This issue of Keystone, the first of 2018, contains four articles.

The first article is a research paper on the Clean and Energy Efficient Cook Stoves (CEES) distributed in 195 households in World Vision India’s Nagpur ADP, as a case study. It compares the traditional firewood stoves and the smokeless stoves, highlighting reduced emissions, health impacts and time and energy efficiency. The CEECS not only improved the health of women and children by reducing smoke and harmful particles, but also minimised the time they spent in collecting firewood. The paper was written by Sieti Immanuel.

The second article is a brief of an evaluation study of World Vision India’s Water Buffalo Project in Andhra Pradesh’s Guntur district. It covers the changes made by the programme in the economic status and quality of life of 413 vulnerable households who were the target beneficiaries, through provision of a water buffalo with calf to each family. As per the study, 84.46% households were able to provide well for their children and school and Anganwadi enrolment rates improved. The brief was prepared by Sudipta Ranjan Ram with the help of Subramania Siva.

The third article is a review paper on utilisation, practice and disposal of sanitary napkins among women in reproductive age in urban areas of India. Following an analysis of secondary sources and the WASH urban baseline data, the article argues for a focussed WASH intervention targeting menstrual hygiene management (MHM) as the issue has been associated with absenteeism of girls in schools. This was written by Dr Angel Princy D (Intern with WASH from SRM University) and Sherin Daniel.

The fourth article explores the effect of climate change on Indian agriculture, and why community action is key to building disaster risk resilience and combating climate shocks. Citing Jamui ADP as a case, it emphasises the importance of community participation in watershed management programmes. This is paper is adapted from a previous case study, written by Sarojitha Arokiaraj and Bestin Samuel.
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Abstract

Firewood is still the main source of fuel for cooking and heating for majority of households because of the easier availability, accessibility and affordability. The usage of traditional cook stove is common. This will result in heat or energy loss, increased smoke, less efficient firewood burning leading to indoor air pollution, increasing respiratory illness, more time in collecting firewood and cooking. The exploitation rates including degradation of forest for agriculture purposes are realised to be far beyond the forest resource replenishment rate.

To untangle this issue, Clean Energy Efficient Cook Stoves (CEECS) were provided to 195 households in Umred and Bhivapur blocks of Nagpur district.
Introduction

The oldest cooking fuel is firewood in the form of logs and branches from trees. Firewood is defined by Food and Agriculture Organization of the United Nations (FAO) as “wood in rough (from trunks and branches of trees) to be used as fuel for purposes such as cooking, heating or power production.” (FAO, 2004). The use of firewood in rural areas is still predominant since it is often the only available, accessible and affordable fuel in the region.

Accessibility of firewood is a crucial factor for households using firewood for cooking purpose, especially in rural areas where alternative fuels such as Liquefied Petroleum Gas (LPG) are often not readily available. Households near to forest area can collect firewood close to their houses at all times due to the fact that it is available year-round and not susceptible to heavy seasonal fluctuations. Affordability plays a decisive role in the use of firewood for cooking. Considering that many households can collect firewood for free, it will remain the cheapest energy source for cooking and heating. The relative price for cooking with firewood remains substantially below that of potential substitute fuels.

The Problem

Compared to the production of charcoal, production of firewood contributes less to deforestation and degradation for two reasons. Firstly, direct use of firewood requires smaller quantities of wood to satisfy the same energy needs as there are no conversion losses. Secondly, firewood is less commercialised and a great portion of consumed firewood is covered by collection of dead branches, trees outside of forests or fallow land (Sepp, 2014). Many people still use traditional stoves, especially those communities which are near forests. The burning of firewood continues to have a negative impact on health due to high emissions, leading to respiratory and heart diseases, lung cancer, and eye irritations. Households using wood in an open fire experience particulate matter (PM) concentrations of over 3000µg/m3 in the
air compared to households using charcoal stoves, which are only exposed to PM concentrations of around 500μg/m³. (Robert Bailis, 2004).

WHO recommends that emission rates of PM 2.5 from household fuel combustion should not exceed 0.23 mg/min in unventilated and 0.80 mg/min in ventilated spaces. For Carbon mono-oxide, 0.16 g/min in unventilated spaces and 0.69 g/min in ventilated spaces (WHO, 2014).

Concentrated industrial and urban demand for firewood combined with weak regulation and control still contributes to forest degradation and deforestation. In many areas, especially communities near forests, the amount of harvested firewood exceed the annual growth rate of forest resources due to inefficient harvesting and utilisation practices. This counteracts the potential for firewood to be a renewable resource and calls for promotion of efficient conversion and consumption technologies (Sep, 2014).

A significant amount of time is spent by women and children in collecting fuel wood each day. This might prevent children from going to school and women from dedicating time to income-generating activities.

The Solution

An opportunity for the technical development and modernisation of firewood use lies in the distribution of improved cook stoves. The fuel-saving potential of improved cook stoves allows households to save between 22% and 46% of firewood compared to a three-stone fire (depending on the technical properties of the cook stove and individual cooking habits). There are also other emerging technologies such as micro-gasifiers – stoves which operate on volatile gases, leaving charcoal instead of ash – which provide the cleanest burning option available (Sepp, 2014). More efficient cooking stoves can reduce smoke inhalation, with significant health benefits, as well as reduce greenhouse gas emissions, reduce deforestation and provide a host of social benefits.

The Clean and Energy Efficient Cook Stove (CEECS) is developed to address these problems by providing community members with low-cost, easy-to-use energy-efficient cook stoves. The use of improved stoves reduces household consumption of biomass fuel which in turn contributes to reducing deforestation rates and saving time for local communities. In addition, less harmful smoke and particles are emitted, providing significant health benefits for women and children (WVI 2014).

Implementation

<table>
<thead>
<tr>
<th>STATUS OF THE FORESTS (at present and 30 years back)</th>
<th>TYPE OF COOKING ENERGY USED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very dense</td>
<td>LPG</td>
</tr>
<tr>
<td>Moderate</td>
<td>Kerosene</td>
</tr>
<tr>
<td>Almost barren</td>
<td>Coal</td>
</tr>
<tr>
<td>Converted to agri field</td>
<td>Cowdung</td>
</tr>
<tr>
<td>100</td>
<td>Biogas</td>
</tr>
<tr>
<td>18</td>
<td>Firewood</td>
</tr>
<tr>
<td>18</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
<tr>
<td>0</td>
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<tr>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

At present | 30 years back
In this article, the scope of reduced use of firewood, time saving in terms of cooking and collection time and positive health impact were studied. Approximate average emission reduction was also computed based on the study results and available emission factors. The long-term impact such as increased forest cover and shorter distance covered to collect firewood are not included in the scope of study.

