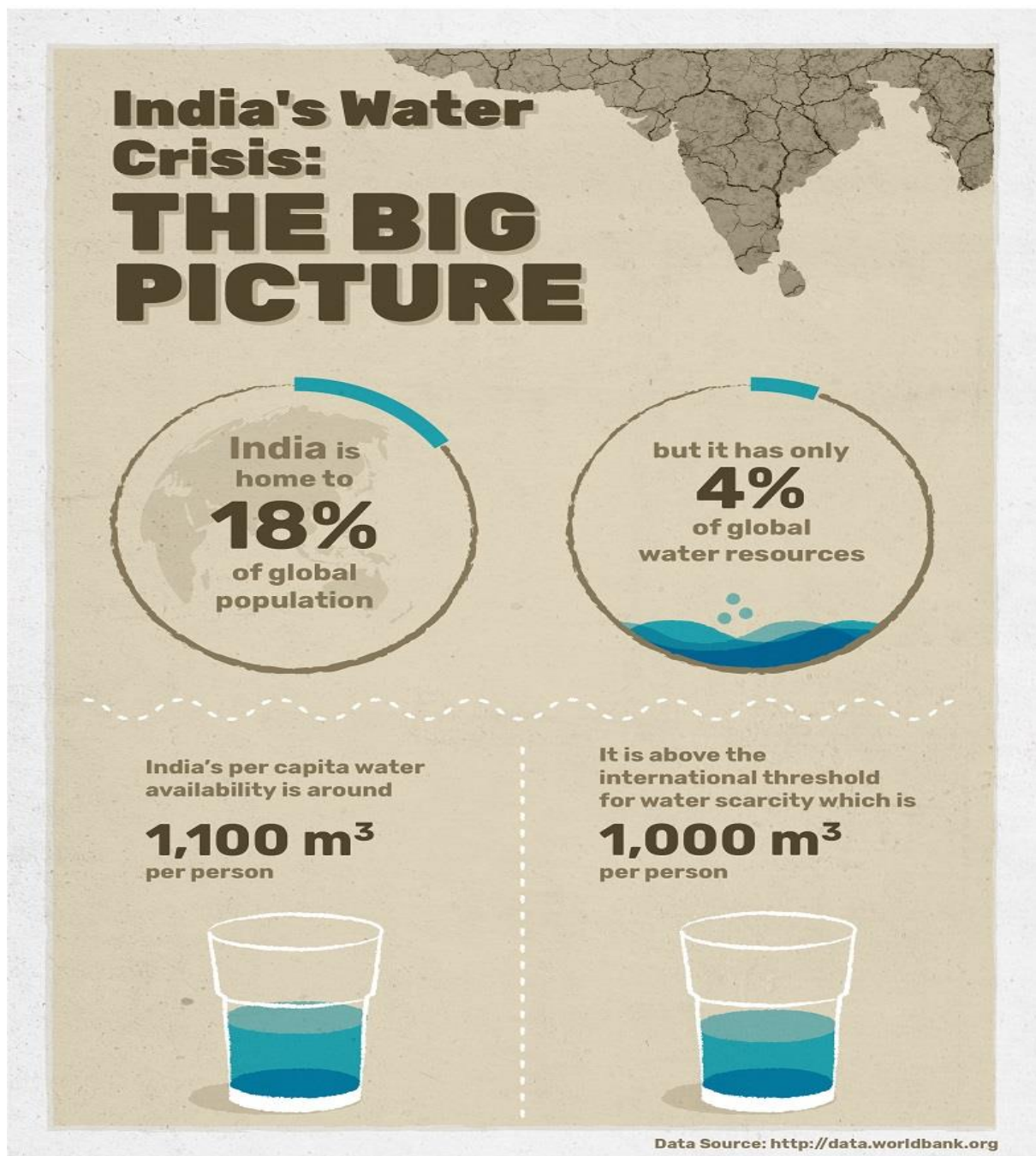
While Goal 6 of SDG 2030 calls for the achievement of universal and equitable access to safe and affordable drinking water for all, reality shows it as a farfetched goal. This can be sufficed by the UNICEF estimations that project:

- Four billion people — almost two-thirds of the world’s population — experience severe water scarcity for at least one month each year.
- Over two billion people live in countries where the water supply is inadequate.
- Half of the world’s population could be living in areas facing water scarcity by as early as 2025.
- Some 700 million people could be displaced by intense water scarcity by 2030.
- By 2040, roughly 1 in 4 children worldwide will be living in areas of extremely high water stress.

