Samhita
A BETTER NORMAL

Report:
Impact Assessment of Cummins' Holistic Rural Development Programme (2011-2022)

Submitted to:

Cummins

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1. Introduction

Cummins India Limited's ('Cummins') commitment towards Corporate Social Responsibility (CSR) has been largely realized through the work of Cummins India Foundation ('the Foundation') founded in 1990. Cummins and the Foundation mainly focus on three key areas - higher education, energy & environment, and local community infrastructure development. The Foundation works closely with civic bodies, NGOs, government, and communities in achieving the organisation's vision of "Making people's lives better by unleashing the power of Cummins".

Under these three key areas, Cummins has been providing support to the community through various projects. One such project is the Holistic Rural Development Programme (HRD) which started with one village in the year 2011. Since then, it has touched the lives of communities in the states of Maharashtra, Madhya Pradesh and Jharkhand until 2021, with engagement to ensure sustained impact carried on till 2022. The programme has benefitted more than 50,000 people in rural areas across 26 villages through water conservation and agriculture, education and infrastructure building, women empowerment, healthcare access and social engineering.

This report assesses the impact created in 13 out of 26 villages across the three states from the financial year 2011-2022, of which programme activities were conducted till 2021 while sustainability efforts were undertaken till 2022.

2. Background of the programme

The Holistic Rural Development (HRD) began when Cummins identified Nandal village, located 5 Km from its mega site at Phaltan, Maharashtra as one of the neediest village in the vicinity in 2010. Nandal faced various issues - scarcity of water and sanitation, lack of livelihood development, low productivity of agriculture, lack of proper infrastructure and education. After identification of the problems, Cummins started working on most pressing issues such as access to water for irrigation and domestic use, renovation of school infrastructure and development of livelihood options. After creating visible impact in Nandal, Cummins planned to replicate its rural development model and scale up the impact over other regions where their plants were located. For that, Cummins incorporated the learnings from Nandal village to follow a systematic process and criteria in identification and selection of village using Six Sigma methodology. They also adopted the technique of Participatory Rural Appraisal (PRA) to understand the needs of the identified villages. From the findings across the villages, Cummins identified the top five thematic areas that required support and created 5 pillars under the programme of HRD. The 5 pillars identified were - Water management, Education, Income growth, Health sanitation and wellness, and Sustainable social engineering. Construction, renovation and upgradation activities were conducted under Water management and Education pillars, while development of new livelihood models was focused on under Income growth. Health camps were conducted in each village, largely for Non-Communicable Diseases (NCDs) under the Health pillar. Sustainable social engineering included linking the community to government schemes, afforestation and convergence with government institutions for implementing the programme. A strong due-diligence process was carried out after identifying the on-ground partners for implementing the programme. This 5-year programme under its first phase was carried out in 3 sub-phases. The first phase consisted of 13 villages across the states of Maharashtra, Madhya Pradesh and Jharkhand. It was estimated that over 25,000 people across the villages had benefitted from the programme. The list of the villages and population impacted is annexed to this document. As part of Cummins' Employee Engagement programme, each village was allotted an employee project leader, who supervised programme work in the entire village followed by 5 employee pillar heads overlooking work under each pillar. All 6 were supported by a project sponsor who would usually be the head of a business unit at the closest plant. Five central pillar heads were also appointed, in order to mitigate operational challenges and replicate good practices across the different regions. In interviews with the Samhita team, Cummins reported their intention to stay involved with the villages for the foreseeable future and did not have an exit plan for these regions at the time of study. However, it must be noted that active, capital-intensive work under the 5 pillars is carried out in all project villages for a period of 5 years, beyond which the engagement largely revolves around facilitating the communities' access to government schemes.

3. Research Methodology

Samhita Social Ventures was commissioned by Cummins India to conduct an impact assessment of the CSR activities in the below mentioned villages with the intention of assessing the outcomes and impact of the programme on the community. The study was conducted from November 2022 to January 2023.

Sr. No.	State	Villages	Population
1	Jharkhand	Nutandi	453
2	Madhya Pradesh	Karwasa	729
3		Rajoda	5251
4	Maharashtra	Nandal	2854
5		Takobaichiwadi	599
6		Saswad	3523
7		Suravadi	3890
8		Mulikwadi	1232
9		Kalaj	2066
10		Manjursumbha	1194
11		Nimgaon Bhogi	1645
12		Wathar Nimbalkar	3954
13		Devgaon	1135
Total population			**28,525**

Table 1: List of treatment villages

3.1 Research objectives

The overall aim of Samhita's approach to the impact assessment is to 'prove and improve',

Prove

1. The **efficiency of processes** used to deliver interventions and create impact.
2. The **effectiveness of programmes** in terms of programme outcomes, social outcomes, and improvements in lives of end participants of the programme.

Improve

1. By providing actionable suggestions and recommendations for improving programme design and implementation, thereby strengthening the social impact

3.1 Methodology

The study adopted a mixed methods approach for collecting primary data using quantitative and qualitative methods. To uphold data validity, only villages where the programme began in 2014 and after were sampled for the quantitative data collection while all villages were considered while sampling for qualitative data collection. The study further identified two groups of villages under treatment and comparison groups. Nine villages where at least one activity under Cummins was conducted were considered under treatment group, and 3 villages with no support from Cummins were identified to constitute a comparison group. The comparison villages were selected based on their socio-economic similarities with intervention villages such as population size, occupation and proximity from treatment villages. The comparison villages selected for Jharkhand, Madhya Pradesh and Maharashtra were Kalajhor, Khetakhedi and Malavadi respectively.

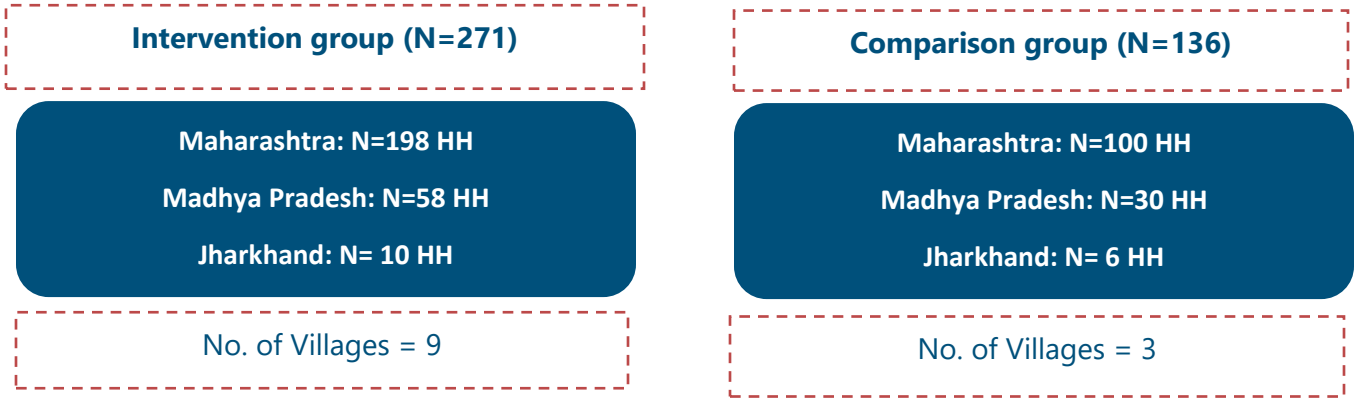
The primary data was collected on-field from the aforementioned comparison and treatment villages. This study documents the social development outcomes in some of the most challenging regions of India as a result of Cummins India Foundation's concerted work in the region in the last 11 years.

3.2 Sampling

Random sampling of the community members from the treatment (intervention) and comparison group of villages was carried out to arrive at an adequate representation of participants with respect to the village-wise population. The treatment villages were split according to the initial year of engagement for quantitative and qualitative studies. The villages where Cummins started to engage on and before the year 2014 were selected largely for qualitative data collection while the rest of the villages were sampled for quantitative surveys. The prime reason for this categorisation was to ensure coverage of all villages without compromising on data quality that may be affected due to low recall of events occurring over 8 years in the past as on the date of the assessment. The sample split per village has been annexed to the document.

3.3 Surveys

Quantitative data from 271 and 136 respondents for treatment and comparison villages, respectively, was considered for the study of the programmme.



3.4 In-depth interactions

The below table shows the type and number of stakeholders interacted with for collecting qualitative data and contextualising the programme's operations and impact.

KIIs (Number of interviews)	Focussed Group Discussions (Number of sessions)	Observations
• Sarpanch (7) • Government Officials (2) • SHG members (3) • School teachers and principal (7) • Model farmers (4) • Cummmins programme staff (2) • Anganwadi workers (3) • ASHA workers (2) • Pillar heads of the programme (4) • Project leaders for village (2) • Implementation partners (3)	• SHG members (3) • Organic farmers (1) • Youth (4)	• Water structures • Water ATM • Sanitary Napkin Unit • Poultry Unit • School infrastructure

Table 2: List of qualitative interviews

3.5 Data analysis and presentation

The surveyed data was cleaned and analysed to figure out commonalities, region-specific practices and bottlenecks from the programme. The qualitative data from in-depth interviews and observations were brought together with the quantitative data to identify the outcome achieved and pillar-wise insights of the programme. The analysed insights were presented using the Organisation for Economic Co-operation and Development (OECD) framework across the pillars.

3.6 Limitations of the study

A few factors to be kept in mind while reading the report that act as limitations for the study are presented below:

i) Given that the programme first began in 2011 and was assessed for impact in 2022, many participants from the community had unclear or incomplete recollections of the activities of the programme or their village and life before it.

ii) For the same reason as above, many important stakeholders such as implementation partners and Cummins personnel instrumental to certain stages of the programme were no longer available for interactions conducted as part of this study.

iii) The SHG operating the business of rental service of milking machine unit was unavailable during the time of study and hence details pertaining to them are limited.

4. About the OECD Framework

The Organisation for Economic Co-operation and Development (OECD) is an international organisation that works to build better policies for better lives. The goal of the organization is to shape policies that foster prosperity, equality, opportunity and well-being for all. Together with governments, policy makers and citizens, the organisation works on establishing evidence-based international standards and finding solutions to a range of social, economic and environmental challenges[1].

The OECD Development Assistance Committee (DAC) Network on Development Evaluation (EvalNet) has defined six evaluation criteria – relevance, coherence, effectiveness, efficiency, impact and sustainability - for measuring the impact of a given programme. These criteria provide a normative framework used to determine the merit of an intervention. They serve as the basis upon which evaluative analyses are made.

Figure 1: OECD framework with criteria

The definition, according to OECD, of the six criteria is described below[2]:

- **Relevance** - The extent to which the intervention objectives and design respond to beneficiaries', global, country, and partner/institution needs; policies, and priorities, and continue to do so if circumstances change.
- **Coherence** - The compatibility of the intervention with other interventions in a country, sector or institution.
- **Efficiency** - The extent to which the intervention delivers, or is likely to deliver, results in an economic and timely way.

[1] Organisation for Economic Co-operation and Development
[2] Evaluation Criteria

- **Impact** - The extent to which the intervention has generated or is expected to generate significant positive or negative, intended or unintended, higher-level effects.
- **Sustainability** - The extent to which the net benefits of the intervention continue or are likely to continue.

The findings of the study have been presented in the OECD format to assess the impact created by the programme.

5. Profile of the respondents

This section represents the profile of respondents to the survey conducted in the sampled villages in locations where Cummins has executed its HRD programme.

5.1 Socio-demographic indicators

5.1.1 Gender and Age profile

Of the 271 participants from treatment group, 51.5% were female respondents across the survey, of which 77% represented the state of Maharashtra. Similarly, a majority (51.47% of 136 respondents) from the comparison group were female members.

The median age of the overall treatment respondents was 42 years while it was 40 years for the comparison group. The median age for the treatment states of Jharkhand, Maharashtra and Madhya Pradesh were 36 years, 43 years and 40 years respectively.

The average adult members per family of the treatment villages in Jharkhand, Maharashtra and Madhya Pradesh were 5.9, 4.18, and 4.37 members respectively. The same for the comparison villages were 5.33, 3.76, and 4.1 members.

The average count of children per family in the treatment villages of the Jharkhand, Maharashtra and Madhya Pradesh were 2.3, 1.16 and 1.55 members. While the same for the comparison villages were around 1.66, 1.65 and 1.4 members respectively.

5.2 Educational Qualifications

The following table highlights the current educational qualifications of the respondents in the intervention and comparison villages.

	% of intervention respondents (N=271)			% of comparison respondents (N=136)		
Qualification	Maharashtra	Jharkhand	Madhya Pradesh	Maharashtra	Jharkhand	Madhya Pradesh
Diploma	1.48%	0%	0%	2.94%	0%	0.74%
Graduation	7.75%	0%	1.11%	4.41%	0.74%	0.74%
Illiterate	4.80%	2.58%	4.06%	16.18%	0.74%	7.35%
No Formal Education	1.11%	0%	0.37%	0.74%	0.74%	0%
Post-graduation	2.58%	0%	1.11%	3.68%	0%	0%
Upto10th	25.46%	1.48%	4.43%	16.91%	0.74%	4.41%

Upto12th	11.81%	0.00%	3.32%	8.09%	0.00%	1.47%
Upto5th	18.08%	1.11%	7.01%	20.59%	1.47%	7.35%

Table 3: Educational qualifications

Around 61% of the treatment village population has completed grade 10 across the three states, while 44.86% of the comparison village population has completed the same.

5.3 Occupation

The following table highlights the current educational qualifications of the respondents in the intervention and comparison villages. Around 45.02% of the respondents from the treatment villages were engaged in farm-based livelihoods followed by around 32.84% with a salaried job. However, a majority of the respondents (64.71%) from comparison group were engaged in farm-based livelihoods.

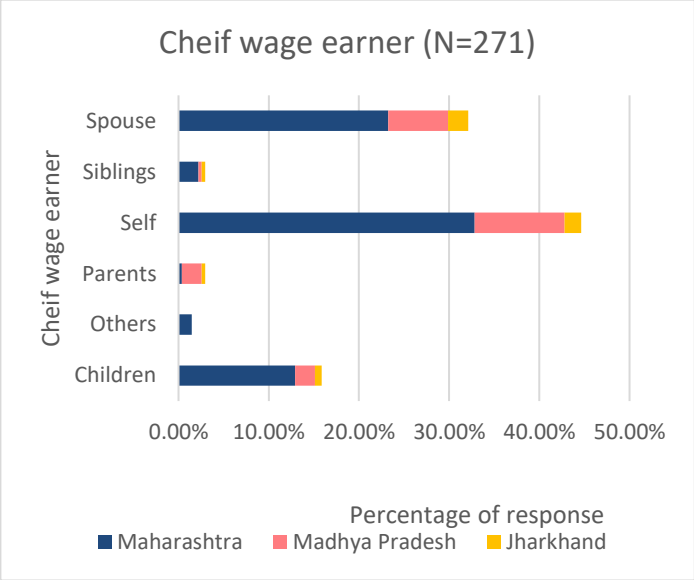
Occupation	% of intervention respondents (N=271)			% of comparison respondents (N=136)		
	Maharashtra	Jharkhand	Madhya Pradesh	Maharashtra	Jharkhand	Madhya Pradesh
Agriculture (own field)	25.83%	8.49%	2.21%	2.21%	5.88%	49.26%
Agriculture (land-lease)	1.48%	0%	0%	0.74%	0%	2.21%
Daily wage	2.58%	4.06%	1.48%	0%	0.74%	3.68%
Farm-based jobs	3.32%	0.37%	0.37%	0%	0%	0.74%
Farm-based business	2.58%	0.37%	0%	0.74%	0%	0%
Livestock-based business	1.85%	0%	0%	0.74%	3.68%	0.74%
Non-farm-based business	3.69%	4.06%	0.37%	0%	2.21%	4.41%
Paid work	28.04%	3.69%	1.11%	0%	0%	0.74%
Pension	1.85%	0.37%	0%	0%	0%	0.74%
Others	1.85%	0%	0%	0%	9.56%	11.03%

Table 4: Occupation of the respondents

Around 36.53% of the respondents from treatment group practice agriculture as their primary occupation on their own land, while 57.35% of the respondents from the comparison group practice the same. The median cultivable land possessed by the farmers was around 4 acres among the treatment villages while the land possessed by the famers of the comparison villages is 3 acres.

5.4 Income and expenditure

Around 44.65% of the respondents were the chief wage earners for their families (including 9% female respondents) among the treatment villages, followed by their spouse around 32.10%. While among the comparison villages, both the respondents (37.5%) and their spouses (38.97%) were almost equally the breadwinners for their families. It was also noticed from the survey that 8.11% of children who are of or above 18 years were the chief wage earners of families in the treatment villages. This was largely because they had dropped out of school after Classes 5 or 10, or they were unschooled.