STUDY METHODOLOGY

Nagpur Area Development Program has provided CEECS to 195 households in 20 villages. The impact of this intervention was studied at selected households with a questionnaire using stratified random sampling method. Village as a stratum was considered and a random of 10 households from seven villages were studied. The amount of saved fuelwood will be calculated. The emission factors for this saved fuel wood per kilogram will be taken into consideration to compute the saved emissions. The Global Warming Potential (GWP) of each greenhouse gas will be accounted to arrive at the carbon dioxide equivalent emissions from the saved firewood in a year.

The communities are engaged in natural environment regeneration intervention for the community. It is a low-cost and easily replicable approach to restoring and improving land and forest resources. Community-Led Natural Environmental Regeneration (CLNER) is based on encouraging the systematic re-growth of existing trees. The community members are trained on the issues to promote environment-friendly practices in the community. The CEECS intervention provided an easy and cost-efficient method to address the energy efficiency. It may be noted that most of the households access firewood from forests for cooking and other heating purposes. The CEECS use only half of the fuel wood than the traditional stoves, with reduced smoke and soot.

Impact

On the basis of the report and recommendation, Nagpur Area Development Program provided 100 Clean and Energy Efficient Cook Stoves (CEECS) in 13 villages during March 2016 and 95 units in seven villages during March 2017.
Results

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Before CEECS</th>
<th>After CEECS</th>
<th>Reduction in %</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firewood Used- MT/Yr</td>
<td>345.71</td>
<td>162.69</td>
<td>52.94</td>
<td>183.02</td>
</tr>
<tr>
<td>Cooking time- 3 meals-</td>
<td>4.00</td>
<td>2.30</td>
<td>42.50</td>
<td>1.70</td>
</tr>
<tr>
<td>Hours/ day</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO2 Emission- Kg/Yr</td>
<td>549,674.36</td>
<td>258,670.29</td>
<td>52.94</td>
<td>291,004.07</td>
</tr>
<tr>
<td>CO Emission- Kg/Yr</td>
<td>26,792.30</td>
<td>12,608.14</td>
<td></td>
<td>14,184.16</td>
</tr>
<tr>
<td>NOx Emission- Kg/Yr</td>
<td>43.21</td>
<td>20.34</td>
<td>22.88</td>
<td></td>
</tr>
<tr>
<td>CH4 Emission- Kg/Yr</td>
<td>1,832.25</td>
<td>862.23</td>
<td></td>
<td>970.01</td>
</tr>
</tbody>
</table>

In the case of wood combustion, CO2 emission factor is in the range of 1560–1620 g / kg. The emission factors for pollutants CO, CH4, TNMOC and NOx were in the ranges 19–136, 6–10, 6–9 and 0.05–0.2 g/kg (S.C.Bhattacharya, D.O.Albina. P.Abdul Salam, 2002)

The use of CEECS has reduced cooking time and heat losses and improved household’s health by reducing the indoor air pollution, black carbon accumulation due to firewood burning in open traditional stove and socio-economic benefits. These benefits impact the protection of the environment, providing more space in forest resource recuperation, and reduce the burden on women. The added benefits have empowered women to have more quality time with the family, spending time with their children for improving education and spending productive time in economic improvement of the family.

**CARBON DIOXIDE HAS A GWP OF EXACTLY 1**

(A baseline unit to which all greenhouse gases are compared).

GWP values and lifetimes (with climate-carbon feedbacks)
Conclusion

A single smokeless stove has the ability to save two metric tonnes equivalent of carbon dioxide in a year.

Moreover, the stove saves about 53% firewood and 42.5% cooking time. The reduced firewood use over the period of time will reduce the exploitation of forest tree resources, help in tree regeneration and reduce degradation of forests. Though not quantitatively validated, the indoor air pollution has been considerably reduced as experienced by women and reduced amount of carbon soot deposits in the kitchen. The indoor air quality in terms of respirable particulate matter 2.5 is not measured. The time saved in cooking has enabled women to spend more time with the family, attend to children’s needs and education, socialise by going to markets, spend more time in discussing about social issues with their peer groups and take up income generation activities.
Works Cited


- WVI. (2016, January) Environment Assessment Report of Nagpur Adp with Reference to TP 4 ‘Building Resilient Communities’ Programmes. New Delhi, India
Background

World Vision India’s Arpana Area Development Programme (ADP) worked in the Pedakakani Mandal of Guntur District in Andhra Pradesh, from 1996 till 2017. We worked among the Scheduled Castes, Scheduled Tribes and Economically Backward communities - who are predominantly marginal, small farmers, landless and agricultural daily wage labourers.
The Water Buffalo Project

The project started in the year 2012-2013 for a period of five years with the help of World Vision US. It targets 413 marginal farmers and supporting their families through dairy intervention as livelihood opportunities to create an alternative income source.

This initiative supported 413 vulnerable families in 16 villages who are eligible as per the selection criteria set for the project. The goal of the project was to improve the economic status of the marginal, small farmers and landless households to ensure quality of life for children, families and communities. The project ensured an increase in the household income by enhanced market linkages and access to the services of local Service Providers as well as improving the production of livestock in these families.

Objectives of the Project:

World Vision India’s Arpana Area Development Programme is working in 45 villages of Guntur Mandal and 12 slums of Pedakakani and Tenali Mandalas of Guntur district of Andhra Pradesh, India. This programme has been working among 9733 households, covering a population of 73541 including 25857 children. The project started in 1996, and is scheduled to close in September 2017.

Arpana ADP has been working among people belonging to the most backward classes, covering the Scheduled Castes, Other Backward Castes and the Backward Class. The ADP works among meagre income farmers, landless, agricultural labourers, slum dwellers, unskilled workers, families of people living with HIV / AIDS (PLHIV) and people with disability (PWD).
Interventions of the Project:

Steps Followed:

• Provision of locally available cross breed Murrah buffalo with calf (one per family)

• Intensive training on:
  • Buffalo care and management
  • Fodder cultivation
  • Artificial insemination

• Linkages to Animal Husbandry Department for their services
  • Training
  • Artificial insemination
  • Subsidy for silage fodder
  • Veterinary services
  • Schemes for poor farmers

• Formation of a Milk Producers’ Cooperative Society
  • Brought all the 413 households under this umbrella

• Formation of 11 Milk Collection Centres which are linked to Sangam Dairy Cooperative Society, a local milk purchaser

• Linkage with local players in dairy farming and milk production
  • The Arpana Milk Producer Cooperative Society was linked to Sangam Dairy Cooperative Society, which has a huge infrastructure for milk collection, preservation, Animal Husbandry Services, training and assistance.
  • Linking to other services like Insurance.