2.3 billion people live in water-stressed countries, of which 733 million live in high and critically water-stressed countries as per the UN WATER, 2021 Report. As per the FAO (2020) Report 3.2 billion people live in agricultural areas with high to very high water shortages or scarcity. Of this figure, 1.2 billion people – roughly one-sixth of the world’s population – live in severely water-constrained agricultural areas.

India has become severely vulnerable to water scarcity. A NITI Aayog report captioned ‘The Great Indian Thirst: The Story of India’s Water Crisis, Solutions to Tackle,’ 2018 mentions that nearly half of India’s population, 600 million people in absolute terms encounter extreme water stress. It includes three-fourths of India’s rural households that are devoid of piped, potable water and are vulnerable to health risks. Unregulated anthropogenic activities through large-scale and rapid urbanization, unhealthy cropping patterns, overcrowded cities, and waste disposals without thought lead to the depletion of water resources in the country. It becomes worth mentioning here that India has become the world’s largest extractor of groundwater, accounting for 25 percent of the total and 70 percent of water under pollution (CWMI, 2019). Water resource observers note that the overall demand for water in India is expected to double and 40 percent of the population will have no access to drinking water by 2030 which has been targeted to universalize access to water by the SDG (Bhaduri, 2019).

The picture shown below serves as evidence of India’s increasing population with very limited water accessibility which further gives rise to the phenomena of water scarcity and stress affecting the entire nation.



Source: <http://data.worldbank.org>

NITI Aayog in June 2018, in its report captioned as “Composite Water Management Index (CWMI),” mentioned that about 200,000 people were dying every year due to inadequate access to safe water. The report further cautioned that India ranked 120 among 122 countries in the water quality index as the country witnesses 70 per cent of water being contaminated (Terra Green,2022).

A recent Times of India report says that India’s water stock has declined by 75Percent. The decline is very sharp being 6042 cubic meters in 1947 and in 2021 it has become 1486 cubic meters. Encroachment has also led to the vanishing of ponds, lakes, tanks, and wetlands. The water census of India projects that out of 9.45 lakh water bodies, 18,691 i.e.2 percent have been encroached upon. The Jal Shakti Mission covering 740 districts has not yet achieved mega success in tackling the water crisis in the country. In agriculture-dependent states like Punjab, Haryana, and the western U.P. Over 85% of fresh water is diverted to agricultural fields which have created

stress on groundwater. Indiscriminate use of water for fields and cultivation of heavy water-dependent crops have contributed to the depletion of existing water resources at a faster rate (Mohan,2022).

Keeping the fast rate of water scarcity, a very recent Niti Ayog Report has alerted that India is going to face a shortfall of over 50 percent water around 2030. It is projected that the per capita water availability will dip to around 1400 cum in 2025, and further down to 1250 cum by 2050. Climate change has been attributed to this water stress and shock. The country will be in a position to supply 744 billion cubic meters of water against a demand for 1,498 billion cubic meters. The same report mentions that 21 major cities of the country are marching towards zero groundwater levels which will be dangerous. Not only there is going to be an acute shortage in the quantity of water available, but the quality degradation is also very fast posing a water deficit and water-marginalized pockets countrywide. To quote the version of Dr Rajiv Kumar, Vice Chairman, National Institution for Transforming India (NITI) Aayog in August 2021, in India the annual available water is 1999 billion cubic meters (bcm), of which the utilizable water potential is estimated at 1122 cm.