Graph 1: Chief wage earner

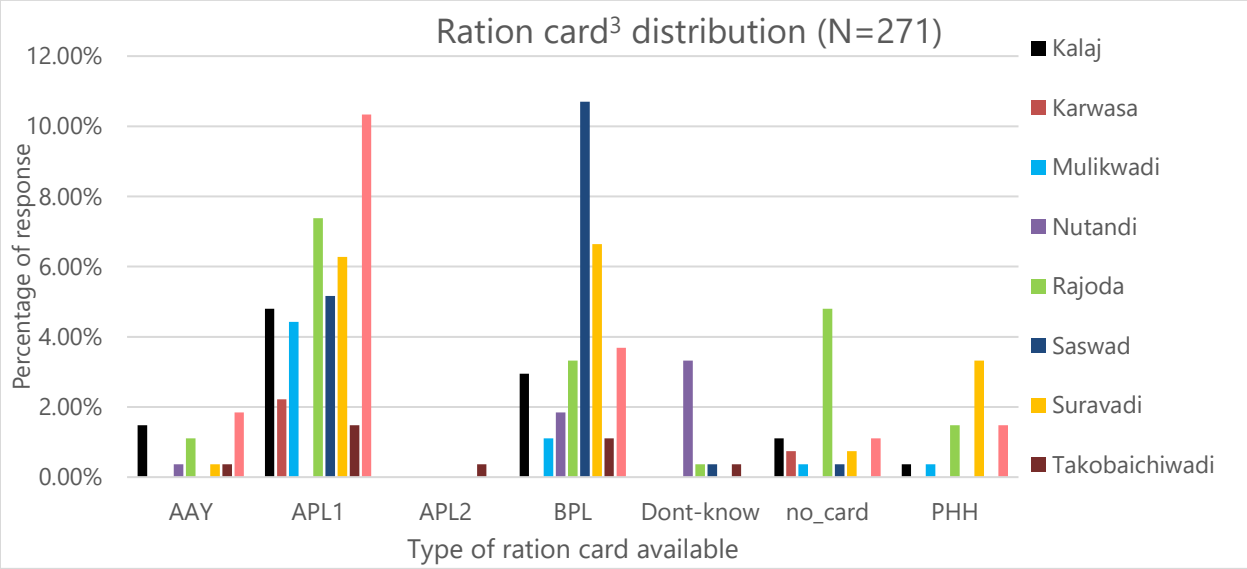
The table 5 shows the major expenses incurred in the families of treatment and comparison villages in the three states. A majority of the respondents across each group spend largely on monthly ration or household provisions.

Expenses	% of intervention respondents (N=271)			% of comparison respondents (N=136)		
	Maharashtra	Jharkhand	Madhya Pradesh	Maharashtra	Jharkhand	Madhya Pradesh
Children's education	8.86%	2.21%	4.06%	9.56%	0%	3.68%
Pay bills	0.74%	0%	1.11%	0.74%	0%	0.74%
Ration	25.09%	3.32%	6.64%	15.44%	4.41%	10.29%
Repayment of loan	0.74%	0%	0.37%	0%	0%	2.21%
Others	4.43%	0%	3.32%	12.50%	0%	0.74%

Table 5: Expenses

There were around 1.86, 1.27 and 1.41 earning members in a family on an average in the states of Jharkhand, Madhya Pradesh and Maharashtra respectively, under treatment villages. The average number of earning per family in the same states from the comparison group comprised of 2.1, 1.13 and 1.44 members respectively. The higher average number of earning members in Jharkhand in both the groups was largely due to entire families' involvement with agriculture as primary source of income.

Graph 2[3] showcases the ration card distribution amongst the survey respondents. As can be seen, a majority of the respondents (42.07%) from the treatment villages hold Above Poverty Line 1 (APL1) ration cards followed by Below Poverty Line (BPL) cards around 31.37%. Around 9.23% respondents didn't have a ration card. In case of the comparison villages, APL2 cards holders were the majority comprising of 43.38%, followed by BPL cardholders around 19%.



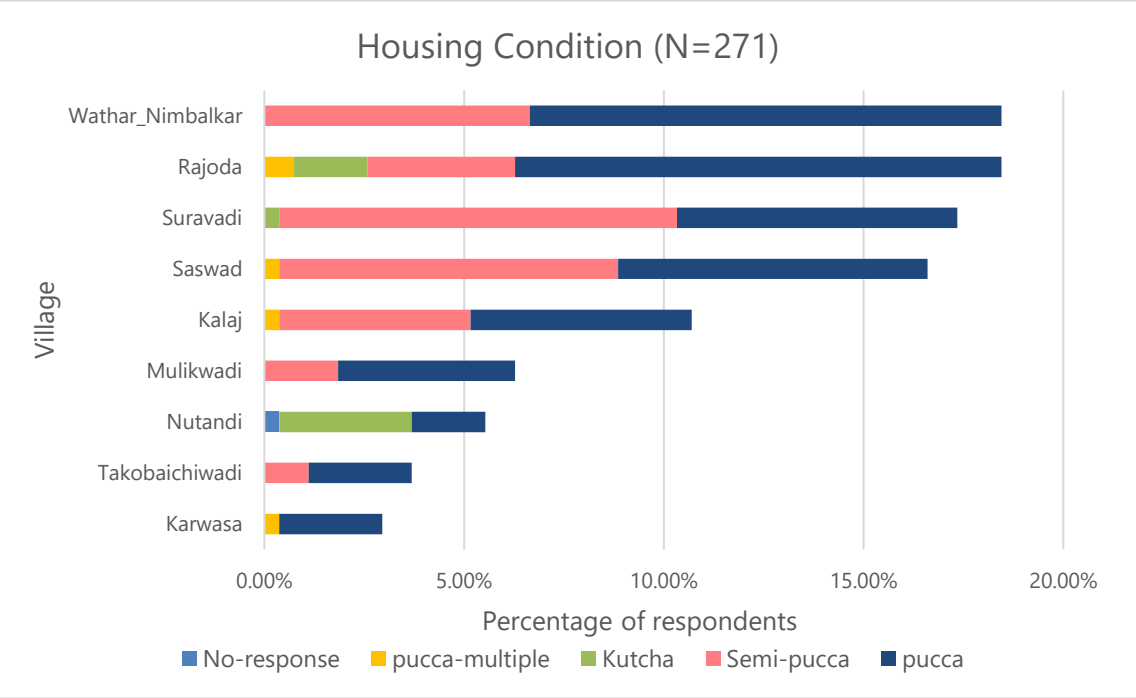
Graph 2:Access to civil supplies

[3] APL= Above poverty Line
APL1= Above Poverty line 1
APL2 = Above Poverty line 2
BPL = Below Poverty Line
AAY= Antyodaya ration card
PHH- Priority Household ration card

5.5 Housing and Energy

Around 54% of the respondents from the treatment villages mentioned that they are native to the surveyed villages. Another 39% said that they had been staying in the village for more than 10 years. While in the comparison group, 51.47% respondents were native and 40.44% were staying in their villages for more than 10 years.

Graph 3 shows the condition of houses in the treatment villages. Around 56% of the respondents had a *pucca* house, followed by 36.53% with *semi-pucca* houses. Nearly 6% of the respondents lived in a *kutcha* house. In comparison villages, 52.20% of the respondents lived in *pucca* houses and 40.44% lived in a *semi-pucca* houses. Like treatment villages, nearly 6% of the respondents lived in a *kutcha* houses.



Graph 3: Housing Condition

77% of the respondents from the treatment villages lived in their own houses, while 97% of the respondents mentioned the same among comparison villages. Around 97% of the respondents in both groups mentioned that electricity is the primary source of energy used in their house. In terms of primary fuel for cooking, 73% of comparison villages used wood/cow dung/coal compared to 30% of the treatment villages. Only 25% of comparison group respondents used LPG cylinders for cooking when compared to 69% of respondents from the treatment group.

6. Relevance

This section evaluates whether the interventions implemented in each state were needed for that specific region. A pillar-wise approach for each state has been considered to evaluate the relevance of the programme.

6.1 Pillar 1: Water management

This section checked whether the intervention of creating watershed structures was relevant to that specific area. The indicators considered to understand the needs have been kept common. The data from the selected indicators was compared with respective state and district figures to analyse the relevance. However, the indicators selected were largely based on current and potential future estimated demand of the geographies, which are as follows:

- **Population growth** is the increase in the number of humans in the respective geographies since 2011;
- **Average rainfall** is the arithmetically averaged total amount of precipitation recorded during a calendar month or year;
- Percentage of **land under drought-prone area** indicates the area within each district where rainfall remains scanty and much below normal;
- **Net cultivable area** consists of net area sown, current fallow, fallow lands, culturable waste and land under miscellaneous tree crops;
- **Net sown area** represents the total area sown with crops and orchards;
- **Vegetation coverage** is the percentage of soil which is covered by green vegetation.

Maharashtra

Table 6 shows the relevance indicators and subsequent observation on watershed for Maharashtra state.

Parameters	State level indicators	District	Observation	Relevance
Population growth[4] (2011-23)	11.24 -13.02 crores	30.04 - 32.10 lakhs	Growth rate is lower than state average, potentially due to emigration	High
Rainfall (in cm)[5]	144.55	91.56	Reduced rainfall would result in limited access to water	Medium

[4] Maharashtra Census 2011
[5] IMF

Percentage of land under drought prone area[6]	42%	43%	Area impacted in the region is in line with state	Medium
Cultivable area with Sown area[7] (in sq.km)	3169- 17192	7573-6829.07	Sown area is less than actual cultivable land	High
Trained pupils for implementation[8]	Limited	Limited	Limited capacity to implement	High
Vegetation coverage	Limited	Partially limited	Draught prone area leading to limited vegetation	Medium

Table 6: Relevance-Watershed Development-Maharashtra

Madhya Pradesh

Table 7 shows the relevance indicators and subsequent observation on watershed for Madhya Pradesh state.

Parameters	State level indicators	District	Observation	Relevance
Population growth (2011-23)[9]	11.24 -13.02 crores	30.04 - 32.10 lakhs	Growth rate is lower than state average, potentially due to emigration.	High
Rainfall (in cm)[10]	144.55	91.56	Reduced rainfall would result in limited access to water	Medium
Whether drought prone area[11]	Occasional	Occasional	Area impacted in the region is in line with state drought condition	Medium
Cultivable area with Sown area (in sq.km)[12]	3169- 17192	7573-6829.07	Sown area is less than actual cultivable land	High

[6] Draught Prone area in Maharashtra
[7] Net Sown area in Maharashtra: RBI
[8] Challenges from policies
[9] Madhya Pradesh Census 2011
[10] Indian Meteorological Department
[11] Inputs from experts
[12] Net irrigated and sown area in Madhya Pradesh: RBI

Trained pupils for implementation[13]	Limited	Limited	Limited capacity to implement	High
Vegetation coverage	Partially coverage	Partial coverage	Limited vegetation during summer seasons	Medium

Table 7: Relevance- Watershed Development- Madhya Pradesh

Jharkhand

The table 8 shows the relevance indicators and subsequent observation on watershed for Jharkhand state.

Parameters	State level indicators	District	Observation	Relevance
Population growth (2011-23)[14]	3.3cr - 3.73cr	22.93L - 30.27L	Growth rate is lower than state average, potentially due to emigration industrial areas	High
Rainfall (in cm) [15]	81.7	117 cm	Receive adequate rainfall	Low
% of land under draught prone area	43.7%	0	East Singbum is one of drought-fee areas in Jharkhand	Low
Cultivable area with Sown area (in hectares)[16]	255000	119000	Sown area is less than actual cultivable land	High
Trained pupils for implementation[17]	Limited	Limited	Limited capacity to implement	High
Vegetation coverage	Limited	High	Receive adequate rainfall	Low

Table 8: Relevance- Watershed Development- Jharkhand

[13] State water policy: Madhya Pradesh
[14] Jharkhand Census 2011
[15] IMF
[16] Net sown area: RBI
[17] From experts

The need for watershed development was found very high in Maharashtra and Madhya Pradesh and had high relevance in Jharkhand region.

6.2 Pillar 2: Education

This section checked whether the intervention of upgrading schools was relevant to each specific area. The indicators considered to understand the needs have been kept common. The data from the selected indicators was compared with respective state and national level data to analyse the need. However, the indicators selected were largely based on current and future estimated demand of the areas, which are as follows.

- **Literacy rate** is the total percentage of the population of an area at a given time aged seven years or above who can read and write with understanding
- **Availability of government schools** for students to pursue education
- **Drop-out rate** refers to the percentage of children leaving school mid-way, pointing to attrition in a classroom
- **Pupil-teacher ratio** is the average number of pupils per teacher
- **Availability of toilets** in government schools
- **Digital education** refers to the technique or method of learning which involves technology and digital devices

Maharashtra

Table 9 shows the relevance indicators and subsequent observation on Education for Maharashtra state.

Parameters	National	State	Observation	Relevance
No. of govt. schools[18]	10,22,386	67,629	Around 6.50% of the nation's school infrastructure lies in Maharashtra	Medium
Drop-out rate at primary level[19]	12.6%	9.53% (2011)	Drop-out rate was yet to be nullified.	High
Pupil teacher ratio (PTR)-UDISE [20]	23:1	27:1	Shortage of teacher leading to managing multiple grades by single teacher.	High
No. of schools with toilet facility[21]	10,10,386	65,182	Around 2500 schools don't have proper toilet facility.	High
No. of schools following digital education methods[22]	5,04,989*	65,000 (approx.)	More than 2700 schools were yet to be digitised.	High

[18] Unified District Information System for Education Plus (UDISE+) 2021-22 report
[19] From UDISE+ report
[20] UDISE+ Report 2021-22
[21] UDISE+ report
[22] UDISE+ report

Literacy rate[23]	74.37%	82.34 %	The state is yet to achieve 100% literacy rate.	High

Table 9: Relevance- Education- Maharashtra

Madhya Pradesh

Table 10 shows the relevance indicators and subsequent observation on Education for Madhya Pradesh state.

Parameters	National	State	Observation	Relevance
No. of govt. schools	10,32,049	1,22,671	Around 11.50% the nation's school infrastructure lies in Madhya Pradesh	High
Drop-out rate at primary level	12.6%	44.93% (2011)	The drop-out rate in the state found fairly high.	High
Pupil teacher ratio (PTR)	23:1	26:1	Shortage of teacher leading to managing multiple grades by single teacher.	Medium
No. of schools with toilet facility	10,10,386	87,258	More than 30,000 schools lack proper toilet facility in schools.	High
No. of schools following digital education methods	5,04,989*	Not available	No data on Digital education available. However, more than 50% of the nation's school was yet to be digitised.	High
Literacy rate[24]	74.37%	69.32 %	The literacy rate of state was lower than national average.	High

Table 10: Relevance- Education- Madhya Pradesh

Jharkhand

Table 11 shows the relevance indicators and subsequent observation on Education for Jharkhand state.

Parameters	National	State	Observation	Relevance
No. of govt. schools	10,22, 386	40,343	Around 3.90% the nation's school infrastructure lies in Madhya Pradesh	Medium

[23] Maharashtra Census 2011
[24] Madhya Pradesh Census 2011

Drop-out rate at primary level	12.6%	19.4% (2011)	The state drop-out level was higher than national average.	High
Pupil teacher ratio (PTR)- UDISE	23:1	29:1	PTR higher than national ratio.	
No. of schools with toilet facility	10,10,386	Not available		------
No. of schools following digital education methods	5,04,989*	Not available	No data on Digital education available. However, more than 50% of the nation's school was yet to be digitised.	High
Literacy rate[25]	74.37%	66.41 %	The literacy rate of state was lower than national average.	High

Table 11: Relevance- Education- Jharkhand

The need for educational infrastructure was found very highly relevant in all the three states.

6.3 Pillar 3: Health Camps

This section evaluated whether conducting health camps was relevant to each specific area. The indicators considered to understand the needs have been kept common. The indicators selected were compared with respective state and district to analyse the need. However, the indicators selected were largely based on current and future estimated demand of the geographies pertained to the pillar which are as follows:

- **Mortality rate** is the ratio between deaths and individuals in a specified population and during a particular time period
- **Life expectancy** refers to the number of years a person can expect to live.
- **Diabetic patients** are people with metabolic diseases in which the person has high blood glucose (blood sugar) level either due to inadequate insulin production or because the body's cells do not respond properly to insulin or both
- **Cancer** is a group of diseases that occurs when abnormal cells grow uncontrollably or spread to other parts of the body.
- **Cardiovascular diseases** (CVD) are a group of disorders of the heart and blood vessels, including coronary heart disease, cerebrovascular disease, peripheral arterial disease, rheumatic heart disease, congenital heart disease, deep vein thrombosis and pulmonary embolism.

Maharashtra

The table 12 shows the relevance indicators and subsequent observation on NCDs health status for Maharashtra state.

[25] Jharkhand Census 2011

Parameters	National	State	Observation	Relevance
Mortality rate	7[26]	5.4[27]	State average rate is less than national average.	Medium
No. of diabetic patients	Approx. 69.9 million by 2025 and 80million by 2030.[28]	6 million[29]	Diabetic patients from the state accounts to 9.34%.	High
No. of cancer affected people	800,000 cases / year[30]	NA	New cancer patients across nation was found at an alarming rate and could be due to change in lifestyle or environment.	High
Estimated no. of people died due to Cardio Vascular disease	17.9 million[31]	NA	Cardio deaths at national-level was at higher count and could be due to change in lifestyle or environment.	High
Life expectancy (2013-17) [32]	69 years	72.5 years	Life expectancy was higher than national average.	Medium

Table 12: Relevance- Health camps- Maharashtra

Madhya Pradesh

Table 13 shows the relevance indicators and subsequent observation on NCDs health status for Madhya Pradesh state.