Dairy Intervention Value Chain
Evaluation of the Project

World Vision India undertook an evaluation of the project to assess the impact of the intervention in the lives of the target households. The main objective of the evaluation was to study the following:

1. EFFECTIVENESS: Assessing how far the intended results were achieved, identifying the key strength, weaknesses and significant changes.

2. EFFICIENCY: Assessing the efficiency of the project in terms of Project Management, Information Systems, Resource Allocation and Process, in contributing to the achieved results.

3. SUSTAINABILITY: Identifying the success and weakness in building capacity and empowering members of target households to lead the process. What will happen if WV was to stop funding and what will continue? How?

Methodology

A quantitative survey was conducted based on the Project Log frame and the objectives of the Evaluation. The quantitative survey was conducted among 200 beneficiaries (150 ongoing beneficiaries and 50 beneficiaries who have sold the cattle received through the Project) out of the 413 beneficiaries, selected through sampling methodology. Sample Size Calculator was used to calculate the number of samples for this exercise. The Survey was conducted through trained volunteers, monitored by the Strategic Evaluation Department, and the Arpana ADP. A database was prepared to enter the data and EPI Info was used to generate the report.

WATER BUFFALO PROJECT - BENEFICIARY AND HOUSEHOLD SAMPLE SURVEY DETAILS

<table>
<thead>
<tr>
<th></th>
<th>Total Beneficiaries</th>
<th>Sample Size Decided</th>
<th>Data Collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle Live</td>
<td>305</td>
<td>150</td>
<td>147</td>
</tr>
<tr>
<td>Cattle Sold</td>
<td>105</td>
<td>50</td>
<td>49</td>
</tr>
<tr>
<td>Cattle Dead</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>413</strong></td>
<td><strong>200</strong></td>
<td><strong>196</strong></td>
</tr>
</tbody>
</table>

Result

Quantitative Evidence (From the Household Survey)

HOUSEHOLD ANNUAL INCOME

As per the survey, 99.32% of households say that their annual household income has been increased due to their participation in
the Water Buffalo Project. It was found that the minimum household income has been changed from INR 12,000 to INR 28,000 and the maximum Household Income has been changed from INR 1,20,000 to INR 1,60,000.

As per the survey data about the annual household income from buffalo rearing it was found that a majority 56.76% of the surveyed households are earning between INR 20001 to INR 30000 and 21.62% of the surveyed households are earning between INR 30001 to INR 40000. Hence, a big majority, about 78.38% are earning between INR 20001 to INR 40000. As further this data is interpreted, it is found that 78.38% of the households are earning INR 1666 to INR 3333 monthly.

As per the household survey data, 75.68% of households say that they were able to repay the debts or loans through the income generated after they have joined the Water Buffalo Project. This is quite significant. Similarly, 59.46% households say that they have invested in savings, deposits or Chit Funds whereas 58.11% say that they have invested in children education.

Simultaneously, 78.38% of the households are earning INR 1666 to INR 3333 monthly.

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** BENEFICIARY HOUSEHOLDS CREATED ASSETS OVER THE PERIOD:**

- As per the household survey data, 75.68% of households say that they were able to repay the debts or loans through the income generated after they have joined the Water Buffalo Project. This is quite significant.
- Simultaneously, 59.46% households say that they have invested in savings, deposits or Chit Funds whereas 58.11% say that they have invested in children education.
- Similarly, 6.76% have purchased household goods or ornaments.
- Similarly, 6.76% have purchased a vehicle and 6.76% have purchased livestock from the income.
- In addition, it is significant to note that 1.35% household have redeemed the mortgaged land and another 1.35% household have leased land for agriculture.

**ENROLMENT OF CHILDREN OF THE BENEFICIARY HOUSEHOLDS IN SCHOOLS AND ANGANWADI CENTRES:**

- It is found that in the households who are continuing with the project, 96.47% of children aged 6 – 18 years are enrolled in school.
- 54.55% of children aged 3 – 6 years in the households who are continuing with the project are enrolled in ICDS/anganwadi.
- As triangulated this with the community members, it was found that the figure has not captured the data of children who have joined private play schools and kindergarten. According to them, almost 100% of the children aged 3 – 6 years are in any form of the pre-school (Anganwadi or Play school).
Child Wellbeing Indicators - 1

| Enrolment in School (children aged 6 – 18 years) | 96.47 |
| Enrolment in ICDS/Anganwadi (children aged 3 - 6 years) | 54.55 |
| Feeding Milk products to their children | 95.2 |

BENEFICIARY FAMILIES WHO ARE ABLE TO PAY FOR THEIR CHILD’S HEALTH:

- As per the findings, 29.05% of households who are continuing with the project, are able to pay their children’s health costs without any assistance from others.

- Simultaneously, 32.65% of the households who sold their cattle are able to pay their children’s health costs without any assistance from others.

CHILDREN OF THE BENEFICIARY HOUSEHOLDS HAVING MILK AND MILK PRODUCTS:

It was found that 95.2% of households are feeding milk products to their children.

Child Wellbeing Indicators - 2

| Able to pay for Children’s health costs without assistance | 29.05 |
| Able to Provide well for the children | 84.46 |

BENEFICIARY FAMILIES ARE ABLE TO PROVIDE WELL FOR THEIR CHILDREN:

- As per the findings, 84.46% of the households, who are continuing with the project, are able to provide well for their children. Simultaneously, 89.8% of the households who have sold their cattle are able to provide well for their children.

- “Provide well” means providing two sets of cloths, a pair of shoes and a blanket for sleeping for all the children aged 5 – 18 years in the household.
QUALITATIVE EVIDENCE (FROM 40 HOUSEHOLDS DURING THE FIELD VALIDATION)

Qualitative Evidence (From 40 Households during the Field Validation)

• All the children aged 6–18 years (100%) of the beneficiaries’ households visited during the Field Validation are enrolled in school. However, as per the data of the children aged 3–6 years, only 27.27% are enrolled in anganwadi centres. When enquired about the reasons for this low enrolment in anganwadi centres, it was found that more of the children aged 3–6 years are enrolled in private play schools or kindergartens. This is because the parents are aspiring for better education for their children.