The state of Odisha situated at the eastern part of India, has beheld water scarcity in a huge amount. More than 95 percent of the population is dependent on ground water for sustenance (Patro,2022). According to the State for Water Resource, Odisha's 1.12 billion cubic meters (6.71%) of groundwater has gone down the drain from 2009 to 2017. Odisha's groundwater volume was reduced from 16.69 billion cubic metres to 15.57 billion cubic metre in 2017 as per the Central Ground Water Board (2009). The primary reason being groundwater extraction in the region, that has amplified from 30% to 42% in the last four years – i.e., between 2013 and 2017. This resulted in nearly 45 per cent of the wells situated in the state to fall in water level by 2mt. The watertight situation of the state turns out to be intense from the Odisha Panchayati Raj and Drinking Water Department that reveals over 1.49 lakh occupancies in the State dependent on borewells for their water needs. During the scorching, heat of the summer, these water sources are dried up causing a heavy water deficit among the dependent groups. Thus, Odisha's rural pouches are gradually getting plagued with water shortage. Rural areas of Nabarangpur, Bolangir and Nuapada, are encountering water marginalization which reaches its height during the summer. A total of 3,510 habitations with 8.52 lakh people in the State are devoid of getting 40 Liters per capita per day throughout the year.

### **1.3 Why the Study is in Nabarangpur District?**

The primary focus of locating the area of research in Nabarangpur emanates from multiple claims of water insecurity confronted by the people of the region. According to District Irrigation Plan, 90 per cent of the public residing in the district are rural inhabitants with substantial dependence on agriculture and farming for their livelihood. Almost 75 percent of cultivable land is rainfed and is exposed to higher risks and uncertainty due to unpredictable rainfall. As per the report evaluations, the per capita water needs for domestic usage lies @ 60 lpcd for the rural populace. The actual water demand for cropping is estimated to be 0.546 BCM, while the prevailing water potential is 0.492 BCM. Additionally, after domestic consumption, water potential comes down to 0.420 BCM which distinguishes the district as a major deficit of water.

A good number of Media clips can be quoted here which report on the shortage of water in Nabarangpur district. These clippings are put in Table No. 1.1.

**Table No. 1.1.**

<b>Name of the NewsPaper</b>	<b>Date and Name of the Feature writer</b>	<b>Title of the article</b>	<b>The issue of water scarcity on highlight</b>
<b>The New Indian Express</b>	<b>26<sup>th</sup> July 2011</b>	<b>Erratic rainfall hits agriculture</b>	<b>Agricultural activities have come to a halt in Nabarangpur district, where 90 percent of the population depends on farming, due to erratic rainfall. In the absence of permanent irrigation</b>
<b>Orissapost</b>	<b>15<sup>th</sup> June 2018</b>	<b>Water Scarcity in Nabrangpur District</b>	<b>700 people in Dangriguda village of Dabugaon block face water shortage and villagers walk half a mile to fetch water and with summer season underground water level declines.</b>
<b>Odishatv</b>	<b>Monday, 22 October 2018 Rojalin Mishra</b>	<b>Locals stage road blockade over drinking water scarcity in Nabarangpur</b>	<b>The lives of 400 families residing in the village Sandaibeta in Nabarangpur district have become miserable due to water scarcity. The villagers face severe health-related</b>

			ailments due to the unavailability of safe drinking water. Their dependence on a limited number of tube wells while most of them are lying defunct has forced them to stage a road blockade on NH-26 holding empty utensils.
<b>Business standard</b>	<b>November 1, 2018</b>	<b>Odisha-drought-Nabarangpur</b>	<b>Nabarangpur declared as a drought prone district by the state government along with another 18 districts.</b>
<b>The New Indian Express</b>	<b>12th April 2021</b>	<b>Nabarangpur villages in grip of water scarcity</b>	<b>Semlidora village with a population of 350, Deopur village with 400 families and Dongriguda villagers struggle hard and walk kms to fetch drinking water.</b>
<b>The Hans India</b>	<b>12<sup>th</sup> April, 2022</b>	<b>Villagers of Nabarangpur district thirsting for water</b>	<b>With the onset of summer, many villages in the Nabarangpur district are in the grip of a drinking</b>



			<p><b>water crisis. Tendeka Dongri village, under Jharigaon block having a population of around 400 in 70 families faces acute water scarcity. Students and villagers are forced to soiled clothes due to lack of water for washing.</b></p>
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### **Methodology:**

The research aims to look into the water situation of the study district and its impact on the quality of life of the people with a special reference to the acutely water-stressed villages.