Parameters	National	State	Observation	Relevance
Mortality rate	7	6.6[33]	State average rate is less than national average.	Medium
No. of diabetic patients	Approx. 69.9 million by 2025 and	6% in rural	Control over diabetics shall be taken care to avoid hereditary issues in rural areas,	High

[26] Mortality rate India
[27] Economic survey 2021-22
[28] India diabetics estimate
[29] Maharashtra: Diabetic patients count
[30] Cancer count in India
[31] Cardiovascular diseases in India
[32] Life Expectancy in Indian States: RBI
[33] Economic survey 2021-22

	80million by 2030.	areas suffer	essentially eradicating multiply the cases.	
No. of cancer affected people	800,000 cases / year	NA	New cancer patients across nation was found at an alarming rate and could be due to change in lifestyle or environment.	High
Estimated no. of people died due to Cardio Vascular disease	17.9 million	NA	Cardio deaths at national-level was at higher count and could be due to change in lifestyle or environment.	High
Life expectancy (2013-17)	69 years	64.2 years	Life expectancy was lower than national average.	High

Table 13: Relevance- Health camps- Madhya Pradesh

Jharkhand

Table 12 shows the relevance indicators and subsequent observation on NCDs health status for Jharkhand state.

Parameters	National	State	Observation	Relevance
Mortality rate	7	5.3[34]	Rate was found comparatively lower than national average and other states	Medium
No. of diabetic patients	Approx. 69.9 million by 2025 and 80million by 2030.	6 million	Control over diabetics shall be taken care to avoid hereditary issues in rural areas that will multiply the cases.	High
No. of cancer affected people	800,000 cases / year	NA		High
Estimated no. of people died due to Cardio Vascular disease	17.9 million	NA		High
Life expectancy (2013-17)	69 years	68.6 years	State life expectancy was found near to national average	Medium

Table 14: Relevance- Health Camps- Jharkhand

[34] Economic survey 2021-22

The need for conducting timely health camps was found very highly relevant in all the three states.

6.4 Pillar 4: Income Growth

This section checked whether the intervention of creating livelihood models was relevant to each intervention state. The indicators considered to understand the needs have been kept common. The indicators selected were compared with respective state and district to analyse the need. However, the indicators selected were largely based on current and future estimated demand of the regions, pertained to the pillar which are as follows:

- **Per capita income** refers to the average income earned per person in a given area (city, region, country, etc.) in a specified year
- **Antyodaya Anna Yojana** (AAY) was a step in the direction of making targeted Public Distribution System aimed at reducing hunger among the poorest segments of the BPL population
- **Unemployment rate** is the sum of the unemployed who are willing to work and are actively looking for a job and the unemployed who are willing to work and are not actively looking for a job, expressed as a percentage of the greater labour force.

Maharashtra

Table 15 shows the relevance indicators and subsequent observation on livelihoods for Maharashtra state.

Parameters	State	District (Satara)	Observation	Relevance
Per capita income	₹207,727[35]	₹ 93,518[36]	Per capita income lower than state average	High
AAY ration card[37]	24,40,870 holders	26,249 holders	10.75% of AAY holders of the state was from Satara district. Reduction in livelihood options leading to more AAY holders across the country.	High
Unemployment rate[38](Dec 2022)	3.1%	16 % [39]	Unemployment rate higher than state average	High

Table 15: Relevance-Livelihoods- Maharashtra

[35] Economic Survey: Maharashtra
[36] Satara Per Capita Income
[37] National Food Security Portal
[38] CMIE; Unemployment rate across Indian states
[39] Maharashtra state unemployment rates

Madhya Pradesh

Table 16 shows the relevance indicators and subsequent observation on livelihoods for Madhya Pradesh state.

Parameters	State	District (Dewas)	Obseravtion	Relevance
Per capita income	₹1,24,685[40]	₹ 97,780[41]	Per capita income lower than state average	High
AAY ration card	14,68,419 holders	23,062 holders	1.57% of AAY holders of the state was from Dewas district. Reduction in livelihood options leading to more AAY holders across the country.	High
Unemployment rate (Dec 2022)	6.17%	Not available	Unemployment rate higher in state	High

Table 16: Relevance-Livelihoods- Madhya Pradesh

Jharkhand

Table 17 shows the relevance indicators and subsequent observation on livelihoods for Jharkhand state.

Parameters	State	District	Observation	Relevance
Per capita income	₹ 78,660	₹ 30,546	Per capita income lower than state average	High
AAY ration card	8,97,313 holders	56,517 holders	6.29 % of AAY holders of the state was from East Singbhum district. Reduction in livelihood options leading to more AAY holders across the country.	High
Unemployment rate (Dec 2022)	14.32%	Not available	Unemployment rate higher in state	High

Table 17: Relevance-Livelihoods- Jharkhand

The need for developing livelihood opportunities was found very highly relevant in all the three states from the above observations.

[40] Findings from state economic survey

[41] Dewas: Per capita Income

6.5 Pillar 5: Social Engineering

This section checked whether the intervention of providing afforestation support were relevant to that specific area The indicators considered to understand the needs have been kept common. The indicators selected were compared with respective state and national data to analyse the need. However, the indicators selected were largely based on current and futuristic demand of the geographies pertained to the pillar which are as follows:

- **Forest area** is land under natural or planted stands of trees of at least 5 meters in situ, whether productive or not, and excludes tree stands in agricultural production systems.
- **Hot arid regions** are characterized by scarce natural resources and an inhospitable climate.

Maharashtra

Table 18 shows the relevance indicators and subsequent observation on vegetation for Maharashtra state.

Parameters	National	State	Observation	Relevance
Forest area (in hectares)	80.9 million	6.1,579 million	State accounts for 7.61% of the forest land compared to national forest land size.	High
Hot arid region (in hectares)	31.7 million	0.112 million	0.35% of the state fall under arid region of the country.	High

Table 18: Relevance- Social Engineering- Maharashtra

Madhya Pradesh

Table 19 shows the relevance indicators and subsequent observation on vegetation for Madhya Pradesh state.

Parameters	National	State	Observation	Relevance
Forest area (in hectares)	80.9 million	6.665 million	State accounts for 8.23% of the forest land compared to national forest land size.	High
Hot arid region (in hectares)	31.7 million	Partially arid	Partially arid only during summer season.	Medium

Table 19:Relevance- Social Engineering- Madhya Pradesh

Jharkhand

Table 20 shows the relevance indicators and subsequent observation on vegetation for Jharkhand state.

Parameters	National	State	Observation	Relevance
Forest area (in hectares)	80.9 million	2.96 million	State accounts for 3.65% of the forest land compared to national forest land size.	High
Hot arid region (in hectares)	31.7 million	Less affected	State have adequate amount of ground water to prevent itself to become arid region.	Medium

Table 20:Relevance- Social Engineering- Jharkhand

The need for developing vegetative areas was found highly relevant in Maharashtra and medium relevant in other two states from the above observation.

7. Efficiency

7.1 Selection of programme activities

Cummins has created a comprehensive and detailed standard operating procedure document for work under all five pillars to be carried out in the villages where it works as part of the Holistic Rural Development programme. This document was first created in 2014-15 and has since undergone two revisions based on findings and recommendations from various ground staff involved in the implementation of the programme. The practice in the villages assessed under this programme, as observed by Samhita researchers, has been to first establish contact with the village leaders and then begin implementation of the activities as described in the SOP. Differences in the interventions carried out in any two programme villages have been minor, to the extent of selection of a slightly different watershed management procedure depending on the possibilities in the geography, or the provision of different Teaching-Learning Material (TLM) or extra-curricular implements in schools depending on the need. This has allowed Cummins to scale the HRD programme in a large number of villages, essentially creating a plug-n-play mechanism for their programme design. The list of support provided under each pillar is annexed to the report.

At the same time, the standardisation of the programme has made it difficult to take into account deeper specific needs of the programme villages. For example, the construction of check dams has been standardised down to the physical specifications of the dams to be created. Since this is also Cummins' area of expertise, they have largely taken up the construction of these themselves. However, in some cases, the specifications are not fit for that location owing to geographical differences, such as the type of soil or nature of rainfall. This has led to the check dams being broken down much sooner than in other places and rendered the activity useless for the primary stakeholders. Similarly, irrigation and water-saving techniques used for rain-positive and drought-prone village areas are the same, therefore reducing the impact that can be achieved. It is recommended that Cummins consider doing detailed analysis of the needs and existing conditions of the villages it begins the HRD programme in, with local expert consultation, and leave room for customisation in its implementation plan so as to maximise impact.

7.2 NGO Empanelment

The last mile delivery of all interventions under the various pillars was noted to have been carried out by external implementation partners. The partners were initially identified through Darpan apart from suggestions from co-workers and other organisations. A due diligence exercise studying past work records and financials was conducted before the selection of the implementing partners. While Cummins programme personnel informed us that these organisations were not involved in the continuous conducting and supervision of activities but rather as vendors for units of work under the programme, during the field visits for the study, it was noted that the NGOs played a major role in ensuring regular communication and were responsible for all pillars' work in their respective geographies.

It was also found that in the initial stages, for all locations we covered, organisations were empaneled centrally from Pune. As the programmes progressed, this was found infeasible due to the higher costs, timelines and coordination work involved and local organisations were brought in as partners to leverage on their geographical presence and knowledge. While this has evidently been beneficial in terms of efficiency and outcomes, a loss of information and continuity could be observed in the changing of partners, with newer partners not as aware or involved in the aspects of the programme that were completed before their arrival. In most cases, this was the watershed development activities, as these tended to be the first that Cummins took up after initiating the programme in a village. Many of the watershed-related interventions, such as check dams in Karwasa and the lift irrigation system in Nutandi, were in need of maintenance or repair which the new partners have been unable to take up due to their lack of information about the details of the work done by previous partners.

7.3 Monitoring and Evaluation

Both Cummins team members and NGO partners regularly visit the programme villages allowing them to stay in contact with the primary stakeholders, i.e., the community. This allows for continuous monitoring of any ongoing programme activities, checking for any assistance required for completed activities and is also the chief method of ongoing engagement post the first 5-year period. This informal mode of monitoring, however, lacks structure and a mechanism to objectively evaluate outcomes. This has left a conspicuous gap in the form of an absence of data that can allow for tracking of outcomes throughout the project lifecycle as well as using evidence to feed back into the programme as and when required.

For a programme with a lifecycle of over a decade, this kind of data could have been instrumental in modifying the programme design to take into account common requirements. For example, as mentioned in the previous section, many of the larger infrastructural interventions need maintenance and repair after every few years. This can be brought into the fold of programme activities as training or capacity building of community persons to maintain and repair the infrastructure such as check dams, irrigations pumps, school buildings, projectors, etc. so as to ensure continued usage and longevity.

7.4 Post-5-year plan

Cummins is committed to remaining engaged with the villages it has taken into its care as part of the HRD programme. As part of this commitment, it continues to actively invest in these villages through regular visits by local employees, NGO partners and meetings with the concerned community members to identify areas of ad-hoc support and provide assistance where feasible. These have been in the nature of connecting community members to beneficial government schemes, providing implements and minor infrastructure to schools it has supported earlier, health camps and campaigns, as observed by the Samhita research team in the course of this study. Cummins also attempts to support the community in continuing the use of the infrastructure and institutions created through the course of its initial 5-year intervention, such as water management or irrigation structures, e-learning hardware, water ATMs and the Udgam

machinery. However, it was noted that in most places, the community tends to lack the funds or expertise to take up any repairs or maintenance of these on their own. While it is commendable that Cummins wishes to be engaged with the communities for this purpose for as long as possible, it is recommended that they consider building the capacity of the communities to take these up. This could be taken up as part of the last phase of the 5-year intervention and will ensure that the community becomes self-sufficient in dealing with future issues that arise for the use of implements and infrastructure that Cummins has already made significant investments in, thus increasing the sustainability of the intervention. Building the capacity of the communities in this regard could also have the add-on effect of allowing them to take up work in this area or actively and independently take up the installation of future technologies.

8. Effectiveness

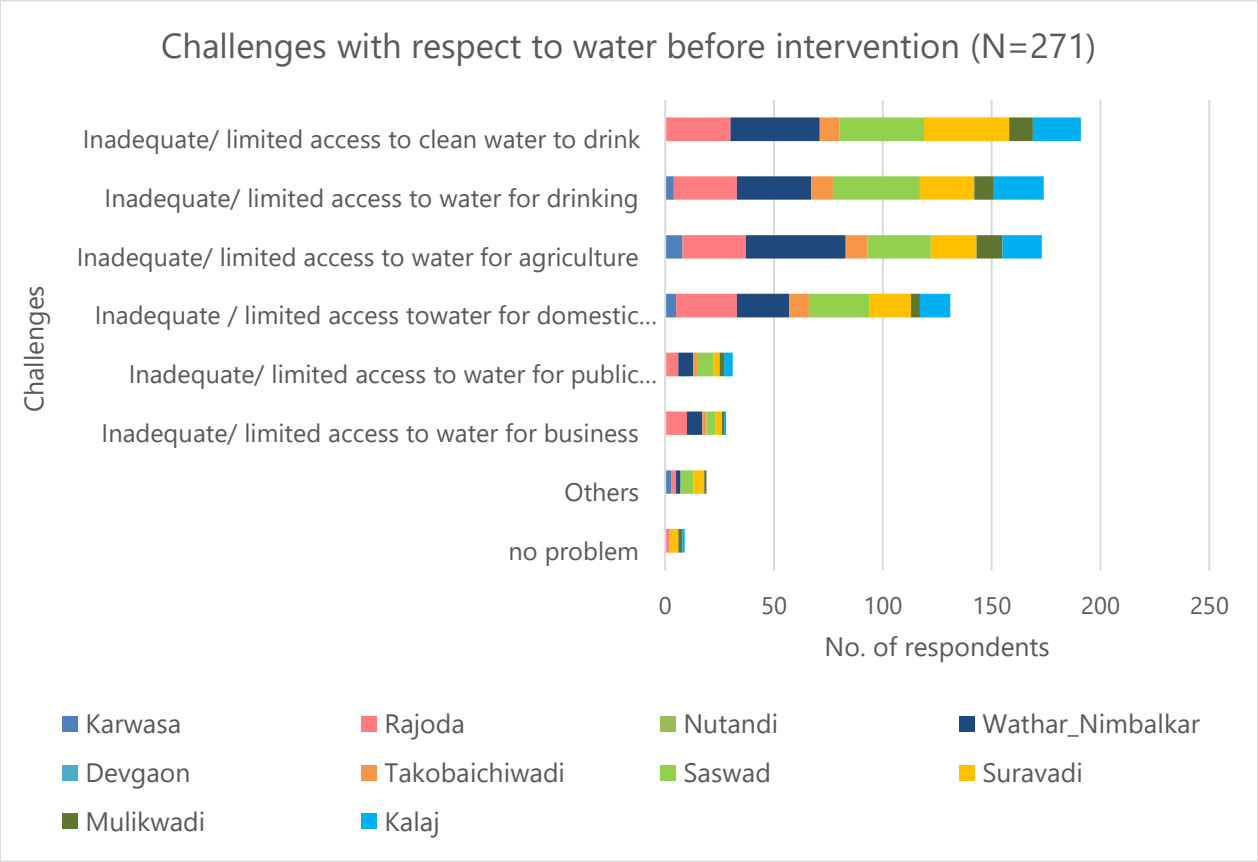
This section outlines in detail the effectiveness of the interventions implemented through the above-mentioned partners. The extent to which the outcomes and the impact have been met has been analysed and discussed in detail. However, most of the respondents from Jharkhand had disagreed on the support they received from Cummins in their villages, when they were asked about it. As a result, very limited response was received from the community in Nutandi village of Patamda, Jharkhand during the study.

8.1 Improved access to water

The following section highlights the findings on the outcomes and impact of water on agriculture, health and livelihoods. The findings from both treatment and comparison villages were analysed to identify the differences.

Figure 2:A water collection tank near sugarcane fields

There were severe challenges faced by the community due to lack of availability of water in the treatment villages before the intervention, as per the PRA reports. Graph 4 explains the areas affected due to this insufficiency across the villages, which was captured through a survey for this assessment.



Inadequate water for drinking and agriculture emerged as the two major challenges in the villages,

Graph 4: challenges with respect to water before intervention

largely in Maharashtra since the villages were located in drought-affected regions. Although Madhya Pradesh receives adequate rainfall when compared to Maharashtra, according to the community members, a drought-like situation follows the monsoon rains, starting from the months of December. For this reason, community members had faced challenges such as health issues (62%), decreased agricultural yield (43%), negotiation of hygiene (46%), reduction in savings (13%) and rise in expenditure (14%), according to the survey. Therefore, conservation of water became an immediate need to mitigate the impact of the climate crisis faced by the treatment villages. Construction of various water structures like check dams, contour trenches, percolation/soak pits etc. focusing on storing and penetration of water for a longer period was thus carried out under the programme.