• Most of the households are providing milk and milk products to their children. Out of the total households responded to this query during the household visits, 88.89% households say that they are providing milk and milk products to their children. When asked the rest of the families (11.11%) during the stakeholders’ meeting, the parents said that few families were not able to feed milk to the children, as they were more in number. Also, few families did not provide milk to the children aspiring for more income for their family to meet their needs.

• As enquired with the households, 37 out of 39 households (94.87%) mentioned that there is an increase in the annual household income after they have started buffalo rearing through this project. In addition, it was evident that the households have increased their assets or invested significant amount in savings, repaying their debts or loans or children’s education. Most of the households mentioned that they are able to pay for the health costs of their children (29 out of 37 households-78.38%) and are able to provide well for their children (26 out of 37 households-70.27%).

• As per the household visits, 92.31% are availing market services from different local stakeholders.
Conclusion

The Water Buffalo Project has significantly contributed to the needs of the most vulnerable households by bringing them together under this project and providing them income opportunities through this initiative. This was done by providing them the assistance for starting dairy units, which is very much viable due to the local geographical context, available resources, government and private support and value chain.

The project has been able to create income opportunities for 305 beneficiary households, which is about 73% of the total beneficiaries supported. Simultaneously, there has been a significant change in the total beneficiary household income. This increase in the household income has enabled them to repay their debts or loans, invest in savings, and educate their children. 96.47% of the children aged 6 – 18 years are enrolled in school and 54.55% of the children aged 3 – 6 years are enrolled in the ICDS/anganwadi. It was found that the rest of the children of this age are enrolled in private play schools and kindergarten.

As per the survey, 84.46% households are able to provide well for their children and only 29.05% households are able to pay for their children’s health costs without any external assistance. All the households are linked with the Milk Collection Centres and are enrolled with the Arpana Milk Producers Mutually Aided Cooperative Society (AMP-MACS), because of which they are supported with veterinary services, insurance, training etc. The Milk Collection Centres are connected with Sangam Milk Producer Company Ltd, which purchases milk from these collection centres.

Due to the involvement of women in this initiative, their confidence level has gone up tremendously and now they are able to participate in the household income, which was evident during the Field Validation. Now they are trained properly on Livestock care and management, and most of them are managing their livestock well. The project has a Monthly Monitoring System, which was developed and managed for proper management and decision-making. This system has captured all the details of the livestock management of each beneficiaries, which is noteworthy.

It was found that many of the beneficiaries’ households are able to follow the recommendations from the Value Chain Study. This includes ensuring of fodder (Green and Dry) and cattle shed before purchase, having a savings account and regular supply of Fodder (green and dry). However, few of the recommendations were not followed appropriately due to which there are failures in getting 100% achievement in the project.

The project has constituted a Cooperative Society, which is the foundation for the sustainability of the Project. Arpana Milk Producers’ Mutually Aided Cooperative Society is formed and managed by the beneficiaries of the Water Buffalo Project, who came together for the mutual benefit of all the members. It was found that the Cooperative Society needs more handholding support and training on Financial Management and Entrepreneurial Management.
Most Significant Stories

SIKA MARTHAMMA

Sika Marthamma is a 32-year-old woman living in a village in Arpana ADP target area. Her husband Anand Babu met with an accident while he was at daily labour work and is unable to do any physical work. They have two children who are studying in the fifth and third grade. Because of Anand Babu’s accident, their financial condition became miserable and they were unable to meet their basic needs. Marthamma was the only breadwinner for the family because of her husband’s health condition. Based on the need, WVI provided a milch animal worth INR 30000 to this family. The buffalo gives 5.5 litres of milk daily. They sell 5 litre and earn INR 250 daily. She keeps some milk aside and gives to her children to keep them healthy. She was also able to spend some amount for her husband’s. Now he is also going for labour work. Marthamma became a member of the milk cooperative society. She now earns a good income from the milk she sells through this centre. This has helped her family to live in the society with dignity, to take care of their basic needs and to meet their children’s education expenses. She is repaying INR 600 every month to the Community Based Organisation (CBO). She has developed a habit of saving INR 100 in the Self Help Group (SHG) every month.

NALLAPU SAILAJA

Nallapu Sailaja and Kondalrao live in Jakir Hussain Nagar. Both of them were doing agricultural labour work. They take care of their aged parents. All of a sudden, Sailaja got nerve weakness due to which he was unable to go for labour work. They have spent a lot of amount for her medical treatment. They struggled to repay the money they got from moneylenders at high interest rates. At this juncture, they were assisted with a buffalo under water buffalo Programme of Arpana ADP. Now they are selling 5 litres of milk every day and earn INR 250 daily. With these earnings, they have gradually cleared all their debts with in one and half year time. They also purchased two goats. They also have one young calf now. Now they are living peacefully without any fear, taking good medical treatment, and looking after their aged parents.
Analysis

Utilisation of Sanitary Napkins by Women of Reproductive Age in Urban Settings

Abstract

This is a review paper on the utilisation, practice and disposal of sanitary napkins among women of reproductive age in urban settlements of India. We looked into different studies focusing on sanitary napkin usage by women in the urban cities of India, along with World Vision’s Urban WASH baseline data. The results showed 20% of Indian women in the “My City” initiative project area still use cloth. Only 47% of women with a household income below INR 5000 use sanitary napkins compared to 85% usage of sanitary napkins among women with a household income of INR 15000. Affordability is still a challenge for 61% of women to use sanitary napkins. With regard to disposal of used sanitary napkins, 85% dispose sanitary napkins along with the household waste. Commercially available sanitary napkins, being non bio-degradable, create a burden to the community and environment as well. The above findings highlight the need of WASH programmes to focus on Menstrual Hygiene Management (MHM).

Keywords: MHM (Menstrual Hygiene Management), Sanitary napkins, Disposal of sanitary napkins, WASH (Water, Sanitation and Hygiene)
Introduction

Sanitary napkin usage has made women’s lives easier, preventing them from the embarrassment and worry and also promotes mobility of the women during menstruation (6). Globally, 52% of female population are in reproductive age and most of them menstruate every month (1). Women in our current generation have an estimated 450 periods in their lifetime (2). There are about 300 million women aged 15 to 54 years. A woman will use an average of 10,000 pieces of sanitary napkins within 30 to 40 years of her entire lifetime. As per these estimates, the consumption is estimated to be 58,500 million pieces per year. But, in India, the present consumption is only 2659 million pieces (9). Unfortunately, not all the women in the country have access to hygiene products, affordability being a constraint in most cases.