Often academic researches undermine the role of water thinking it as a gift of nature. But its propensity to determine not only the quality of life of the people but the fate and future of the local communities has hardly emerged as a matter of concern, which is elaborately done in this piece of research work. The entire research hinges upon the Sociology of the environment having its thrust on the New Ecological perspective and being a critique of the Human Exemptional perspective. Its thrust on the gender dimensions of water brings it into the fold of the Sociology of Gender with a thrust on women's health, work, and marginalization due to the feminization of water carrying. Further, the deal with the quality of life of the people, makes it related to the Sociology of Policy Studies where the basic focus is bringing changes in the quality of life of the people through public policies. Finally, the present research is expected to carve new areas of research in the field that can be taken up by future researchers.

Geographically, the study is confined to Odisha often treated as a water-abundant state because of its long coastline. While states like Maharashtra, Rajasthan, and Tamil Nadu often adorn national media highlights as water-stressed states, the state of Odisha does not have a place there, though the state too reels under water scarcity. The scope of the study is confined to a water deficit and underdeveloped district of the state i.e., Nabarangpur which is hardly brought into the social science research ambit. The study has been situated in the acute water-stressed blocks of Nabarangpur, which are Chandahandi, Dabugaon, Jharigaon, and Papadhandi. Thus, the geographical scope of the study pertains to an under-discussed water-stressed district of the state.

The policy scope of the study has far-reaching consequences. The study has tried to establish water as a basic life resource whose availability not only affects the quality of life but also the economic situation and the access to and opportunity for other capability-building ingredients. It has tried to document the vision and versions of the local community to provide a micro in-depth perspective that can enable better policy designing for water consumption, conservation, and adaptation to the growing water scarcity.

## **Risk Scenarios: Excerpts from the Field**

### **Chandahandi Block**

Chandahandi block is a highly water-stressed block of the district of Nabarangpur. It is located in the district of Nabarangpur at a distance of 101.8 km from the district headquarters and is the farthest of all the blocks. It covers a total area of 600 sq. Kms. From 01.04.1961, the Block became functional and the second stage came into operation on 01.04.1974. The Block is under the Tribal SubPlan area of Nabarangpur ITDA and comes within the jurisdiction of DRDA, Nabarangpur. The block has 14 GPs and 88 Revenue villages. As per Census 2011, the total population of the block is 73,953 out of which 36,460 are males and 37,493 are females (census India.co.in). The block is resided by 7877 SC, 25,990 ST, and 45,086 Generalcaste people. There are 18,833 households residing in the villages with an average sex ratio of 1,028.

The block comprises 89 villages and has 14 GPs. Two villages brought under the sample are Jamalipada and Khaparadihi. Jamalipada is a small village under Beheramunda Gram Panchayat comprising of only 12 households and 50 people, out of which the majority are men. Geographically, the village is situated at a distance of 20 kms from Chandahandi sharing its border with the the neighbouring state of Chattisgarh. Some of the villagers even own agricultural and fallow lands that are located in the other state. The primary occupation of the people is agriculture and most of the men migrate outside in the non-farming season. The water sources from which, the people of Jamalipada derive water for their daily usage, are limited in number. The situation of crisis erupts with the availability of only two tube-wells, out of which one is affected by lead and the other is situated at a distance of 1.5 km from the locality. The regular water practice of the people is centralized to women, who are the fetchers and major users of the resource. The village lacks basic infrastructural facilities, that include education, electricity, transport, and communication.

A major issue faced by the inhabitants of Jamalipada constitutes that of agriculture. Many of the households have lands in both under the jurisdiction of Odisha and Chattisgarh. Due to such division of their lands, the agriculturists and peasants are exposed to difficulties in cultivation and yielding crops. The peasants also complained about the issue they face while selling their crops to bigger farmers or sending them to the market through traders. The mandis in Odisha are very irregular in terms of taking the yields produced by the local peasants and farmers. The minimum support price (MSP) set by the Odisha government is lesser than that of the government of Chhattisgarh. This places the farmers in a position of moral dilemma. However, with the passage of time, they are becoming profit driven and most of the crops that the market of Odisha deserves end up getting sold to Chhattisgarh.