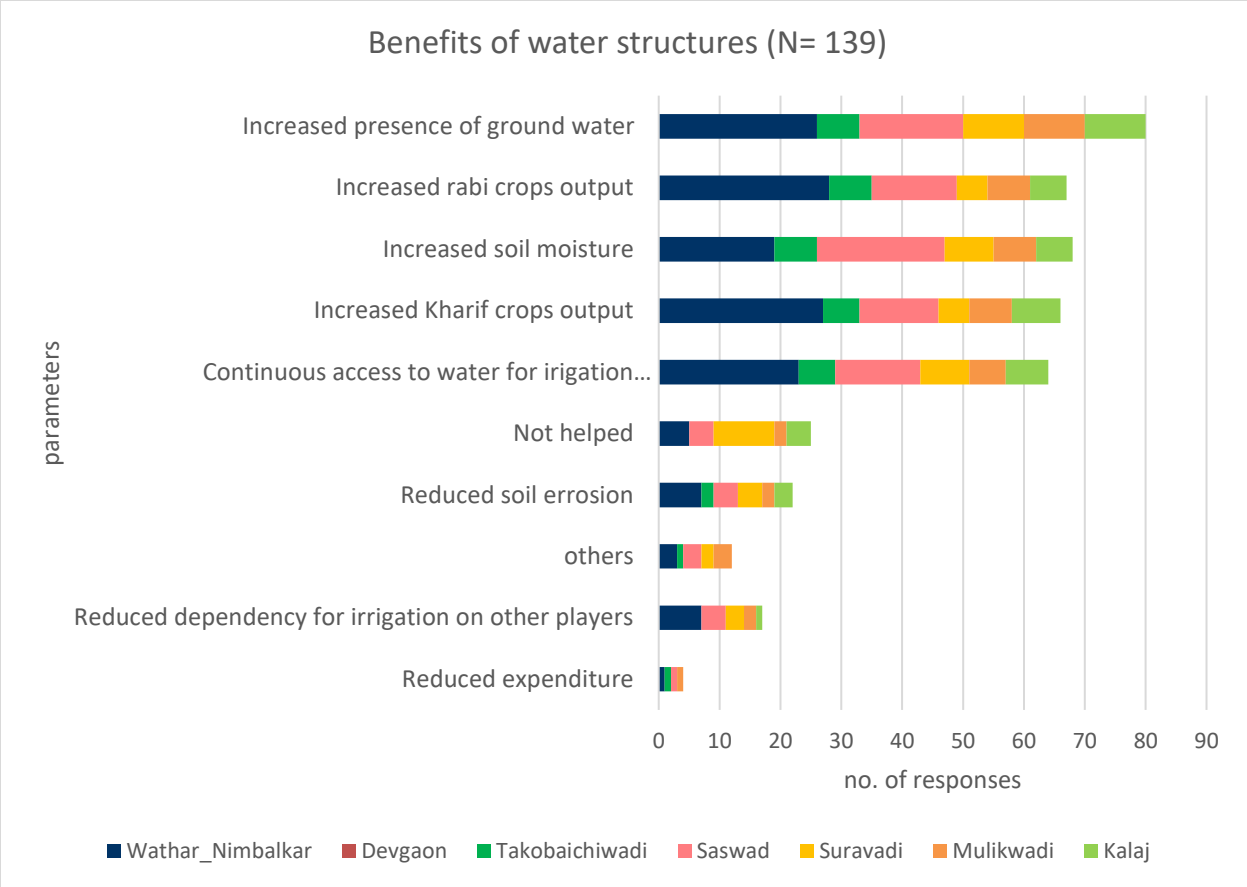
Around 51% of the respondents from treatment villages practiced agriculture compared with 75% of the respondents from the comparison group. Table 21 shows the responses by them on the availability of water during agricultural seasons.

Whether having adequate water for agriculture				
Options	Before intervention		After intervention	
	Kharif	Rabi	Kharif	Rabi
Yes	13%	15%	42%	46%
Somewhat	29%	31.37%	14%	13%
No	13%	17%	7%	4%

Table 21: Availability of water at Rabi & Kharif seasons

From the survey, farmers confirmed that there was an increased presence of water in the ground during both kharif and rabi seasons post Cummins' intervention.

It was found that the average depth of water has come down from 120.83 feet to 83.59 feet across the treatment states, according to the community members. In Maharashtra, the average decrease in depth was 38.87 feet, while in Madhya Pradesh it was around 31.06 feet. During primary data collection, the farmers and other community members informed us that there was an increased access to water for around 45 days after the intervention. This implied that around 3.8mn[42] liters of water was available in the treatment villages during the time. From on-ground interactions, it was also noticed that the partnership with NABARD has helped to bring both knowledge and monetary support to build water structures in one of the villages (which is hilly in terrain) in Maharashtra.



Graph 5: Benefits of water structures reported by the community

[42] (Litre per capita per day) x (No. of persons benefitted)

It was observed during field visits that the villages in Satara district of Maharshtra have started adopting cash crops such as sugarcane, that requires water between 1500-2000 mm as per the Food and Agriculture Organisation (FAO), post the intervention. Adoption of such crops implies that there has been a rise in the availability of water. However, 39% of the respondents mentioned that they face water scarcity, especially during the summers. Moreover, some of the community members across Maharashtra and Madhya Pradesh informed that the water structures were not surrounding the village completely or were only built on one side of the village, benefitting only the farmers with land nearby. According to Cummins, this was largely because of the terrain. Graph 5 shows the benefits of water structure built in the treatment villages as reported by the respondents.

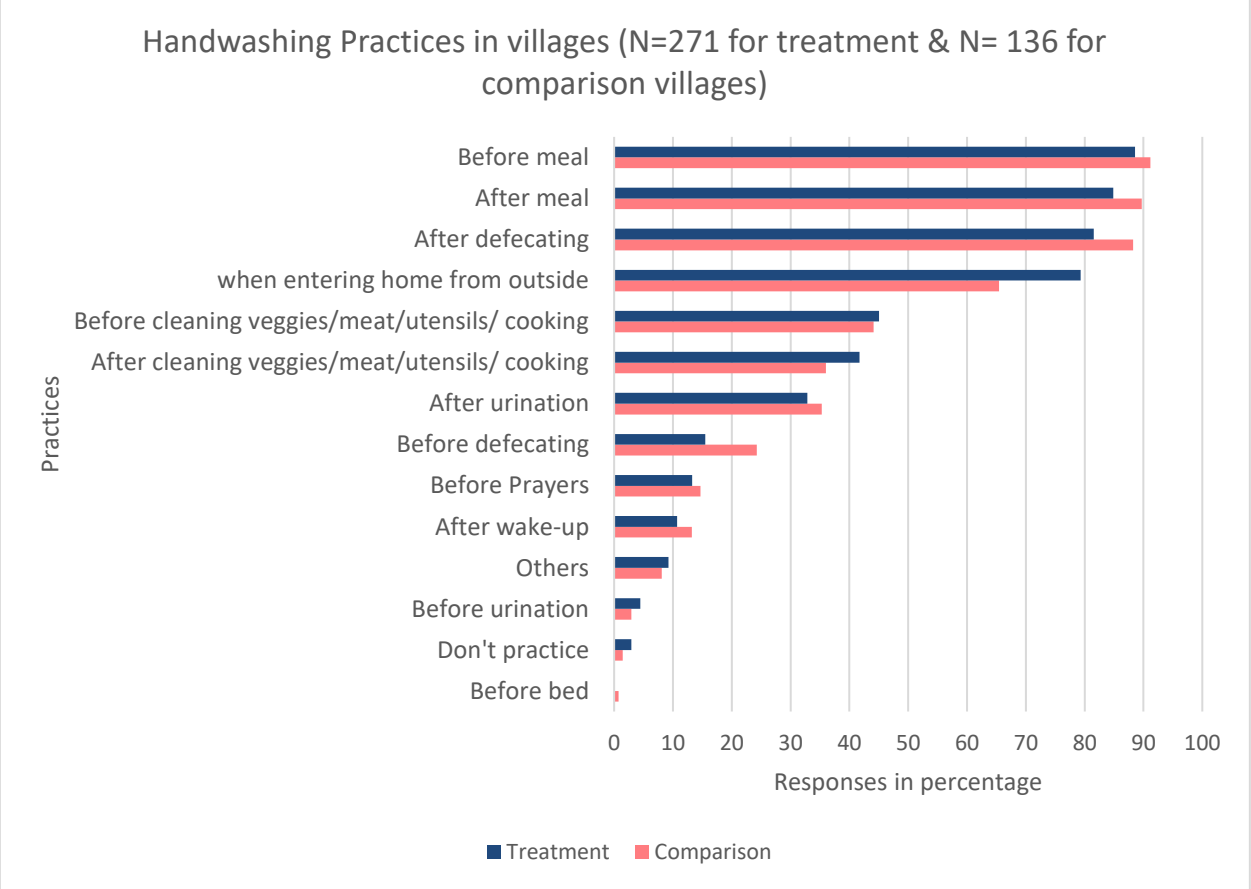
Figure 3: Check dams built by Cummins in Maharashtra

Water for domestic and drinking purposes was fetched in treatment and comparison group villages through pipelines at home (45% and 49%), community wells (23% and 33%), and hand pumps (13% and 10%) before the intervention. At the time of study, around 54% of the respondents have shifted to water ATMs for accessing drinking water. This has ensured access to clean drinking water till the last mile in the treatment villages. However, according to the survey, 43% of the respondents continued accessing water for drinking purposes through direct pipelines, of which 58% use cloth to filter the water. Some of the reasons noticed for this behaviour were non-proximity to the ATMs from individual houses and other personal reasons between the members. During in-depth interaction, the community members also showed a hesitation towards the idea of buying water for drinking when it was available for free. The average distance travelled to fetch water after the intervention was 2.66km and 1 km in the treatment villages of Maharashtra and Madhya Pradesh, respectively. This distance was reduced from 4.5 km and,1.5 km in the same states before the intervention. On the other hand, the average distance found in the comparison villages was 2.75 km, 0.35 km and 3km for Maharashtra, Madhya Pradesh and Jharkhand states. According to the survey, 90% of the household members feel that they have adequate water for cooking and washing in treatment villages compared to 54% of the comparison villages.

Increased access to water has also brought a change in behavioural shift among the community.

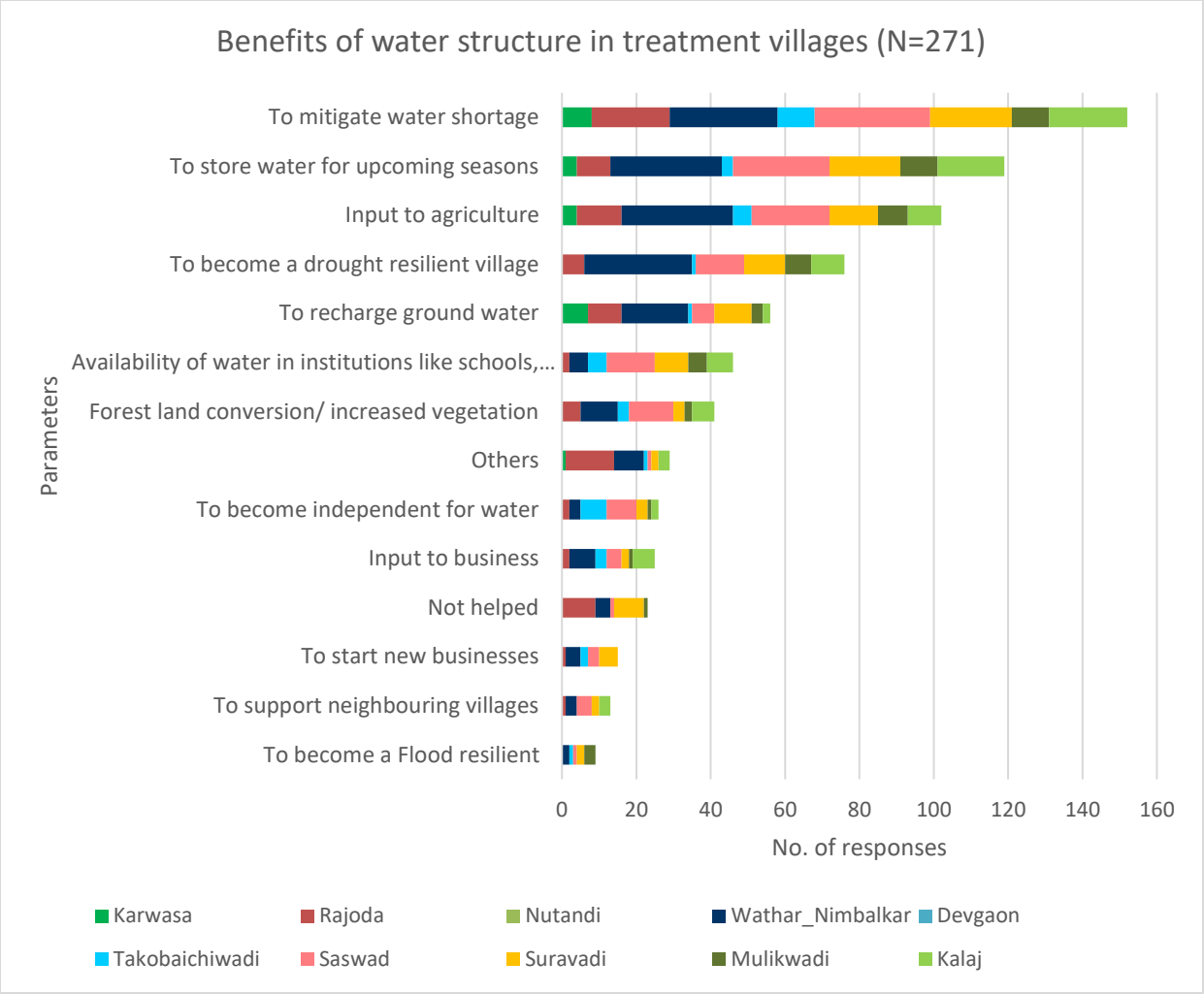
Figure 4: Contour trenches built on last mile areas for water penetration and to prevent soil runoff

Graph 6 shows the handwashing behaviour of treatment villages with comparison villages. Although, the comparison villages show an increase in percentile of the parameters, it could largely be due to the sample size considered for those villages.



Graph 6:Handwashing Practices in villages

Around 61% of the respondents mentioned that they had attended an awareness session before the construction of the structures. Graph 7 shows the benefits received by the treatment village communities because of the newly built water structure, as reported during the survey.



Graph 7: Benefits of water structure in treatment villages

Limited access to water during summer (35.62%) and limited access to drinking water (16.23%) emerged as challenges during the study. As a resolution, 36% of the respondents have suggested provision of more filtering methods and 34% have suggested building more water structures in the treatment villages, respectively.

8.2 Improved skills and social status

The following section highlights the findings on the outcomes and impact on the skills built under different pillars of the programme.

In terms of organic farming, only around 3% of the respondents have received support, according to the survey, while other 33.58% are practicing by themselves. The partnership with knowledge partners such as Go-Vigyan and Thum creative has helped the farmers to adapt from conventional farming to organic farming through Integrated Cow-based Farming (ICBF) where local breed suitable for the weather was provided free of cost (however, was banned to sell them instead of paying its price), to produce the input manure in tonic form and sprays for pest using excreta for organic farming. This initiative has helped to mitigate various climate related challenges such as drought and stability in food production by carbon sequestration and releasing release fewer greenhouse gases[43]. Farmers also mentioned that they noticed increase in soil health by contents available in it after testing. However, during primary interaction some of the farmers when questioned on the benefits of organic farming mentioned that they were able to get longer shelf life of the organic outputs which is contrary to the established findings due to no usage of chemical pesticides and further processing[44].

Figure 5: Organic pesticide made by an organic farmer from Desi cow provided through ICBF

From the primary interaction, the newly created model farmers in the treatment villages were upskilled through the support of agriculture extensions as well as other model farmers. This has helped them to switch to other methods of cropping such as multi cropping and drip irrigation.

In terms of income growth, the new SHGs formed were provided with training pertained to the business models. During primary research, it was found that each of the business models has tried to utilise and build on improving the skills by self-learning. For instance, napkin production unit under Udgam scheme has tried to explore new markets and newer techniques for increased sales. Likewise, SHGs who run poultry setup have created skills within themselves in identifying the problems within their flock and also on sales.

[43] How does organic farming help mitigate climate change.
[44] Why organic food spoil faster?

As a reason of having new livelihoods, almost everyone had conveyed an increased social status among family and community. However, the group of women who worked on peeling garlic have mentioned that they faced discouragement from families to continue with the job due to very lower remuneration and high effort.

8.3 Improved income and savings

The following section highlights the findings on the outcomes and impact of water and livelihoods on the beneficiaries. The findings from both treatment and comparison villages were analysed to identify the differences.