Developed countries like U.S.A has 73 to 90% usage of sanitary napkins while in India, with a population of 1.21 billion, the usage is as low as 12% (2). According to National Family Health Survey (NFHS)-4 2015-16 only 59.2% of urban women use sanitary napkins exclusively during menstruation (5). Different menstrual hygiene products used by women during menstruation are as follows: 89% of women use cloth, 2 percent cotton wool, 7% sanitary pads and 2% ash (4). Another essential factor of menstrual management is disposal of used pads (7). Sanitary napkins are made of synthetic material and can take 500 years to decompose (18).

While the government stresses on provision of sanitary napkins to all the women in the country, very little focus is on the practise and safe disposal of the sanitary napkins. Over 1 billion non-compostable sanitary pads are dumped into urban sewerage systems, landfills, rural fields and water bodies in India every month (13). This paper focuses on the utilisation, practise and disposal of sanitary napkins by women across urban settlements in India.
DESK REVIEW

This paper has reviewed different studies on management of menstrual hygiene and menstrual waste disposal among urban settings. Government data, United Nations reports and other publications were also reviewed. We specifically studied the aspects of utilisation of sanitary napkins, practise of using menstrual absorbents and disposal of sanitary waste during the desk review. The primary data for this paper is sourced from World Vision India’s Urban WASH baseline conducted in the year 2017, covering seven cities (Delhi, Mumbai, Kolkata, Chennai, Bangalore, Guwahati and Hyderabad) that fall under World Vision India’s ‘My City Initiative’ programme, resulting in a sample size of 842. Tools were updated and translated into the language in which the survey would be conducted, prior to data collection.

Findings

UTILISATION OF SANITARY NAPKINS

A study from Mumbai among young urban women revealed an alarming fact that 25% of them still use cloth during menstruation (7). While another study from Delhi urban slums has revealed that only 11.3% women use cloth exclusively and 60% of women use both cloth and sanitary napkins. According to WASH Urban survey done by World Vision India among the 'My City Initiatives' in seven cities in India only 66.6% of the women use sanitary napkins exclusively. 20.3% of women use cloth exclusively and 10% use both cloth and sanitary napkins. A study conducted among adolescent girls also revealed that 60% of girls from urban settings use sanitary napkins exclusively and 38% use cloth (8). In a study conducted at a tertiary care hospital at Indore, among women in the reproductive age group, 67% were found to use sanitary napkins and the rest 30.3% use cloth.

MENSTRUAL HYGIENE PRACTICES AMONG URBAN WOMEN IN FEW CITIES OF INDIA AS PER DIFFERENT STUDIES.
In a study by the Department of Economics, Galgotias University, it was found that 70% of women see affordability as the biggest barrier for the usage of sanitary napkin. Only 5% of women from lower income groups use the sanitary napkins. A study by AC Nielsen showed that 70% of women found affordability to be a constraint for the use of sanitary napkins. The results from World Vision WASH urban baseline showed that regardless of economic status, 61% of women said, sanitary napkins are expensive and they struggle to afford them. Only 47% of women with a monthly income below INR 5000 use sanitary napkins whereas 85% of women with a monthly income of more than INR 15000 use sanitary napkins and 74% women with a monthly income between INR 5000 and 15000 use them. Non-affordability is a reason for 64% of women, who use cloth (n=234), not using sanitary napkins. In a Jaipur study among school-going and non-school-going girls, 73% of both the groups use sanitary napkins. However, the girls living in the slums particularly from poorer background said they do not have enough money to buy the sanitary napkins and hence they go back to using cloth. (9).

**PERCENTAGE OF WOMEN USING SANITARY NAPKINS FROM DIFFERENT ECONOMIC BACKGROUNDS IN CITIES FROM 'MY CITY INITIATIVE' PROGRAMME.** *(SOURCE: DATA FROM WV INDIA URBAN WASH BASELINE)*

In a focussed group discussion (FGD) by World Vision India among the women in Chennai, although the adolescent girls did not complain about the cost of the napkins, married women expressed that they buy the cheapest available sanitary napkins. Women said “We know it’s costly but we can’t avoid buying them. We buy the 29-Rupee packet from the shop.” In urban settlements in Delhi, 89% do not use sanitary napkins claiming the economic constraints. According to NFHS 2015-16 data, less than 10% of girls and women in the poorest and poor category used hygienic methods compared with 64 percent among the richest and 33% among rich women. (11) “Udaan” Scheme impact assessment on MHM at Jaipur reported 67% of the non school-going girls initiated
the practice of using sanitary napkins after using the freely distributed sanitary napkins, and now they save the money and buy the sanitary napkins. The rest 33% of girls said they were unable to carry forward the practice as they could not afford to buy the sanitary napkins. The same report also expressed the following statement by a mother, in slum area in Shastri Nagar “I have four daughters and all of them menstruate. I cannot afford to buy napkins; so I tell my daughters to use cloth. I know it is not hygienic to use old cloth; I have suffered a lot with infection. Free sanitary napkins should be distributed by government to both women and girls.”

**USAGE OF MENSTRUAL HYGIENE PRODUCTS**

From the WASH urban baseline by World Vision India, among women using cloth exclusively (n=171), 71 i.e. 42% dispose the used cloth into the garbage, 25% wash and dry within the room, 30% of women wash the cloth, dry it under the sun and reuse it. Focussing on access to toilets during menstruation, it was found that 5% of women do not have access to toilets. 7% of women in the survey have access to water only once in a day during menstruation for their personal hygiene. In a FGD conducted at Chennai “My City” initiative project area, women said they are not habituated to drying the sanitary cloth under the sun due to few cultural taboos and shame that men would see them.

A study from Indore says, 11% wash and dry the used cloth inside the home. And 57% of women use more than seven pads/cloth during their menstruation (12). A study from Hyderabad has shown 16.3% use unclean cloth. 19.2% of women using menstrual cloth do not dry the cloth under the sun.