Khapradihi, on the other hand, is a relatively bigger village under Gambhariguda GP having almost 400 households and a total population of 1626 out of which 775 are males whereas, 851 are females. The village is divided into *sahis* and each sahi comprises nearly 200 households. However, each *sahi* is provided with only one tubewell, upon which 200 households remain dependent. This, in turn, creates a situation of scarcity of water in the village. The women in every household are supposed to fetch water for the entire house covering an average distance of 0.5 km to 1 km, depending on the location of their respective houses. The village is located at the brink of river *Tel*, which pacifies the water stress a little, as the majority of the people use the river water for bathing and washing purposes. The people of the village complained about the compromised quality of water, due to which they suffer from a number of diseases. After the tube-wells are dug up, the water is contaminated by fluoride and iron, which caused joint pain and other backbone related issues. Khapradihi has the basic infrastructural facilities like a primary school, a primary health centre and an anganwadi for the people residing in the village.

The women in the village are very hard working both in domestic and field related activities. But consuming fluoride contaminated water on a daily basis, has stolen their happiness by forming a reddish tint over their teeth, that compels them not to smile. On social gatherings and vents, they are forced to cover their mouths as smiling on such occasions in front of hundreds have become a matter of shame. The cost of water is so heavy on the women of Khapradihi, that they have stopped smiling and laughing their heart out has become a stigma for them.

### **Jharigaon Block**

Jharigaon block is surrounded by Dabugam Block in the east, Raighar Block to the west Chandahadi Block to the north, and Umerkote Block in the south. This Block was initially within the Chandahandi block. It was separated from Chandahandi Block vide Notification number 3193 dated 10th July 1963 of Govt. in C.D. & R.R. Department and started functioning from 1964. This Block spans an area of 449.45 sq. Km. The block comprises 21 Gram Panchayats covering 112 Revenue villages. As per the 2011 census, the total population of this Block is 150063. Out of the total population, 18583 are S.C, 93605 are S.T., and the remaining 37875 are coming under other categories. Many of the villages of this Block are in inaccessible areas.

Most of the villages of Jharigaon block are tribal dominated and underprivileged in terms of socio-economic development and progress. The two villages taken for the study are namely- Mundiguda and Gandaguda. The people of Mundiguda are dependent on agriculture largely, but the surmounting climate change has forced many of the inhabitants to leave their ancestral abodes and go on a quest of finding alternative livelihoods. As a result of this the village is now under the reel of mass migration, where people (mostly men) are migrating to cities like, Hyderabad, Surat, Chennai among others.

The case is no different for the people of Gandaguda, who complained about degrading agriculture, as most of it is rainfed in nature and the acute scarcity of water is one of the major reasons they have to seek for substitutes of sustenance.

## **Dabugam Block**

This block is bounded by Kalahandi District in the east, Kosagumuda Block in the west, Dabugam Block to the north and Nabarangpur Block to the south. This Block began operating on April 1, 1961, and it finished stage II on September 30, 1978. This Block is part of the Nabarangpur ITDA's Tribal Sub-Plan Area and is governed by the DRDA, Nabarangpur. 8 Gram Panchayats covering 67 Revenue villages make up this block. The Block's total area is 225.36 square kilometres. According to the 2011 Population Census, this Block has a total population of 67,654. A total of 19,389 fall into the General category, 7769 belong to the SC category, and 40,496 to the ST group.

The village taken under the research for study is Kusumbandh, situated at a distance of 20 kms from the block. In comparison to other villages under study, Kusumbandh stands apart from the rest in terms of water availability and overall quality of life. The better status of the village however, is not backed by the productivity of the people in general, rather it's the political support owned by one of the inhabitants who happens to be a member of legislative assembly (MLA).