From the primary survey with 37% of the respondents whose household income was earned through agriculture, there was an overall increase in the produce of both Rabi and Kharif seasonal crop after the support of watershed development. On average, they reported that the increase of output during Rabi season was seen around 48% and a 43% increase in output during Kharif season. This implied that there was eventually an increase in income of the farmers due to the support. Of these 100 farmers, 34% were marginal. Moreover, during primary interaction with community, it was noticed that the villages in Maharashtra have reduced their dependency on water through tanker services, thereby a reduction in expenditure and increased savings. However, the marginal farmers have seen an increase of only around 9% with the help of structure, during both the seasons. Therefore, the extent to which the water structures are benefiting the most-needy seemed to be limited.

Figure 6: A delivery agent in a village in Maharashtra, resembling the change in behaviour among the community

Similarly, continuity in farming because of access to water for more days after the monsoon, had helped the farmers to produce more crops during a demanding situation. From interaction, it was noticed that they were able to sell their produce at a larger price during pre-summer times. This has also aided in generating more income for them. However, most of them lack negotiation skills with the middlemen.

A case study of backyard poultry in Maharashtra

Figure 1: A poultry setup

The poultry unit was established five years' prior by creating two SHG units in the village of Devgaon, each with 40 members. Each member received 50 local breed (*Kadaknath*) chicks through Cummins. Additionally, a 3-day residential training was offered with the assistance of the nearby *Krishi Vikas Kendra*. With Cummins' assistance, food and vaccinations for the chicks were also given. Cummins claims that it cost INR 42,000 to provide all the support, including the cages. Therefore, to create an ownership among the participants, they were charged a sum of INR 2200 for training, or 5% of the overall cost. They were able to sell poultry items for INR 6000 after the first three months. They had a fleet of roughly 500 chicks at the time of the study and sold both eggs and meat to their clients. They were selling a hen for INR 350 and a cock for INR 500, based on their interactions. The egg costs between Re.3 and Re.5. Desi eggs were in high demand in the localities. Some neighbours and vendors that buy eggs in quantity made up the majority of the clientele. There was only one hour of work per day necessary for the business. The larger fleet allowed the SHG to earn a profit of INR 42,000 in just three months (business was done individually). 35 of the 40 women still were employed by the business. They have expanded their business to include broiler breed hens, which were being sold for INR 300 at the time of the study. The business model's success of the business model has also contributed to an improvement in the status of the family. Additionally, they have acknowledged that an increase in their income has affected their way of life. Their families, nevertheless, were not prepared to let them attend a 3-day residential course on enhancing the business. As a result of their interactions, other women see them and learn about their business; as a result, they become a source of assistance. The health of the chicks and the business were both impacted by illnesses like the flu. After launching the business, the bird flu killed about 50 birds. According to SHG women, they make more money from the poultry industry than from farming and have been able to create a secondary business by selling the bird excreta to organic farms.

Switching to innovative and alternate methods of multi cropping and drip irrigation has helped farmers to save expenditure and increase in income up to 50%, mentioned during primary interaction. However, the same technique of drip irrigation apart from lift irrigation in Jharkhand was not used by many farmers. The lift irrigation system has been wrapped up and was not in use, at the time of study. Since the area in Jharkhand receives adequate rainfall, systems like rainwater harvesting, which was already installed in school, shall be replicated instead of watershed management practices. This shall eventually help the community to begin new livelihood options such as hydroponics or pisiculture that could create impact on income, savings and entrepreneurial behaviours.

Figure 7: Lift irrigation equipment under inoperable condition

Under the pillar of income growth, a total of 5 livelihood business models were set up by Cummins across 13 treatment villages. From primary interaction, it was noted that there was an increase in income among all business models set up by Cummins. However, the sanitary napkin project in Maharashtra faced challenges with production and pricing. Although a minimum of 100 pads could be made in a day by a staff, a profit of INR1 was the maximum amount received per pad, where the process was non-automated and faced challenges on market penetration due to other big players. The majority of the pads were sold to Cummins plants located nearby.

During the survey, 34% of the respondents mentioned that the support by Cummins has influenced them to buy various assets. Smart phones (17.7%), two-wheeler vehicles (10.70%), utensils (8.85%), furniture (5.90%), kitchen appliances (8.47%) and insurance (2.58%) were some of the major assets bought by the respondents. Another 7.74% of respondents each have renovated their houses and have not bought any assets. This implied that there was an increase in income among the community after the intervention. Nevertheless, Cummins could plan to upscale the impact in upcoming times.

Figure 8: Sanitary napkin unit in Maharashtra

A case study of Water-ATM unit run by SHG in Phaltan

The water ATM unit was started with 10 member-SHG of which 4 dropped off due to personal reasons and no new members were joined in the group. The group had received training through TATA on working and maintenance of the setup. The unit was installed through the support of Cummins and TATA in the village. There was an agreement signed up with Gram Panchayat to run the business for 11 months. According to Cummins, the SHG usually gets shifted every year to run the business, to benefit more people from the business. A door-to-door awareness were conducted by the SHG group about the facility available. The setup provided a litre of water for Re.1 and 20 litres of water at Re.5. According to the members, there were able to save money up to INR 8000 per months. Around INR4000 was spent on maintenance of the setup. Members have told that many people have installed water filters in their houses, hence a decrease in footfall from the community. However, people from other villages also come to get water from the unit, according to members. From their analysis, around 35% of the community access water from ATMs, while poor people or people working in farms drink water directly from wells. Load shedding was a challenge, limiting 24x7 access to water through ATMs and were requesting for inverters.

The second major benefit for the SHG members was limited efforts to put out for running the business. In terms of the impact created apart from increased income and savings, the members told that many people have shifted to using water from ATMs due to the hygiene and taste. The use of water from ATM had reduced health issues among the community. At the time of study, the group plans to expand their business by partnering with other players.

Figure 9: Reading in Water ATM

Figure 10: Water ATM setup

A case study of sanitary napkin business unit in Maharashtra

The SHG for sanitary napkin business under Udgam project in Maharashtra was formed in the year 2019. The group consisted of 10 members, of which 4 looked after marketing and 6 on production. However, at the time of study, there were only 6 active members. The prime focus of the initiative was to develop a behavioural change among menstruating women to switch from cloth to pads using a sustainable livelihood model. To that Cummins had provided semi-automated machine largely for cutting the cotton base for pads, and the total setup was worth around INR 5 lakhs. Cummins had provided support for getting quality and hygiene certification for the products. Training on making the pads were also given. The SHG women were selected through interviews that checked their experience and level of commitment towards the cause. The process of making a pad include, procurement of raw material, cutting in shapes, pasting, drying and packing of the final products. The process was largely manual, however, followed hygienic practices. According to Cummins, the sanitary pad was designed after proper research and development and hence the materials used in napkins were bio-degradable.

The final product consisted of 8 pads in a packet. Each packet was sold at INR 30, at the time of study. According to the SHG members, a packet was sold at INR22 and repriced to INR30 after feedback from Cummins. According to the SHG members, it took around Re. 2.75 to make one sanitary pad and found that selling price per pad was Re3.75, making a profit of Re.1 per pad. With the current setup, a member can make only up to 100 pads/ day, (or 600 pads/day) due to manual processing. All the pads were of same size. In terms of expenses, it was largely for procurement of raw materials, where the providers used to change many times. The Gram panchayat had provided free space for installing the setup, which has helped to not bear expenses on rent.

From the primary interaction, 2 women from the group did door-to-door marketing of the products. Apart from that the product was sold largely to the nearby Cummins plant (around 5000 units). One of the NGO from Pune were also procuring the sanitary pads. Other customers included medical and general shops in the nearby villages as well as some direct customers. COVID-19 has hit the business badly resulted in reduction in sales. The group was planning to partner with local schools for providing pads to girl students at cheaper rate to ensure hygiene, behavioural change and sustainable partners.

From the interaction with customers and SHG members, quality of the product, design of the product, features like ability to stick-on for more time were found low. Also, many of the direct and indirect customers preferred/ trusted branded products. It was found that the packets were sold at INR25/ packet, thereby reducing the profit margin to ensure sales in such cases. It was also noticed that the packaging didn't mention the expiry date of the product.

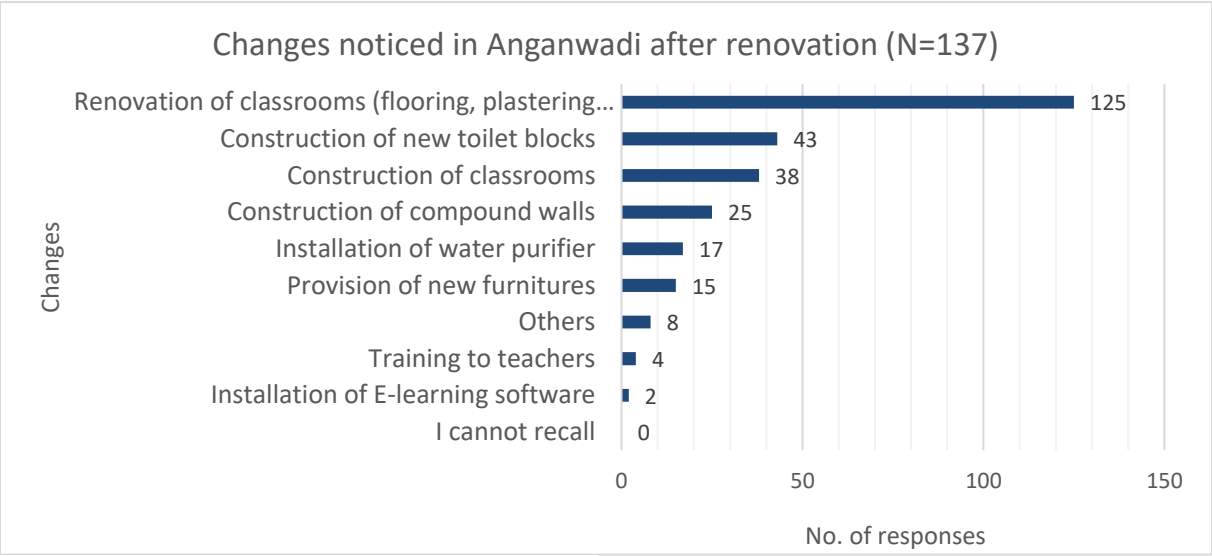
Although they were able to make an income out of the business, the model required handholding support to achieve the goal and to sustain the business. It includes, support to develop products with different features/ targeting different age group, training on pricing and pricing strategy, training on marketing and partnerships, quality management and production of napkins with less efforts. It shall also consider usage of waste products to earn additional income for the business.

The following section highlights the findings on the outcomes and impact on education.

Around 39% and 54.41% of the respondents from treatment and comparison villages respectively have mentioned that there is at least one school going children in their family, according to survey. The below findings from both treatment and comparison villages were analysed to identify the differences.

Around 62% of the respondents from treatment group have noticed a change in the Zilla Parishad school in their respective villages while 8% have told that a new school was built by Cummins. However, 13.28% of the respondents said they were unaware about the renovation while 10.33% have mentioned that no work has been done in the schools. The above graph show the differences noticed by the respondents in treatment villages. Around 58% of the respondents have

Figure 11: Renovated Anganwadis



Graph 9: Changes noticed in Anganwadi after renovation

mentioned that the renovation has brought cleaner classrooms to the schools. While in comparison villages, only 38% of respondents who have at least one child attending the school mentioned it. 40% and 37% of the respondents mentioned that there were cleaner or new toilets and more equipment to play available in the school, respectively. In comparison villages, 43% of the respondents told that toilet facilities for both boys and girls were available in the government schools of the panchayat. However, the cleanliness according to their standards shall be checked. Around 16% endorsed that there was a new compound wall built for the school.

Figure 12: Renovated and Newly constructed gender specific toilet blocks in government school

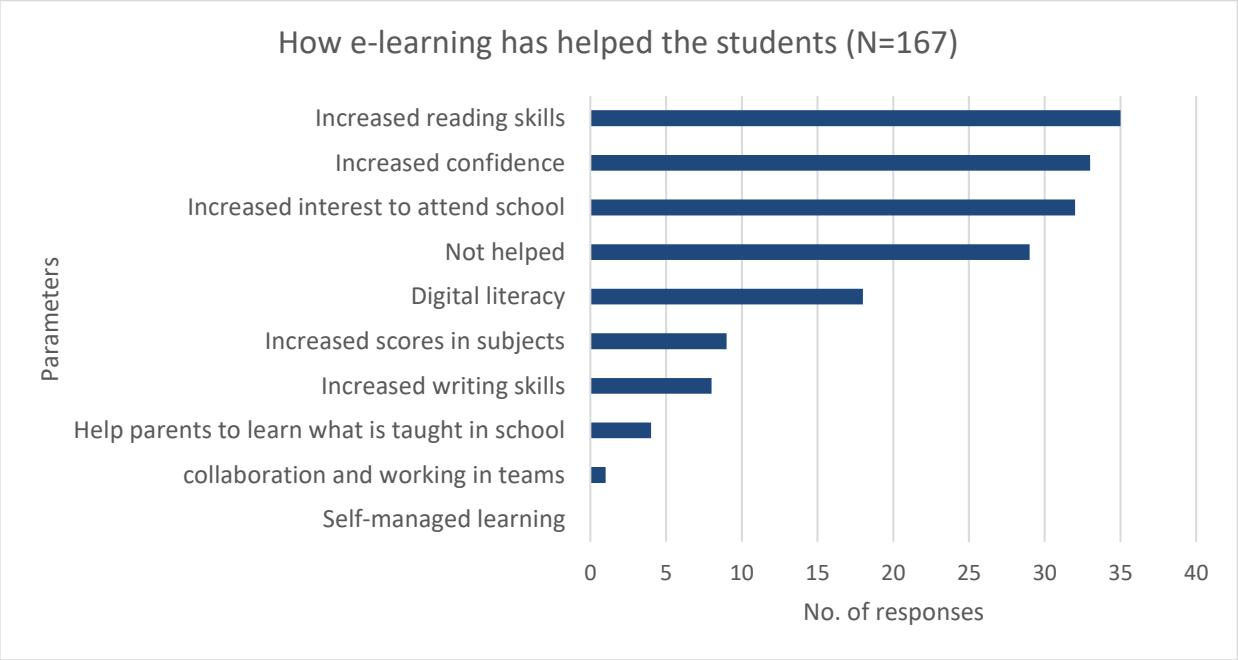
Similarly, around 51% of the respondents mentioned that they have noticed a change with the infrastructure of the Anganwadi in their respective villages. However, 20% of the respondents mentioned no work was done, while another 24% were unaware of the changes. The below graph 9 show the changes noticed by the respondents at Anganwadis in treatment villages.

Figure 13: Newly installed compound walls in government schools

Around 91% of the respondents from treatment villages endorsed that the Anganwadi in their respective villages have been renovated. While in the comparison village, only 35% mentioned that there was a renovated space for children. While 31% &

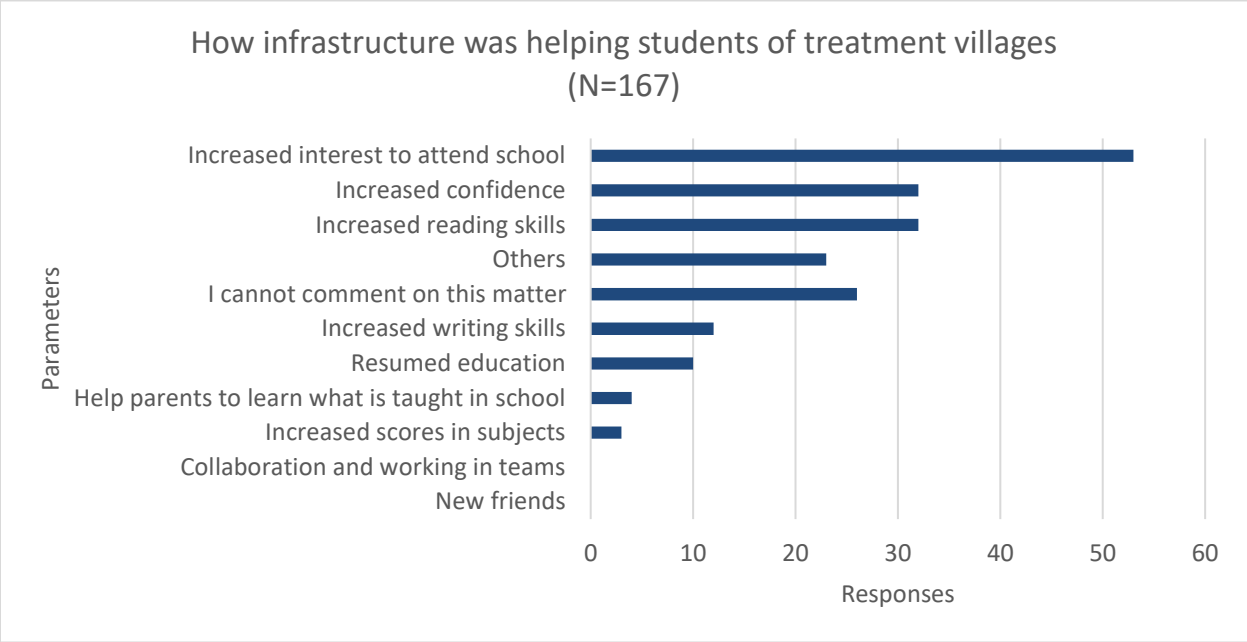
18% mentioned construction/ renovation of toilet blocks in treatment villages, only 4% mentioned the same in comparison villages. According to the Anganwadi staff, the renovation has helped them to cook food at cleaner places, able to bring interest among children to attend the cases using thematic paintings and gadgets like televisions. According to teachers and community members during primary interaction, the compound walls has helped to remain safe for the children from animals and reptiles during intervals, playtime and on weekends. Some of the Panchayats in Maharashtra have helped the school by providing water filters that has reduced illness among the students according to the staff of the institutions. Moreover, during primary visit, new and clean separate toilet blocks, compound walls, e-learning facilities, and cleaner-cum-friendly rooms were noticed in the schools and Anganwadis. Furniture was not provided to every school across the states. The motivation of the children undertaking formal education was checked during the survey. 67% and 52% of the respondents mentioned that they are motivated to attend school and nursery after the makeover. Therefore, it implied that there is an improved aesthetics in the educational institutions after the support. The below graph 10 also show on the benefits of renovated infrastructure in the schools.