**DISPOSAL OF SANITARY NAPKINS**

- **Dispose with household garbage**: 64%
- **Segregate but dispose with household garbage**: 9%
- **Flush in to the toilet**: 0% (only 3 out of 639)
- **Dispose openly**: 5%
- **Burn the napkins**: 21%

A Mumbai study among girls living in low socioeconomic conditions, it was found that girls practice the habit of washing the used sanitary napkins and then wrapping it in a paper or plastic bag to dispose because they believe in a myth that a snake will come for the blood, putting the women at a curse or risk of infertility (13). In some cultures, women are asked to bury the menstrual cloth to prevent them from being used by evil spirits. (14)
With reference to the disposal of sanitary napkins, it is analysed that among the 639 women using sanitary napkins, 64% dispose along with household garbage, 21% of women segregate the sanitary napkins waste, but by the end they either dispose along with the household waste or dispose it openly, 9% flush the napkins into toilets and 5% dispose openly. A very negligible number of women, i.e., 3 out of 639 women burn the used napkins. In a FGD conducted among the women in World Vision India’s “My City” initiative Chennai region, few of the women said “We put the used napkin in a polythene cover with a small stone inside, tie the cover and throw it into the river which flows behind our houses”. A women also said “When I was living with my parents at my village, I used to burn the sanitary napkins, but after marriage I shifted to Chennai here we do not have any space to burn the pads. The houses here are very close to each other and we feel shame if someone see us carrying pads and it stinks when the pads are burnt, which attracts the attention of the neighbours. These situations restrict me from burning the pads.”

A comparative study among urban and rural adolescent girls at Nagpur showed that 45.23% and 12.33% of urban and rural girls, respectively, dispose the sanitary napkins with the household waste (8). A Jaipur study among school-going and non-school-going girls found that 91% of the girls dispose the sanitary napkins in the dustbins and only 5% of the girls burn the sanitary napkins. The same article also claimed that “In one of the slum areas during the FGDs, several girls shared that since there was no public dustbin for disposal in their area, they threw the napkins in an open field behind their basti (slum) as they did not have any other option.” (15).

Discussion

The utilisation of sanitary napkins by women in urban settlements of India is approximately around 50% and varies largely depending on the economic background of the individual. Only 12% of total Indian women use sanitary napkins. Affordability is one of the main constraints in using the sanitary napkin. Commercially available pads are 1.5 times more expensive than pads made by low-cost manufacturers (6).

Approximately 8% of women use homemade sanitary napkins (old clothes or rags) during menstruation. In a few extreme cases, women still use ash, hay, newspaper, wood shavings and dried leaves. (6) Reusable sanitary materials are unhygienic when not maintained properly, since most of the women are unable to dry the cloth in the sun and are forced to dry the used napkins indoor away from proper air and sunlight, due to a feeling of shame. A study in Mumbai has shown evidences that usage of unhygienic cloths has caused growth of microbes in the sanitary cloth, putting girls at a risk of infections (13) (16). Women using reusable cloths are at a twice greater risk of developing symptomatic cases of reproductive tract infection than women using disposable absorbent material. Although tampons and menstrual cups are affordable, available and eco-friendly, the cultural values of the country prevent unmarried women from using them.

On the other hand, improper disposal of sanitary napkins has become a burden on the environment. Consequences of improperly disposed menstrual waste include blockade of the drainage, contamination of the water and breeding of viruses like hepatitis B and C and HIV as well. Used sanitary napkins in the drainage cannot be cleaned with machines and should be cleaned manually, putting the manual scavengers at a potential risk (17).

The main concern with the disposal of sanitary napkins is that they are not categorised (5). Sanitary napkins are categorised neither as bio-medical waste nor as plastic waste. Although sanitary napkins do not fit in to the definition of bio-medical waste (Management and Handling Rules, 1998 –India), used sanitary napkins have a great potential to spread infection (19). Hence, categorising the sanitary napkin waste should be a priority, followed by measures to manage the sanitary waste.
Recommendations

With affordability being one of the hindrances to the utilisation of sanitary napkins, manufacture of low-cost local brand sanitary napkins like “Anandi” pads by Mr. Arunachalam Muruganantham and homemade sanitary by women from different parts of the country should be promoted. Tax exemption on sanitary napkins is a crucial factor to be discussed. The goods and services tax (GST) has placed 12% tax on sanitary napkins, categorising them as a “luxury item,” which has increased the burden on 355 million menstruating women, as the tax is applicable to menstruating women alone (6). In the year 2011, Kenya a developing country similar to India, has exempted import tax on sanitary napkins, resulting in 18% decrease in the cost of the sanitary napkins (7).

The Government should review the taxation policy, reducing the price of sanitary napkins and making them affordable to women from all economic backgrounds. Low-cost sanitary napkins are available at one-third of the cost of other commercially available sanitary pads. Reusable sanitary napkins are one more ray of hope. Eco-Femme, a social enterprise in Tamil Nadu, has introduced cloth pads into the market, which can be reused for months and are affordable. Although hygiene is a matter of concern using cloth pads, this can be gradually addressed by providing proper education to women on usage and maintenance of cloth pads. Training programmes on manufacturing homemade sanitary napkins can be conducted among women in the community, increasing their entrepreneurship skills by creating small-scale industries involving self-help groups (SHGs) making women economically independent.

Safe menstrual hygiene practices do not mean the mean usage of sanitary napkins alone. Sanitary napkins that are not changed for more than certain (6 hours on average and can vary with every individual) (20) hours are not safe too. Information education communication (IEC) and behaviour change communication (BCC) campaigns should be conducted in the communities creating awareness on hygiene practices and different myths of menstruation. It is essential to focus on adolescent girls who will grow up to be mothers for upcoming generations and will teach the same to their children. Men and boys are to be educated on menstruation, creating proper support for women in overcoming several myths.

Proper disposal of sanitary napkin is another major concern of using sanitary napkins. Installation of incinerators in the toilets would be a great benefit to both the environment and the community. Low-cost incinerators by UNICEF with a facility to burn using firewood costing INR 1500 per unit are tested and installed by Tamil Nadu government. Terracotta incinerators are another new invention, which burn the sanitary napkins without producing any foul smell. These incinerators cost INR 2000 per unit in contrast with electrical incinerators which cost approximately INR 12000 per unit.