## **Papadahandi Block**

This block is surrounded by Kalahandi District in the east, Kosagumuda Block to the west, Dabugam Block to the north, and Nabarangpur Block to the south. Beginning on April 1, 1958, this Block began operating and entered the post-stage II phase. This Panchayat Samiti has 22 Gram Panchayats that cover 89 villages across an area of 475.32 square kilometres. According to the 2011 Census, this Block has a total population of 1,34,145, of which 16,129 are SC, 76,358 ST, and the remainder 41,658 belong to other castes.

The researchers have taken two villages for study in this block, namely- Boripadar and Kantasaru of Moidalpur GP. These two villages face acute shortage of water during summer and Boripadar even meets the fate of getting cut off from the mainland during rainy season that amplifies the miseries of the inhabitants even more.

Upon being asked about the distance they cover and time they take to fetch water on a regular basis, the women of the village wondered where to start. They wake up as early as 3am in the morning to collect water for the whole day till 6pm in the evening. More than half of the time in a day is consumed in fetching water and doing household chores. Many of the households have aging population and ailing individuals whether old or young. The women are supposed to fetch water during their crucial period of lives and pregnancy being one of them. One of the women cried her heart out describing the story of her miscarriage while collecting water and walking miles with loaded containers over her head that ultimately put pressure on her lower part of the body and the uterus gave up. She also complained about not being able to conceive ever again due to the strain and pressure she has to undergo on a regular basis to collect water, without which sustenance becomes impossible. There are numerous such examples that jeopardise the daily lives of people residing in this region.

## Hydro-Resilience: Is it Achievable?

Adapt and get away from the taboos and cultural practices need a change.

Resilience, as per records, has been defined as the capacity of structures and systems to bounce back after severe instabilities, disasters, or other forms of extreme events. The definition usually applies to physical, chemical, ecological, social, and political systems (Renschler, et. al., 2010). Community resilience on the other hand, has mostly been used as a tagline to come to grips with expectations of prolonged, passive crises, like diminishing natural resources and crawling environmental perils such as climate change (Wisner and Kelman, 2015).

Likewise, the district of Nabarangpur is exposed to various vagaries, that include both natural and anthropogenic causes. As the risks involves have already been discussed above, let us look at some of the measures or way forwards, that can help the community to transform from a risked to one to that of a resilient one. These are as follows:

- Reduction of deforestation and encouraging afforestation. This will enhance the forest coverage, that in return will help the stock of rainfall to return to its normal amplitude.
- The district administration to play a vital role in promoting green engineering in the entire district to prevent the natural ecosystem of the region.
- Sensitization among the rural masses regarding conservation of the existing quantum of water to mitigate with the worst that is ahead of the ongoing climate crisis.
- Awareness among the people regarding the striking water poverty and measures to alleviate the same through community conservation mechanisms across all social categories, including various caste, gender and age groups.
- Equitable distribution of the resource among all the sections of the society to overcome partial poverty of water.
- Water to be made a community good rather than instilling water capitalism that is growing across communities from urban to rural areas in the present time.
- Local communities to be strengthened through participation in the local self-government and a succeeding convergence between the level of Panchayati Raj, then the state government and finally getting the issues exposed to the central government for an inductive analysis of the root cause.

All the aforementioned practices among the local communities can have far reaching consequences with regard to alleviating water poverty and henceforth transforming the communities from risked to resilient ones.