Over 16% of the children of the respondents had discontinued education in the last 2 years in treatment villages of which 73% was because of COVID-19. However, 91% of them are willing to rejoin the school. In comparison villages, around 90% have discontinued due to COVID-19 and 80% have enrolled back. Deteriorated academic performance (44% & 55%), pause to co-/extra-curricular activities (22% & 26%) and development and increased screen time (11% & 14%) were some of the major issues created due to COVID-19 in treatment and comparison villages respectively. It was also noticed through the respondents during survey that many children have started to develop addiction to mobile phones during Covid-19/ post lockdown.



Graph 10:How e-learning has helped the students

The provision of e-learning facilities has helped both students and teachers in multiple ways. Graph 11 shows the benefits of e-learning facility in schools.



Graph 11:How infrastructure was helping students of treatment villages

Around 22% of the respondents who have at least one child attending school take part in SMC meeting. Of this 22%, 70% have said that they have attended the meeting after renovation. From the primary survey, 39% of the respondents have mentioned that the capacity of the teachers has been increased because of the e-learning facility, of which only 6% attended SMC meeting in the schools. However, teachers during primary interaction have informed that it has become easy for them to conduct classes and to hold

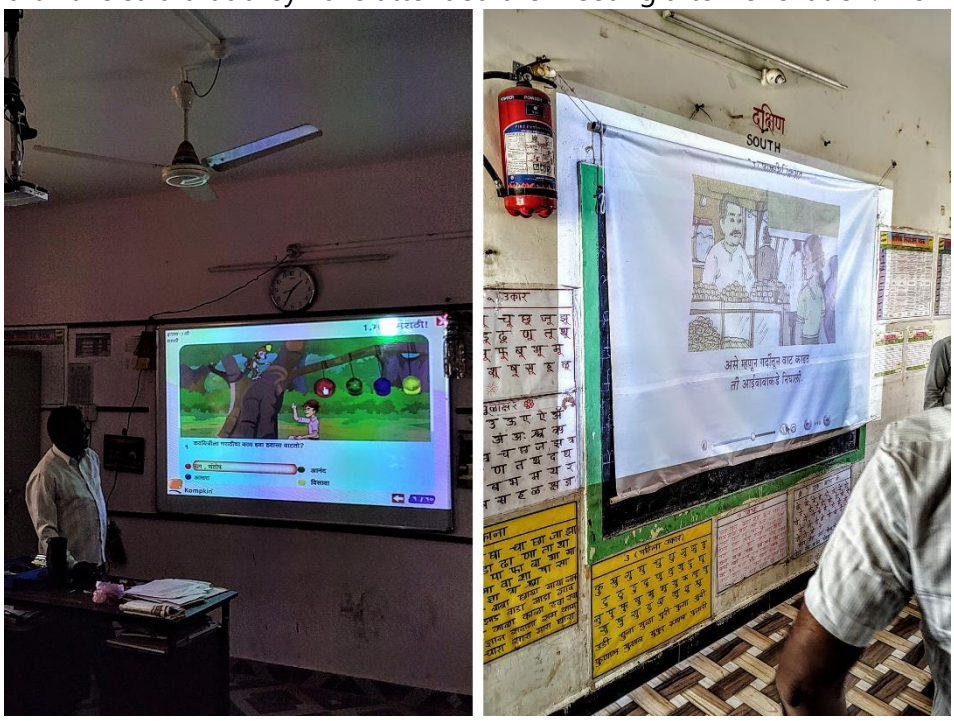


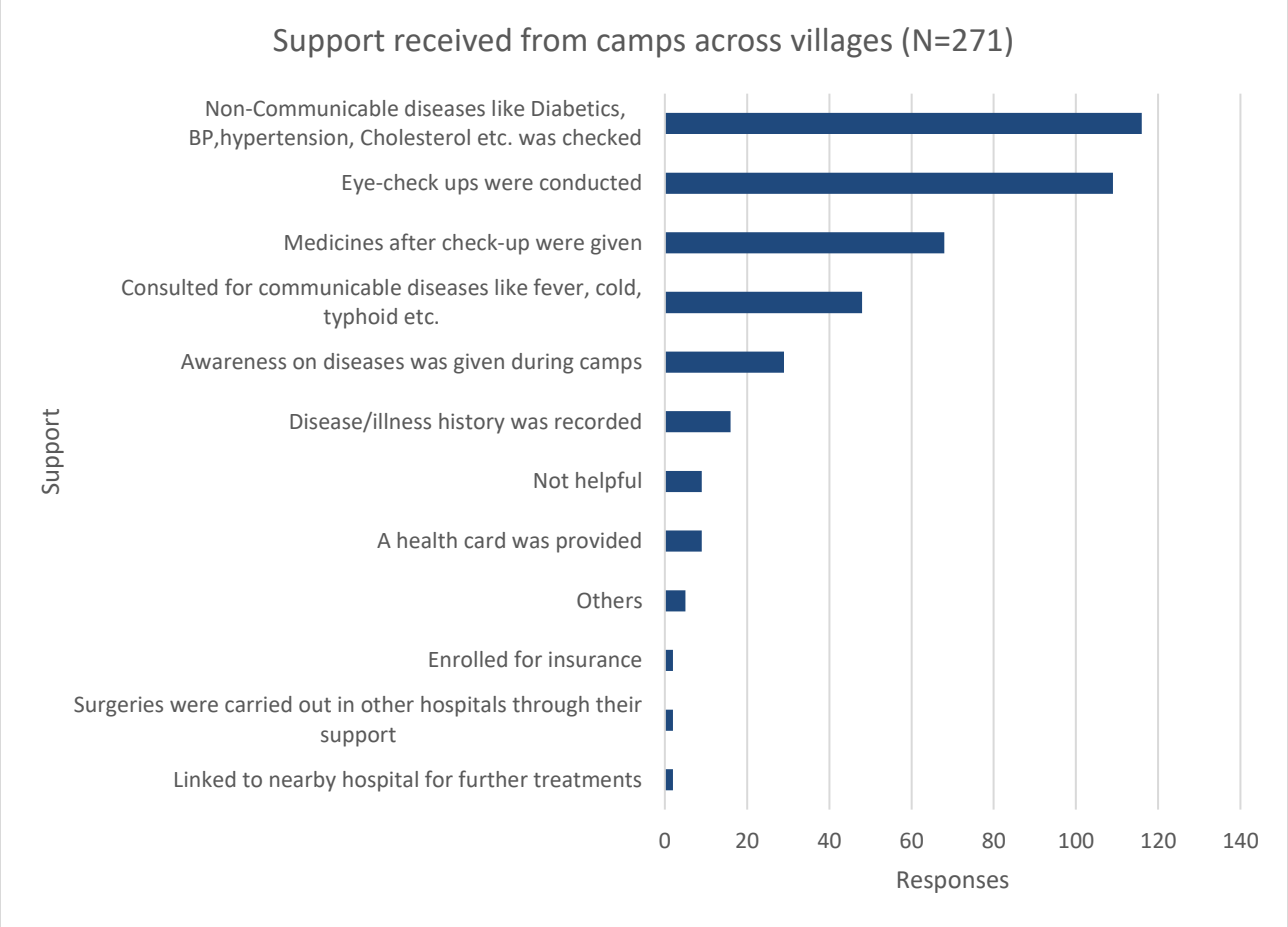
Figure 14: E-learning facility with (picture towards left) and without (picture towards right) using whiteboard in government schools

attention among the students. Moreover, both the heads and teachers of the institutions have informed that the new infrastructural facilities have helped to reduce the drop-out rate as well as an increase in enrollment of children in schools across the states. For instance, according to the head of a primary school in *Nandal* village of Maharashtra, there were 93 students before the year 2019, and it has reached 104 even after the pandemic. There were also instances across the states were students from private school was shifted to the ones Cummins intervened in. This meant that there was an improved participation in formal schooling in the villages due to increased aesthetics and facilities for both staff and students. However, many of the schools shift classrooms to use this facility between different grade students and had requested for more set-up for each class. Nevertheless, it should be noted that some schools have mixed two grades in one classroom that would create loss of attention while teaching between each grade and shall consider proving an alternate set-up for classroom as they face shortage of rooms. Moreover, there were some schools that faced an irregular supply of power at times, which should also be prioritised.

8.4 Improved health status and awareness among the community

The following section highlights the findings on the outcomes and impact of health camps on the beneficiaries.

Of 271 respondents, 45% mentioned that they had attended the health camps conducted in the treatment villages while another 14% reported that they were aware of the camps, however, wasn't a part of it. Around 48% of respondents mentioned that their family members had attended the camps, when it was conducted. According to the survey, 38% & 31% said that camps used to happen twice and once in a year, respectively. However, 48% couldn't recall the year of attending the camps. From survey, 86% of respondents prefer to consult a doctor directly while 49% visit PHC in case of a medical need. While in comparison villages, the same is around 75% and 64%, each. However, contacting an ASHA worker found very low in both treatment and comparison villages. This could be due to over trusting of doctors/ hospitals for easy solutions or professional or any personal problems. Graph 12 shows the support received by the communities during health camps.



Graph 12:Support received from camps across villages

During the survey, it was noted that limited members of community (33%) have a habit of keeping own or family's timely medical records in treatment villages, while in comparison villages, it is only 14%. According to Cummins, as a part of the health camp, they had provided individual health records to the attendees by studying each one's history of diseases. 10% of the respondents informed us that they have received a health record from the camp. However, only 64% of those who received the record use it while consulting for a medical treatment. This implied that an effective use of the support provided was limited and should also target the behaviour of community in upcoming camps.

Table 22 shows the expenditure incurred for healthcare per year in each state, from primary survey.

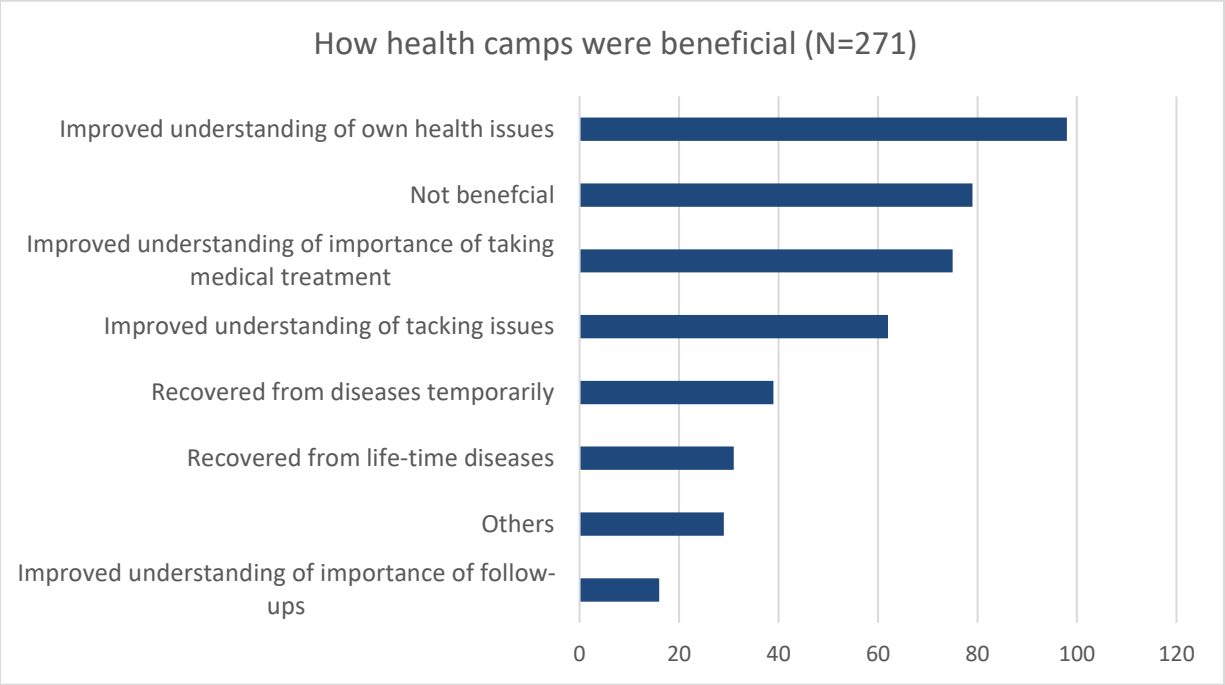
State	Expenditure (Treatment)	Average members in a family according to	Expenditure (Comparison)	Per capita expenditure[46] (Treatment)	Per capita expenditure (Treatment)

[46] Per capita expenditure = Expenditure / Average members

		census 2011[45]			
Maharashtra	INR 16,886	4.60	INR 21,426	INR 3,671	INR 4657
Madhya Pradesh	INR 75,199	4.87	INR 20,852	INR 15,441	INR 4,281
Jharkhand	INR 7,941	5.27	INR 18,617	INR 1,507	INR 3,534

Table 22: Per capita health expenditure

From the table, the per capita expenditure towards primary healthcare needs of Madhya Pradesh found to be on a higher side and shall be checked with Panchayat, ASHA workers and PHC staff



Graph 13:How health camps were beneficial

of the areas. Graph 13 shows the responses on the benefits of conducting camps in treatment villages.

Since no camps were conducted in Jharkhand, everyone had voted that the camps were not beneficial. The other reasons for voting against was because of limited awareness as well as the limited frequency of conducting the camps. However, from primary survey and interaction, many of the community members said that the eye-checkup has been very helpful, especially for older women.

Table 23 shows the amount in which the support has addressed the top five diseases prevalent in the treatment villages according to the survey.

[45] Average members in a family= No. of Population/ No. of households

Top- 5 diseases in treatment villages	Percentage of response across treatment villages	Identify	Prevent	Cure
Urinal infection	0	Not applicable		
Cancer	0			
Fractures and bruises	1	Not available (NA)	NA	NA
Dental problems	2	NA	NA	NA
Malnutrition	3	✓	-	-
Water borne (diarhea, cholera)	4	NA	NA	NA
Heart and lung related problems	5	NA	NA	NA
Kidney stones	6	NA	NA	NA
Anemia	9	✓	-	-
Vector borne disease (malaria, dengue, chikungunya and typhoid)	11	NA	NA	NA
Eye related diseases like conjunctivitis, cataract	27	✓	✓	-
Fever	28	✓	-	✓
Body ache (back pain, joint pain etc)	67	✓	-	-
Weather related disease (flu ,cold, cough)	76	✓	-	✓
Non-Communicable diseases like Diabetics, BP, anxiety, hypertension, Cholesterol, etc.	76	✓	✓	-

Table 23: Support provided to top-5 diseases in the treatment villages

When analysed, it was found that the health camps have helped to identify top five diseases prevalent to the villages, where some were easily curable. However, Cummins can now target on taking measures against prevention and also to cure existing diseases in the villages.

When the respondents were asked on the awareness received on menstruation practices, 64.2% and 50% mentioned that they were informed about the benefits of using pad and on the disposal after usage, respectively. However, 36% reported that no such session was conducted. In terms of the practices, around 88% of the female respondents informed that they prefer sanitary pads during menstruation while 19% prefer cloth and 16% use both the materials.

In terms of the mental well-being, respondents were asked to rate them on a scale of 1-5, 1 being very poor and 5 being very good. Around 84% of the respondents rated 4 or above 4 to their mental peace. Of those who have rated 3 or below, 42% of the respondents were formally employed while 30% of the respondents do agriculture in own field for main source of income.