Girl-friendly toilets are yet another new innovation with latrines specially constructed for sanitary pads disposal. A simple shoulder level chute was introduced in the usual latrine design; these chutes were angled in a manner that soiled napkins directly fall in a deep pit when dropped inside the chute. In this pit, a less expensive chemical agent should be added five times in a month, which ensures fast decomposition of soiled napkins. (17)

Compostable sanitary napkins are evolving in the current generation, contributing to less landfill and pollution of the environment. Banyan fibres and cotton are used as raw material to manufacture compostable sanitary napkins, which are slowly emerging in the market.
**Conclusion**

**WASH** plays a prominent role in menstrual hygiene. Lack of adequate facilities and access to menstrual hygiene materials has been associated with absenteeism of girls in schools(8). A vital awareness on **MHM**, coupled with safe, gender-separated toilets, proper facilities for menstrual waste disposal and adequate water supply, will ease the strain on women during menstruation. Failure to provide menstrual hygiene facilities at schools and communities will prevent the usage of the **WASH** facility in the intended way. Improper disposal of sanitary waste into the latrines can result in solid waste issues, which will block the latrines and cause pit fillings which might also result in the back flow of the sewage, leading to the breeding of viruses in very close proximity to human dwellings. Manual scavenging of improperly disposed sanitary napkins is yet another prime issue putting the person involved in this work at a higher risk of infections. Taking the above into consideration, **MHM** should take its way from a narrow path of sanitary napkin utilisation alone to a broader way of practice and disposal too.
References


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“India’s approach at the international climate change negotiations has undergone a major change,” Erik Solheim was quoted saying in February. One of the three areas that he specifically mentioned was ‘transformation of the Indian agriculture sector’, if India needs to mitigate the effects of climate change. Solheim’s words only emphasise how critical agriculture is in the whole discourse of climate change and its mitigation in the Indian context. Evidently, agriculture matters - accounting for a substantial part of the GDP (16%) and workforce of India. Poor agricultural performance can lead to inflation, farmer distress and unrest, and larger political and social disaffection, all of which can hold back the economy. Studies also abound, which state with evidence the adverse impact of every degree of rise in temperature on loss per tonne of agricultural production. Some indirect impacts include the rise in the number of climate-related shocks like droughts and floods, which again results in crop loss and arable land unfit for cultivation. The context needs to be complemented by the entire ‘human’ angle to climate change, which remains equally significant and in need of attention. Vulnerability to climate change is closely related to loss of livelihoods and poverty, due to limited financial and technical resources. As Sunita Narain says, each drought destroys the abilities of rural communities to cope. It makes them weaker and more disabled to deal with the vagaries of the monsoon. And in that way drought becomes permanent and long lasting and eats away at the very insides of the country. India’s rural poor are heavily dependent on climate-sensitive sectors such as agriculture and forestry; often with fragile economic structures. Climate change consumes lives of the most vulnerable – one of the most relevant markers being farmer suicides in India. It has to be noted that warming temperature trends over the last three decades have already been responsible for over 59,000 suicides throughout India (Carleton 2017). Given that 62% of the cropped area is still dependent on rainfall, Indian agriculture - involving more than 600 million people – continues to be fundamentally dependent on the weather.
Droughts in India and their impact

When Stockholm Water Prize winner Rajendra Singh stated in early 2016 that drought was man-made and not natural, he was pointing at India’s inefficient water management, compounding matters for a country heavily dependent on rainfall. The National Disaster Management Authority (NDMA) concurs - drought is no longer mere scarcity or absence of rainfall, but related to inefficient water resource management. Even regions with high rainfall often face severe water scarcity – Meghalaya’s Cherrapunji with over 11,000 mm of rainfall, now faces drought during winter. Add to this the fact that in three of the past four years, India’s annual rainfall deficit has been 14% (2015), 12% (2014) and 11% (2012). How does a country which ranks 141 out of 180 in the 2016 Environment Protection Index promote efficient water management?

Preventive measures for drought have been well documented; ranging from on-farm reservoirs in medium lands, growing of pulses and oilseeds instead of rice in uplands, ridges and furrows system in cotton crops, growing of intercrops in place of pure crops in uplands, land grading and levelling, stabilisation of field bunds by stone and grasses, graded line bunds, contour trenching for runoff collection, conservation furrows, mulching to more application of farm yard manure (FYM). Additionally, research also highlights efficient water use such as frequent but shallow irrigation, drip and sprinkler irrigation for high value crops, irrigation at critical stages as key interventions (Shrivastava 2016). However, the challenge lies in the implementation and sustainability of such interventions, and thus the need for strategic community participation to meet these objectives, as Smyle et al. highlights in their project findings.
Water Security

With over 600 million of its 1.2 billion involved in agriculture, and more than half of the net sown area rain-fed, India mandatorily needs to bring water security to its rural communities. The 2016 drought affected about 330 million people in India, one of the most severe so far. Looking ahead, the per capita availability of water for India in 2001 is expected to be half its 1947 level. Nevertheless, the concern is much more about the careful use and equitable and distributed access to water, than mere scarcity. Scarcity is not about the lack of resources but certainly about being wise about their use (Dhawan, 2017).

As per OECD environmental outlook 2050, India would face severe water constraints by 2050. This is in part due to the fact that water demand from India’s growing urbanisation looks at its largely agriculture-dependent rural areas for supply. This naturally creates a water stress, for which efficient irrigation systems seem to be the best way forward. Increased investment in irrigation in the past half a century has been successful in building infrastructure for irrigation, which has led to an increased area of cultivation and higher yields. The production of food grains increased from 51 million tonnes in 1950 to over 200 million by the end of the 1990s – over half of this increase is attributed directly to investment in irrigation facilities (Narain, 2006).

However, India’s agriculture sector is still primarily dependent on the rains. For India’s rain and agriculture-dependent rural communities to achieve water security – the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development – the three main components are building of infrastructure, building of knowledge and community mobilisation. The most critical site where the first two meet is the Indian village, thus making community mobilisation key to change.

Towards community action

The Economic Survey 2017-18 states that fully irrigating Indian agriculture against the backdrop of water scarcity and limited efficiency in existing irrigation schemes will be a defining challenge for the future. How then, does one go about this challenge? From World Vision India’s experience, the key to improving efficiency of managing water resources lies in community-based collective action.

Collective action has been defined as decisions taken by a group to internalise negative externalities and/or to generate positive externalities in the use and management of watershed resources. The two main components needed for the effectiveness of watershed management interventions (Shiferaw et al) are the following:

- **ENABLING INSTITUTIONS:**
  This requires the development of rules and regulations for operation and management of the various common assets and structures including grazing lands, check dams, agro forestry and soil and water conservation practices. These rules will also include establishment of mechanisms for conflict resolution, regulation of behaviour and agreed norms for sharing costs and benefits.