**References:**

- Basiago, A. D. (1999). *Economic, social, and environmental sustainability in development theory and urban planning practice: The environmentalist*. Boston: Kluwer Academic Publishers.
- Batie, Sandra S., 1989, "Sustainable Development: Challenges to the Profession of Agricultural Economics." *American Journal of Agricultural Economics*, December:1083-1101
- Bossel H. (1999). *Indicators for sustainable development: theory, method, application*. International Institute for Sustainable Development, Canada, pp. 2– 10
- Browning, M., & Rigolon, A. (2019). School green space and its impact on academic performance: A systematic literature review. *International Journal of Environmental Research and Public Health*, 16(3), 429
- Central Ground Water Board (2022) Aquifer Mapping and Management of Ground water Resources Nabarangpur District Odisha, Department of Water Resources, River Development and Ganga Rejuvenation, Ministry of Jal Shakti Government of India, South Eastern Region, Bhubaneswar
- Diesendorf, M. (2000). Sustainability and sustainable development. In D. Dunphy, J. Benveniste, A. Griffiths, & P. Sutton (Eds.), *Sustainability: The corporate challenge of the 21st century* (pp. 2, 19–37). Sydney: Allen & Unwin.
- District Irrigation Plan of Nabarangpur (2015) District Level Implementation Committee (DLIC), Nabarangpur, Odisha.
- Eblen, R. A., & Eblen, W. R. (1994). *Encyclopaedia of the environment*. Houghton: MifflinCo. development. [http://www.mofa.go.jp/policy/economy/eism ap/k\\_seminar/Round-2-3.pdf](http://www.mofa.go.jp/policy/economy/eism/ap/k_seminar/Round-2-3.pdf)
- Evidence Action (2022) Delivering Safe Water to Millions, <https://www.evidenceaction.org/dispensersforsafewater/>
- FAO (2020) The State of Food and Agriculture 2020, Rome, Italy, <https://www.fao.org/documents/card/en/c/cb1447en/>
- Gennari P. (2007). Key indicators of sustainable Development, 2nd Kyoto International Seminar on Sustainable Growth in the Asia-Pacific region 25-26 October 2007 – Kyoto, Japan
- Gray, R. (2010). Is accounting for sustainability actually accounting for sustainability ... and how would we know? An exploration of narratives of organisations and the planet. *Accounting, Organizations and Society*, 35(1), 47–62.
- Ground Water Information Booklet, Nawarangpur District (2013), Ministry of Water Resources Central Ground Water Board, SER Bhubaneswar

- Ground Water Year Book (2022) South Govt. of India Ministry of Jal Shakti Department of Water Resources, River Development & Ganga Rejuvenation *CENTRAL GROUND WATER BOARD*, South Eastern Region Bhubaneswar
- Klobucista, C., & Robinson, K. (2022). Water Stress: A Global Problem That's Getting Worse. *Council of Foreign Relations*.
- Korten, David C., 1992, "Sustainable Development." *World Policy Journal*, 9(1):157-90
- Lele, Sharachchandra, 1991, "Sustainable Development: A Critical Review." *World Development*, 19(6):607-21
- Mohan, Viswa (2022) What India is doing to tackle its water crisis, Times of India, June ,11,20 22
- Naess, Arne, 1995, "Deep Ecology and Lifestyle." Pp. 259-64 in George Sessions (ed.) *Deep Ecology for the 21st Century*. Boston, MA: Shambhala.
- Patro, Snajeev Kumar(2022) 1.5 Cr In Odisha Will Cry 'Pani', 'Pani' This Summer As Jal Jeevan Mission In Deep Water ,Odishatv.in April,4
- Renschler, C. S., Frazier, A. E., Arendt, L. A., Cimellaro, G. P., Reinhorn, A. M., & Bruneau, M. (2010). *A framework for defining and measuring resilience at the community scale: The PEOPLES resilience framework* (pp. 10-0006). Buffalo: MCEER.
- Rostow, W. W., & Rostow, W. W. (1978). *The world economy: history & prospect* (Vol. 1). Austin: University of Texas Press.
- Schulte, P., (2014). Defining Water Scarcity, Water Stress, and Water Risk, *Pacific institute*
- Terra Green (2022), Water Crisis in India, [https://www.teriin.org/sites/default/files/2022/03/March\\_2022\\_cover\\_story.pdf](https://www.teriin.org/sites/default/files/2022/03/March_2022_cover_story.pdf)
- UN-Water (2021)\_\_\_SDG 6 — water and sanitation for all: Progress Report, <https://www.unwater.org/publications/summary-progress-update-2021-sdg-6-water-and-sanitation-all>
- UNICEF (2021) Water scarcity, <https://www.unicef.org/wash/water-scarcity>
- WHO, Lives (2022) <https://wholives.org/our-mission/mission/>
- Wisner, B., Kelman, I. (2015). Community Resilience to Disasters. *International Encyclopaedia of the Social & Behavioural Sciences (Second Edition)*.
- World Health Organization. (2022) Drinking water. *World Health Organization* <https://www.who.int/news-room/fact-sheets/detail/drinking-water>