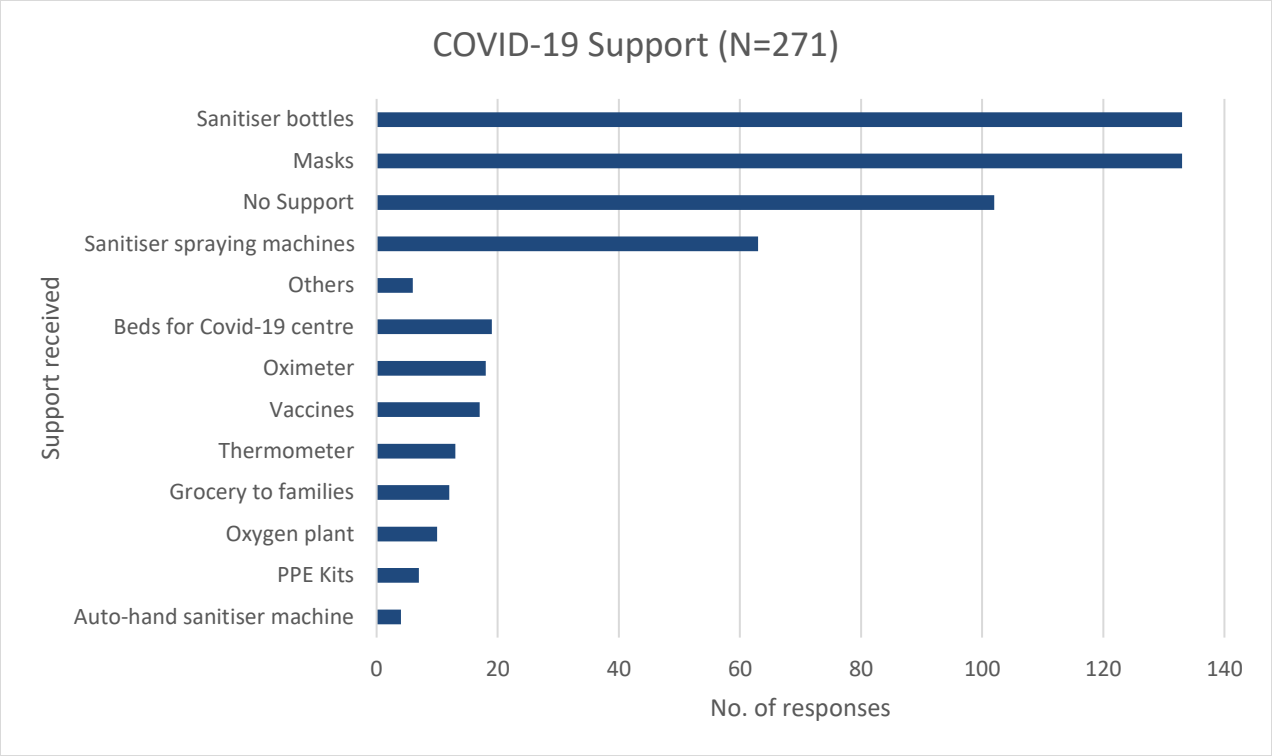
Around 38% of the respondents mentioned that they have received a cook stove (operated by burning wood but less in quantity) through Cummins, of which 20% use both LPG stove and stove provided by Cummins for cooking purpose. According to the survey, to prepare healthy food

(18%), to reduce breathing problem (17%), switching from conventional style of cooking (15%), saving time (14%), and able to multi task (11%) were some of the advantages mentioned by respondents. According to the users from survey and primary interaction, the setup needed only limited amount of wood and helped in concentrating the health efficiently to the utensils, thereby reduction in carbon emission and health issues. However, from the survey, 16.55% of the respondents who had received the stove did not use it. Since around half of the beneficiaries weren't using the facility, Cummins shall prioritise the community who don't have access to LPG cylinders to provide the stove, that would help in creating better impact.

Similarly, Cummins had helped in providing biogas to the community members, largely in Maharashtra. Of the 22% of the respondents who have received the support, 15% each mentioned that it was an alternate for LPG, when unavailable and was very lower in price compared to the LPG cylinders. Another 8% told that it helped to reduce emissions. From survey and primary interaction, it was noticed that switching to biogas has helped to reduction in cutting down of trees/ plants for wood as fuel for cooking. However, the setup for biogas was largely available with those who have cattle for dung or agricultural waste as input. Cummins shall consider finding avenues for scaling up this initiative in more villages since it is able to create potential impact across the areas of waste management, climate change, health, savings and agriculture.

8.5 Covid-19 Support

The 5-year programme was struck with COVID-19 during its implementation. Subsequently, many of the efforts were halted temporarily due to lockdown and COVID-19 protocols. However, the Cummins team had started to provide awareness on the symptoms and preventive measures across the village. Sanitization of villages, essentials for one to two months, provision of preventive equipment to individuals was provided to curb the spread of the virus. The above support was endorsed by Sarpanch, ASHA workers, teachers and community members across the villages. However, many of the community members were unaware that the support was provided by Cummins during the study. The graph 14 shows the support provided by Cummins from primary survey.



Graph 14:COVID-19 Support

8.6 Improved vegetation to mitigate climate change

The following section highlights the findings on the outcomes and impact of afforestation in the villages.

Around 93% of the respondents from the treatment villages have reported that trees have been planted in their respective villages compared to 74% in treatment villages. From the primary visit and interaction with experts, the trees selected for afforestation were the ones with higher lifespan such as banyan, peepal, neem and other locally grown trees with respect to the states. The table 24 shows the responses on the number of trees planted across the villages.

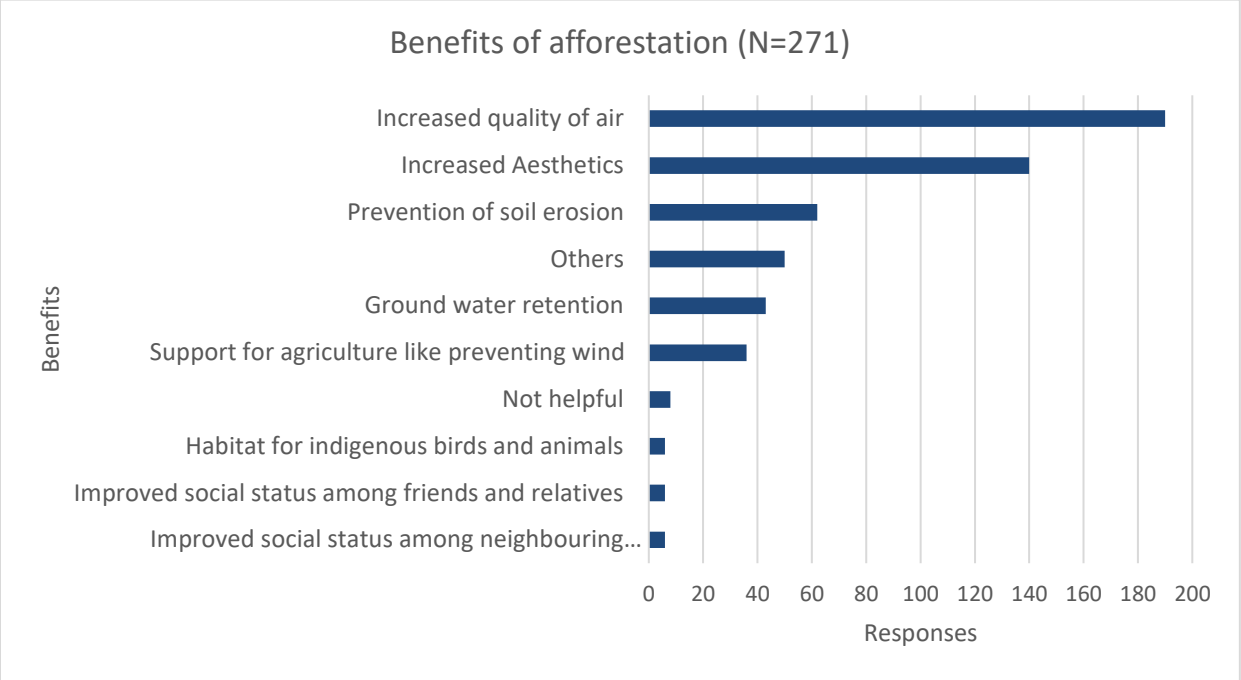
No. of trees planned	No. of responses across the villages
100	23
100-500	89
500-1000	44
1000-1500	13
1500-2000	7
2000+	38

Table 24: Response for number of trees planted across the treatment villages

According to the panchayat officials and members living/ working near to the planted areas, the main source of water was through rain. However, water was also fed to the trees using tanker facility during its initial stages. One of the reasons for selection of such trees is their ability to grow under water stressed areas[47]. From the primary survey, 12% and 10% of the community has informed that youth and a group of community was formed to maintain the plantation sites in the villages. Another 9% informed that the community together maintain the trees. 7% told that

[47] ficus religiosa: Key facts

a SHG looks after the same. However, 22% of the respondents were unaware of person/ institution accountable for maintenance. The graph 15 shows the response on how the afforestation was benefitting the community.



Graph 15:Benefits of afforestation

According to the community, there was an improved growth of trees planted in the treatment villages. Most of the afforestation activities was happened in the outskirts as well as valleys of the villages apart from roadsides. This would help to prevent soil erosion, and could act as windbreakers in these areas. Some of the plantations were also setup between agricultural fields (agroforestry) of some farmers which was helping to maintain the moisture in the soil by providing shades.

In one of the villages, afforestation using the Japanese technique of Miyawaki was piloted. The Miyawaki forest are capable of reducing the temperature, noise reduction, biodiversity balance, soil stability, and carbon sequestration[48]. According to the community and youth and experts who maintains the tress,

Figure 15: Miyawaki forest technique piloted in a village in Maharashtra

[48] Miyawaki Forest

there has been a significant growth after the afforestation. Moreover, during observation, no snag was found in the cultivated area and ample amount of water was received from the nearby farm ponds, built by Cummins. Birds like sparrows were also noticed inside the cluster of trees. This implied that the technique has been able to sustain with the local soil and weather conditions.

Figure 16: A farm pond build by Cummins in a village in Maharashtra

By considering the benefits voted and other information received through qualitative interaction, the afforestation intervention would be able to bring social, environmental and economic benefits to the treatment villages. This would eventually help to mitigate the climate risks pertained to the region. The table 25 explains the possibility for achieving various benefits of afforestation in treatment villages.

Category	Benefits	Less likely to happen	Likely to happen	More likely to happen
Environmental	Increased flora			✓
	Increased fauna		✓	
	Contribution to food chain & ecosystem balancing		✓	
	Increased release of oxygen			✓
	Ability to break wind and reduce damages		✓	
	Reduce soil erosion			✓
	Ability to facilitate rain and bring back hydrological cycle		✓	
	Improve soil fertility		✓	
	Reduce moisture loss from soil		✓	
Social	Increased fall of shadows			✓
	Recreational parks		✓	
	Improved aesthetics of the village		✓	
	Improved status of the village		✓	
	Alternate fuel for heating during winter		✓	

Economic	Contribution to pharmaceutical & herbal industries	✓		
	Organic manure for agriculture		✓	
	Feed for livestock		✓	
	Contribution to mitigate agricultural loss due to weather conditions		✓	
	Business model of recreational parks		✓	

Table 25: Possible impact of afforestation

Therefore, the intervention was capable of mitigating various climatic and social issues, and require timely maintenance for achieving the larger impact. Cummins shall ensure the maintenance of the trees by timely monitoring and evaluation of all the plantation sites.

8.7 Improved access to social schemes

The following section highlights the findings on the outcomes and impact on the support provided for accessing social schemes in the treatment villages.

Around 47% of the respondents mentioned that they were a part of at least one government scheme in last 5 years, wherein 24% had become a part of this support with the support of the Cummins. Of the rest 53%, 78.32% weren't aware of any social schemes that are available for themselves. According to the survey, only 33.21% of respondents have mentioned that either themselves or their family members have received support through implementation partners or Cummins to access various social schemes. Of the 33%, 19.26% of the respondents mentioned that they had only received support on explaining general information such as benefits, eligibility, timeframe, documents required etc. Only 3.56% of the respondents who had received an awareness session reported that they had received support from implementation partner/ Cummins to fill the applications, while another 3% each informed that they were taught on whom to approach and how to contact in case of a need. 61%, 42%, 39% and 19.35% of the respondents voted for the schemes such as *Pradhan Mantri – Jhan Dhan Yojana* (PM-JDY), *Jal Jeevan* Mission (JJM), *Pradhan Mantri – Suraksha Bima Yojana*(PMSBY), *Prandhan Mantri- Jeevan Jyoti Bima Yojana* (PM-JJBY) respectively. These schemes were received through Cummins over the last 5 years. The perception on the awareness levels on social schemes amongst the other community members was checked with the respondents. Only around 10% reported that the community was fully aware of the social schemes, while majority (59%) said that the community was somewhat aware of the schemes. Moreover, it was also noticed that 77% of the respondents don't have a medical insurance at the time of survey. Therefore, it implied that the awareness created among the community was very limited and Cummins shall focus on target-based enrolling after identifying the profile of the communities. Cummins shall also bring various awareness creating sessions. It could be a role play or an interaction session with people who have already claimed the schemes with target community that would effectively help them to understand the needs of various social schemes.

9. Coherence

The below section explains on the compatibility of the interventions done by Cummins with respect to government interventions for a specific theme/pillar. The government programmes available at state and national level were considered to analyse the interventions implemented. A pillar-wise approach has been considered to assess the coherence of the programme.

9.1 Pillar 1: Water management

Programme Features	Jalyukt Shivar Abhiyaan /JalAbhishek Abhiyan	PM- Krishi Sanchayee Yojana	Neerachal Watershed Management	Cummins Watershed development
Sponsoring agency	State Government	Central Government	Central Government	Cummins CSR fund
Geographies covered	Pan-Maharashtra/ Pan- Madhya Pradesh	Pan-India	Pan-India	Satara, Ahmednagar, Dewas, Indore, Jamshedpur
Objectives and action plan	Clear	Clear	Clear	Clear
Local Contextualization	High	Medium	Medium	Medium
Capacity development	Yes	Yes	Yes	No
Whether structure currently present in the villages/ taluka	Partially	Partially	NA	Yes
Quality of work	High	High	NA	Very High
Monitoring & evaluation	High	High	High	Medium
Outcomes achieved	Medium paced	Medium paced	Medium paced	High paced

Table 26: Coherence- Water management

After analysing with central and state government programme on watershed management, the below points were taken out that could be adopted for the HRD programme.

- Objectives and action plan aligning to national and states schemes can complement on smooth implementation and transition at any given point of time.
- Although panchayat in certain villages have made structures, a capacity development on taking over for further more structures would ensure sustainability.
- Timely monitoring of projects in line with established indicators would help in standardization and ease of mitigating the bottlenecks to take forward

9.2 Pillar 2: Education

Programme Features	Swach Vidhyalaya	Swayam	Samagra Siksha Abhiyan	Cummins Education support
Sponsoring agency	Central Government	Central Government	Central and state Governments	Cummins CSR fund
Geographies covered	Pan-India	Pan-India	Pan-India	Satara, Ahmednagar, Dewas, Indore, Jamshedpur
Objectives and action plan	Clear	Clear	Clear	Partially clear
Quality of work	High	High	High	Very High
Convergence with government schemes	High	High	High	Medium
Capacity development	low	low	Low	Low
Whether structures are present in villages	Not applicable (NA)	No	Not applicable (NA)	Yes
Speed of work	Medium paced	Medium paced	Medium paced	High paced
Monitoring & evaluation	Medium	Medium	Medium	Low

Table 27:Coherence-Education

Below are some points noted after comparing with the state and central programmes on education.

- Capacity development on converging schemes to get adequate funds at right time would aid to quality infrastructure and retention and increase in strength.
- Timely monitoring of projects in line with established indicators would help in standardization and ease of mitigating the bottlenecks to take forward.

9.3 Pillar 3: Income growth

Programme Features	Promotion of organic farming in village clusters	Start-up Village Entrepreneurship Programme (SVEP)	Cummins Education support
Sponsoring agency	Central & state governments	Central & state governments	Cummins CSR fund
Geographies covered	Pan-India	Pan-India	Satara, Ahmednagar, Dewas, Indore, Jamshedpur
Objectives and action plan	Clear	Clear	Partially clear
Quality of work	High	High	High
Convergence with government schemes	Not applicable	Not applicable	Medium
Capacity development	High	High	High
Whether structures are present in villages	Not available	Not available	Available
Speed of work	Medium paced	Medium paced	High paced
Monitoring & evaluation	High	High	Medium
Hand holding frequency	Medium paced	Medium paced	Medium paced

Table 28: Income growth

The compatibility findings from the livelihood programmes with respect to Cummins HRD is as follows:

- Objectives and action plan aligning to national and states schemes can complement on smooth implementation and for further support in maximizing the unit.
- Capacity development on converging schemes to get adequate funds and handholding support, eventually leading to maximizing the impact.

- Timely monitoring of projects in line with established indicators would help in standardization and ease of mitigating the bottlenecks to take forward.

9.4 Pillar 4: Health Camps

Programme Features	National Programme For Prevention & Control Of Cancer, Diabetes, Cardiovascular Diseases & Stroke (NPCDCS)	National Programme For Healthcare Of Elderly (NPHCE)	National Oral Health Programme (NOHP)	Cummins Health Support
Sponsoring agency	Central & state governments	Central government	Central government	Cummins CSR fund
Geographies covered	Pan-India	Pan-India	Pan-India	Satara, Ahmednagar, Dewas, Indore, Jamshedpur
Objectives and action plan	Clear	Clear	Clear	Low initial clarity (dependence on local context)
Frequency of work	High	Medium	Medium	Once in a few years to Yearly
Convergence with government schemes	Not applicable	Not applicable	Not applicable	Low
Capacity development	High	High	High	Low to Medium
Monitoring & evaluation	Not available	High	High	Low
Outcomes achieved	Medium paced	Not available	Not available	Medium
Hand holding frequency	High	Not available	Not available	Medium paced

Table 29: Coherence- Health camps

Below are some points noted after comparing with the state and central programmes on health camps.