- **ORGANISATIONAL PERFORMANCE:**
  This involves the design and establishment of local mechanisms for coordination and implementation of watershed activities. This often calls for establishment of user groups, watershed committees and watershed associations, wherein the objectives and basic structure of authority and decision making are determined. These institutional and organisational structures of the community are critical
for conceptualising the need for collective behaviour and facilitating the proper planning, designing and execution of specific actions taken by the community groups at various stages of implementing the watershed project, including mobilisation and management of local and other resources, implementation of watershed activities, conflict resolutions and maintenance of such investments.

Some studies have shown that integrated watershed management interventions that also include improved access to markets and agricultural innovations are useful strategies for reducing poverty, improving livelihood resilience and sustainability in these less-favoured areas (Joshi et al., 2004a,b; Reddy et al., 2004b). However, Shiferaw et al argue that this approach cannot succeed without collective action and coordination of resource use decisions by several actors and communities at the landscape level. Their results highlight:

The real benefits of watershed programs in terms of improving livelihoods, reducing poverty and enhancing sustainable intensification of agro-ecosystems will critically depend on participation of resource users in community collective action. Whereas individual farmers often lack the capability and the incentive to improve local public goods, local institutions for collective action can help internalize externalities and reduce transaction costs for management of local commons. This contributes towards the empowerment communities and facilitates joint investments for improving productivity and resource use sustainability at the landscape level (Shiferaw 2008).

As mentioned, watershed management through active community participation and ownership has ripple effects on multiple levels, with the biggest improvement taking place in the aspect of sustainability of interventions. As the World Bank notes:

Although effective participation imposes demanding requirements, participatory approaches and the use of community WSM plans have been shown to be effective in empowering communities and in gaining their buy-in (ownership) of WSM programs. Decentralized and participatory programs are complex, but they are key to building effective partnerships at different levels (Smyle et al, 2014).
In many instances, communities are supported by various primary implementing agencies (PIAs) - governmental, non-governmental or corporate – in achieving water security. The important roles of the PIA are to facilitate community organisation and training, motivate the formulation of local rules for collective action and resource mobilisation and design and facilitate implementation of development plans for the watershed. Studies have shown that the support of NGOs has been relatively more successful (Kerr, 2001), and has paved the way for a higher rate of adoption for participatory approaches even in government-run programmes. From the perspective of World Vision India, these aspects were the crux of its community interventions in Bihar’s Jamui district. The grass root development organisation has been working with the most vulnerable pockets of India, engaging over 6200 communities.

Some villages in one of India’s rainfed districts Jamui, on the Bihar-Jharkhand border, scripted a success story across ten years of community-based water management initiatives despite being drought prone. The annual rainfall in Jamui in 1998 was 1204.60 mm, which fell to 663.7 mm in 2008; the district’s rainfall has been recorded as below average for the last six years as per data from 2013. In Jamui’s Chakai block, most of the population earn their livelihood by farming activities. 93.59% of households are involved in either cultivation or manual labour – which in the rural scenario is mostly agriculture related. Close to 80% of the households earn an income which is less than INR 5000 a month. The block has a tribal population of 17.5%, the largest concentration of tribal population in Jamui district. Chakai has a hilly and rocky terrain, and only 40.43% of the total land area is cultivatable. Additionally, Chakai had low rainfall, poor irrigation infrastructure, sparse water bodies and heavy soil erosion. Mono-cropping was the only way of farming in practice, creating an overt dependence on the kharif crop - paddy - and zero income in off-season. As a result, people live in poverty, resulting in food insecurity and migration to nearby cities.

However, community-based water conservation efforts have borne fruit in Chakai, initiated in 2005 and aided by World Vision India. With water availability being the most pressing need, farmers were successful in creating water storage and irrigation structures, aided by Krishi Vigyan Kendras (KVKs), MLA funds, Bihar Government’s Public Health and Engineering Department (PHED), Mahatma Gandhi National Rural Employment Scheme (MNREGS) and other linkages and resources. Information-building of over 1000 farmers from 77 villages by KVKs on System of Rice Intensification (SRI), multiple cropping, mixed cropping, seed preparation, seed treatment, vermicompost, organic farming, low-water farming techniques and remedies to common crop diseases greatly helped. Following this, apart from the kharif crop, farmers also began cultivating the rabi crop (wheat), sugarcane and vegetables. Due to year-round availability of water, 912 acres of land were brought under irrigation and 2800 farmers reported increase in yield (as per 2015 data), and migration also declined. The proportion of families who were able to provide well for their children had gone up from 33.66% in 2012 to 67% in 2015, as per surveys. Farmers in Baratand village were able to increase the cultivatable from 17.87 acres to 60.05 acres.
Way forward

Inter-governmental Panel on Climate Change (IPCC) predicts that yield from rain-dependent agriculture could be down by 50% by 2020. World Bank reports say rainfall variability alone could push 12 million people to absolute poverty. IPCC also predicts that temperatures in India are likely to rise by between 3 degrees Celsius and 4 degrees Celsius by the end of the 21st century. “These predictions, combined with our regression estimates, imply that in the absence of any adaptation by farmers and any changes in policy (such as irrigation), farm incomes will be lower by around 12% on an average in the coming years, and unirrigated areas will be the most severely affected, with potential losses amounting to 18% of annual revenue,” India’s Economic Survey 2017-18 survey says.

Research reveals a direct correlation between community participation and system performance. According to the Ministry of Agriculture, “as local water management and rainwater harvesting hold the key to drought mitigation, Government policies should emphasize community-based water resource management. Community-based institutions, such as Water Users Associations (WUAs), can play important roles in managing water resources at the micro level.” Equipping the community increases awareness, brings them closer to their rights and entitlements, helps them realise key linkages and ultimately makes them resilient. As climate change assumes shape to pose a real threat to fragile ecosystems in rural India, deliberate and strategic community involvement is indeed the way forward to make them immune to perennial losses from droughts.

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World Vision is one of the world’s leading child-focused humanitarian organisations. Through development, relief and advocacy, we pursue fullness of life for every child by serving the poor and oppressed regardless of religion, race, ethnicity or gender as a demonstration of God’s unconditional love for all people. With nearly 65 years of experience in India, World Vision works in 185 districts impacting 26 lakh children and their families in over 6200 communities spread across 26 states of India.