- Objectives and action plan aligning to national and states schemes can complement on smooth implementation and maximizing the impact.
- Capacity development on converging schemes to use funds and other resources eventually aiding to improved database and services in local medical institutions.
- Timely monitoring of projects in line with established indicators would help in standardization and ease of mitigating the bottlenecks to take forward.

9.5 Pillar 5: Social Engineering

Programme Features	Green India Mission (GIM)	National Afforestation Programme (NAP)	Cummins Health Support
Sponsoring agency	Central government	Central government	Cummins CSR fund
Geographies covered	Pan-India	Pan-India	Satara, Ahmednagar, Dewas, Indore, Jamshedpur districts
Objectives and action plan	Clear	Clear	Clear but not well-framed
Micro planning	High	High	Medium to high
Capacity development	High	High	Medium to high
Planting and fencing	High	High	Medium to high
Value addition and marketing	High	High	Medium
Treatment of land	High	High	High
Use of technology	High	Medium to High	Low to medium
Monitoring & evaluation	High	High	Medium
Outcomes achieved	Medium paced	Medium paced	Medium paced

Table 30: Coherence- Social engineering (afforestation)

The compatibility findings from government level afforestation programme with respect to Cummins HRD is as follows:

- Objectives and action plan aligning to national and states programme could help in adding valuing to the lager impact.

- Timely monitoring of projects in line with established indicators would help in standardization. A third-person agency could be brought in for monitoring of the project using technology like GIS system.
- Projects shall use improved technologies such as tissue culture, clonal seedlings, root-trainers, rhizobia culture, specialized silvicultural operation, etc.
- Economical angle to the project by value addition shall be brought in to create revenue models out of it.

10. Impact

This section highlights the outcomes and impact achieved by the interventions across the programme. The impact achieved have been presented pillar-wise.

10.1 Pillar 1: Water management

1. Watershed development activities was undertaken across all 13 villages.
2. Water table across 12 villages of Maharashtra and Madhya Pradesh have been increased with a minimum of 31feet towards the ground level.
3. There was water available for 45days post kharif season which helped in continuing agriculture during demanding times and increased income.
4. An increase in water for domestic use up to 3.8 million liters was recorded.
5. Around 28,525 people were benefitted out of the water structures in the villages.
6. Improved access to water has helped in improved vegetation and as an input to the plantation, thereby helping to mitigate climate change.

10.2 Pillar 2: Education

1. Zilla Parisha schools at 13 villages now have a renovated / new classroom and toilet facility.
2. All 13 schools have been provided with sophisticated equipment for e-learning under digital inclusion.
3. Two Anganwadi/ nursey schools have been upgraded.
4. All the schools have a clean gender-specific toilet facility available.
5. All schools have a compound wall ensuring the safety of the children.
6. Every school has recorded a reduction in drop-out rate.
7. Every school has recorded increase in retention rate.
8. Improved toilet facilities have helped to reduce illness among students and showed improvement in their health status.

10.3 Pillar 3: Income Growth

1. All 3 states have at least one Water ATM facility available.
2. Provision of clean drinking water at affordable rates (Re.1/ liter and Rs.5 per 20 liter) ensured decrease in illness and reduction in health expenditure.
3. Around 5 models of business were created under the programme.
4. Two units of sanitary pad production was installed at Maharashtra and Madhya Pradesh.

5. Minimum of 5 women entrepreneurs were created per sanitary pad making unit under the support.
6. Pad making units has helped in bringing a behaviour change among village women to switch from cloth to sanitary pads during menstruation. 88% of the female community preferred pads.
7. 154 women were benefited by the intervention of Poultry farming.
8. 154 women entrepreneurs were created out of poultry business.
9. Poultry unit ensured increased income and sustainable business model.
10. 5 villages have been provided with organic farming support.

10.4 Pillar 4: Health

1. 1-2 health camps were conducted in every village once in a year.
2. 64% of the community use past health recorded created for every individual while consulting.
3. Health camps have helped to identify top five diseases prevalent to the villages.
4. The per capita medical expenditure in the villages of Maharashtra and Jharkhand was less than national count.
5. 84% of the respondents rated 4 or above 4 to their mental peace on a scale of 1-5, 1 being very poor and 5 being very good.
6. Right focus to provide awareness and medical supplies during COVID-19 have helped to curb the spread among the villages.

10.5 Pillar 5: Social engineering

1. All villages in Maharashtra and Madhya Pradesh have received support for afforestation.
2. Minimum of 100 trees have been planted in each of the 12 villages.
3. Agroforestry has been practiced in the villages of Maharashtra, aiding to mitigate climate change.
4. Pilot project of Miyawaki forest technique has been acclimatised with the local conditions.
5. The afforestation projects that includes traditional and indigenous plants were capable of providing Environmental, social and economic benefits to the villages.
6. 24% of the community had received support to access schemes through Cummins.
7. 61%, 42%, 39% and 19.35% of the respondents voted for the schemes *Pradhan Mantri – Jhan Dhan Yojana* (PM-JDY), *Jal Jeevan* Mission (JJM), *Pradhan Mantri – Suraksha Bima Yojana*(PMSBY), *Prandhan Mantri- Jeevan Jyoti Bima Yojana* (PM-JJBY) received through Cummins over the last 5 years, respectively.

11. Sustainability of the programme

From the above sections, it was evident that the support provided on the pillars was a futuristic approach, which have started to cater the needs of the community. However, many aspects on the sustainability of the pillars was found a medium to low range. The below section explains the sustainability aspect of the interventions to be included in the support offered by Cummins across the pillars.

11.1 Capacity building on water budgeting for efficient use of water

Although the community was aware of the seasons where water was available, a session of water budgeting shall be provided before handover of the structure. A water plan provides information about current water uses and charts a course for water efficiency improvements, conservation activities, and water-reduction goals. A strategic plan establishes the priorities and can help the villages to allocate water for the community, every year. The water plan/ budget would also help to allocate funding for water-efficiency projects that provides the biggest impact in the villages.

11.2 Capacity building for maintenance of water structures

At the time of study, the maintenance of the structures like desilting was done by Cummins. However, the local community shall be taught on the basic maintenance needed for the structures with timeline for each action, skills required, methods and criteria to identify vendors etc. before handing over the project. This would ensure a smooth transition of the support from Cummins to the community and would help in easy exiting from the village, any time. Also, it would help Cummins to monitor the maintenance without much effort, if planning to stay back in the villages for more time.

11.3 Capacity building on budgeting- Income growth

The support provided under various livelihood opportunities have helped women SHGs to find an earning and build confidence among them. However, in terms of the sustainability of the business models, a well structure capacity development on identifying bottlenecks, planning and decision making and budgeting shall be provided before handing over or within 6 months of handover of the projects. This step shall develop confidence and accountability among the entrepreneurs to rebuilt or expand their business at any given time. This would also help Cummins to monitor and provide suggestion easily because of the basic knowledge imparted or in easy exiting from the villages, when required.

11.4 Support for follow-ups after health camps

From the study it was found that the camps were conducted once or twice in a year, although the duration between the camps differs. Apart from those people who suffer from eye-related diseases like cataract, others don't receive much support post the conduction of camps. This support could be like follow-up consultation, examination in laboratories, medicines and other treatments. Therefore, to ensure impact of camps, Cummins shall consider linking with local laboratories, clinic and doctors to provide support during follow ups at discounted price. For instance, Cummins can consider opening a"Jan ousadhi" medical store by identifying local talent

and forming an SHG under Income growth, that would eventually help to partner with Cummins or other organisations who wish to conduct camps in the any of the villages and adjacent area. Opening such an enterprise would also benefit in access to affordable medicines at the village level apart from a livelihood option for the SHG.

11.5 Maintenance of interventions across all pillars

During the study, it was noted that no provisions were made for maintenance of the support given. Although some of the interventions like projectors and water ATM facilities have after-sales service available, providing an Annual Maintenance Contract (AMC) shall not only help the interventions to sustain for longer time, also would help the community/ stakeholders to utilise interventions effectively as well as to understand the need of such support in upcoming practices.

11.6 Plan for external partnerships across the pillars

From our interactions, it was apparent that Cummins wanted to continue their support in the villages for a longer time. However, it is likely that the presence of Cummins in these villages might limit the community from exploring other avenues for assisting in maintenance of existing structures or development of the villages. Therefore, Cummins could develop capacity among the leaders of the villages to ensure that larger impact can be achieved through more developmental project partnerships. This could also include private players for creating long lasting partnerships like contract farming with marginal farmers, partnering with companies for women empowerment through labour support etc.

12. Recommendations

12.1 Developing impact and pillar-wise objectives of the programme with timeline.

The holistic rural development programme was initially started in Nandal village after the plant was set-up near the Phaltan region. The programme started to address the needs of the village over a period of time, under various thematic areas. Sooner after a visible impact was noticed in the village, similar interventions were replicated in the other villages selected near other plant site. Although, a set of criteria for identifying villages and stakeholders were framed, a programme level impact statement was missing. Similarly, objective across the five pillars identified was also found limited. Therefore, Samhita suggests to frame a clear impact statement that includes target beneficiaries, target numbers etc. with a roadmap on implementing the projects along with milestones pertained to the statement. Similarly, a pillar-wise objective with clarity on the impact to be achieved in terms of number and other parameters shall be clearly defined. This would help in ensuring the quality check as well as the pace of the work and impact achieved at a given time period.

12.2 Timely monitoring and evaluation of the programme.

According to Cummins, both project leaders for the village and heads of the pillar visit the villages during and post implementation of the projects. Although follow-up visits were conducted by the CSR teams, monitoring of the projects was not followed systematically. A framework for monitoring of the thematic areas with clear indicators was missing. Hence, Cummins shall a standardised framework for monitoring the interventions that would help to measure the short-, medium- and long-term objectives of the programme across the villages. This would also help in clarify relationship between programme activities and external factors. Moreover, it would help to evaluate the programme at regular intervals of time that would not only help to take appropriate decisions, but also to replicate the best practices among other villages. The standardised monitoring and evaluation framework shall include national-level indicators that would help to showcase the contribution by Cummins to create impact and also for easy uptake of the villages for any government programme in future times.

12.3 Capacity building of the community members to make them future-ready.

Several instances were found that limited the sustainability of the interventions beyond the period of Cummins' active involvement in its first 5 years in each village. For example, during the primary interaction with women groups, it was noticed that the groups handling Udgam Sanitary pad making unit in Maharashtra faced issues related to marketing, pricing, budgeting and technical upgradation. In a day, 40 person-hours of work by 5 people was able to bring only a profit of INR 600 in total. They faced issues related to design of the napkins, market penetration as well as expansion of their business. From interactions with the community and observation, it was observed that the Water ATMs installed near the roadsides targeting both villagers and public

found a limited footfall. Moreover, the garlic-peeling community has stopped taking the work due to very low remuneration and high amount of input. In terms of water, proper budgeting on identifying the available quantity of water versus the need of the community was missing. For other infrastructural interventions, too, such as school buildings, the need for maintenance was apparent after many years of the initial building elapsing by the time of this assessment.

Given these instances, Cummins could consider providing more advanced capacity development sessions pertaining to the interventions during the first 5-year period. These could focus on ensuring the sustainability of the models as well as to identify and act on the bottlenecks which might arise in the models in the future. Essentially, the relevant stakeholders can be trained to either maintain structures themselves or take up maintenance through a third party, carry out minor repairs, and brainstorm or work with relevant external partners to resolve issues that limit the impact of the interventions provided by the company.

12.4 Focused approach towards development of marginal farmers

From primary survey and interaction, only 9% increase was found in the income of the marginal farmers after the construction of watershed structures. The structures also found limited in catering to the needs of the entire famer community due to reasons related with the terrain of the areas. Therefore, Cummins shall ensure that farmers, especially marginal farmers have access to water for farming by tackling the issues pertained to the terrain. Cummins shall prioritise on providing more drip irrigation or sprinkler units to marginal farmers. Cummins can also introduce contract farming for marginal farmers that will ensure stabilised income even during tough times. Forming a FPO of marginal farmers shall be considered not only for ensuring monetary returns, but also for developing ancillary business in the value chain, thereby producing more revenue and employment opportunities in the villages.

12.5 Support for protecting farm fields from animal attack.

During the primary interaction with farmers in both Madhya Pradesh and Maharashtra, it was noticed that there was a constant threat faced from wild boars and pigs on their farm fields. The attack by these animals were destroying the crops, which was heavily affecting the marginal farmers. Due to this

Figure 17: Half-eaten vegetables by wild boars

unexpected attack, many of them, including marginal and non-marginal farmers faced financial loss. To avoid the loss, farmers can consider installing fences that won't create loss to both crops and animals. One such is solar fence by Krushi store. Another technique to prevent attack from wild animals is the use of repellents. One of the practices found in Malaysia is the use of coconut fruit bunches to deter the wild pigs from entering cultivated areas[49]. Using motor-driven loud noise creating equipment also scares the animals[50]. Electronic repellents such as ultrasonic repellents are silent to humans, while the high-frequency sound waves repel wild animals. Other techniques include cultivating chilly at the boundaries of the farmland that act as natural repellent. There are also organic and chemical repellents available in the market. Chemical repellents which include active substances such as Anthraquinone, Butanethiol, and Methyl Anthranilate can be used to keep wild animals away from crops[51]. However, the repellent changes with respect to the animal. Cummins can support by funding fully or partially for the set-up. Prioritising farmers according to their land size would help to effectively provide support to the most needed groups.

[49] SIMPLE WAYS TO PROTECT CROPS FROM WILD PIGS
[50] Innovative techniques by framers of Andhra Pradesh to avoid wild animal attack on fields
[51] Strategies to Protect Crops from Wild Animals

13. Annexure

List of villages and population impacted

Name of the village supported	Block/ Taluka	District	State	Population
Nandal	Phaltan	Satara	Maharashtra	2854
Takobaichiwadi	Phaltan	Satara	Maharashtra	599
Saswad	Phaltan	Satara	Maharashtra	3523
Suravadi	Phaltan	Satara	Maharashtra	3890
Mulikwadi	Phaltan	Satara	Maharashtra	1232
Kalaj	Phaltan	Satara	Maharashtra	2066
Karwasa	Depalpur	Indore	Madhya Pradesh	729
Rajoda	Dewas	Dewas	Madhya Pradesh	5251
Manjursumbha	Ahmednagar	Ahmednagar	Maharashtra	1194
Nimgaon Bhogi	Shirur	Pune	Maharashtra	1645
Nutandi	Patamda Block	East Singhbum	Jharkhand	453
Wathar Nimbalkar	Phaltan	Satara	Maharashtra	3954
Devgaon	Ahmednagar	Ahmednagar	Maharashtra	1135
Total population				**28525**

Support provided under each pillar

Pillar	Support provided
Water management	• Desilting of existing waterbodies. • Construct new check dams, percolation/ soak pits, farm ponds, boulder structure, contour trenches. • Water Conservation through – drip irrigation. • Create Awareness for Water Conservation. • Convergence with state institutions
Education	• Redevelopment and upgradation of School and Anganwadi building. • Renovation and construction of class rooms, toilet Block for girls and boys • Provided E-Learning software, Black/white boards, Desk-bench facilities/furniture • Tree Plantation. • Construction of Compound wall
Health camps	• Provision of cook stoves • Provision of biogas • Conduction of health camps • Awareness creation on health camps • Provision of mask, sanitiser, oximeter during OCVID-19 • Sanitisation of villages during OCVID-19 • Awareness creation on COVID-19
Income growth	• Training on becoming organic and model farmers • Formation of SHGs • Installation of Water ATMs • Installation of sanitary napkin units • Installation of backyard poultry setup • Provision of milking machine • Training foe each of the business model • Convergence with state institutions
Social engineering	• Participatory Rural appraisal • Linking with local/government institutions • Awareness creation on various government schemes • Support to enrol for government schemes • Afforestation activities

Sample split per village

Treatment group

S. No	Name of the village	Block, District	Sample Size breakage to be surveyed (265)
1	Takobaichiwadi	Phaltan, Satara, MH	8
2	Saswad	Phaltan, Satara, MH	47
3	Suravadi	Phaltan, Satara, MH	50
4	Mulikwadi	Phaltan, Satara, MH	17
5	Kalaj	Phaltan, Satara, MH	28
6	Wathar Nimbalkar	Phaltan, Satara, MH	50
7	Karwasa	Depalpur, Indore, MP	7
8	Rajoda	Dewas, Dewas, MP	49
9	Nutandi	Patamda, East Singhbum, JH	9

Comparison group

S. No	Name of the village	Block, District	state	Sample Size breakage to be surveyed (133)
1	Malavadi	Phaltan, Satara	Maharashtra	99
2	Kalajhor	Jamshedpur	Jharkhand	6
3	Khetakhedi Village	Dewas,	Madhya Pradesh	28