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Foreword

aritas India has a history of working towards community empowerment and sustainability through our Natural Resource Management programs to address the food security and climate change issues, SAF-BIN, the action research program under European Union is a multi-dimensional research focuses on agricultural development challenges of developing and emerging countries especially Bangladesh, India and Nepal. The program aims to promote local food and nutritional security through adaptive small scale farming in four rainfed Agro Ecosystems (AES) in South Asia.

The program is implemented in three districts of Sagar, Satna & Mandla of Madhya Pradesh with its district agro ecological climatic conditions. This On-Farm Adaptive Research covers 1445 smallholder farmers with 1112 hectares of farm holdings in India. The interventions of SAF-BIN program is intended to facilitate a proactive process among smallholder farming community to address the issues and climate change and food security.

The uniqueness of this program lies in the inter-collaborative learning of farmers, agriculture scientist, research scholars and extension workers to give edge over the unprecedented climatic variations.

The district report is the compilation of district and village level assessments carried out in 10 project villages in Satna district.

The content of report is based on the data source collected from the primary and the secondary sources of the research area through direct interaction with the villages and the stakeholder, Participatory Rural (PRA) tools, data collected through households survey (HHS), Focus group discussion (FGD) with the different groups of the project implementation area, indepth interview (IDI) of the government officials and stakeholder and secondary information through government records and other sources.

Fr. Frederick D'Souza Executive Director Caritas India

Introduction

In this report information related to the project and its work process is discussed with the description of the project area. This report is based on the project implementation activities and overall view of the project area to know the present situation of the project and the project area to analyse and show the need of project implementation. This is also going to be helpful for the team and stakeholder to get familiar and informed about the work or targeted area.

This report is based on the project activities of SAFBIN which is Small holder Adaptive Farming in Bangladesh, India and Nepal. SAFBIN is an Agriculture Based Research for the Food security and environment safety of the Targeted group of the society. In this the targeted group of society are the Small Holder farmers from SC/ST and other sections of society who are facing problem of food insecurity due to change in environment and other natural calamities which affects their crop production and food availability. In this the targeted people are the poor and small land holding families who don't have enough resources to make sure their food security due to lack of enough resources, information, productive agriculture technique, natural calamities, etc which results in Hunger, Malnutrition, Land degradation, Low Production, Illiteracy, unemployment, Migration, etc. To solve all such problems related to food insecurity and environment safety the agriculture research is conducted with the targeted group/section of people from Unchehara Block of Satna District at Madhya Pradesh. The project area was selected on the basis of the following main criteria:-

- a. The targeted area should be under the decided single district limits.
- b. The targeted area should cover the SC/ST population on priority base.
- c. The targeted area should have the problem related to food insecurity.
- d. The targeted area should be covering the Small Holder farmer.
- e. The targeted area should have common need/scope of agriculture research.
- f. The targeted area should be covering 10 different villages/tola for agricultural research process with the targeted area of 10 villages of same districts.

Therefore, according to the criteria base 10 villages of Unchehara Block were selected under Satna District of Madhya Pradesh which are as follows:-

- 1. Itamakala
- 2. Aakaha
- 3. Shivrampur
- 4. Aakahi
- MatriPatora
- 6. Dadari
- 7. Birpur
- 8. GobrawaKala
- 9. Dhaneh
- 10. Bharahata

Introduction to the District area: Satna

Satna District:-

Longitude & Latitude:- Longitude: 80"21' and 81"23' east &

Latitude: 23" 58' and 25"12' north

Geographical Area: 742432 Ha.

Height from Sea Level: 317 m.

Average Rain Fall: 817.6 mm (Year 2008-2009)

Satna District, was formed in 1948, is a district of Madhya Pradesh State in central India. The town of Satna is the district headquarters. The Geographical Area coverage of Satna is around 742432 Hectare which is situated at Longitude: 80"21' and 81"23' east & Latitude: 23" 58' and 25"12' north. Total population of Satna in 2011 Census, was recorded around 2,228,619 of which male and female were 1,156,734 and 1,071,885 respectively. The population distribution shows that about 78% of population lives at Rural Area and around 21% Population lives at urban area.

Geography of Satna District

Location:-

The District of Satna is situated between latituedes 23" 58' and 25"12' north and longitute 80"21' and 81"23' east in mid northern part of Rewa Commissioner's Division in Madhya Pradesh state of India. Eastern Bombay of the district runs with the Teonther, Sirmour and Huzur tehsils of Rewa district and a very small questions of the Gopadbanas tehsil of Sidhi District. The entire western boundary of the district is made by Panna district while the southern boundary abuts on the Murwara tehsil of Jabalpur district in the west and Bandhogarh tehsil of Umaria district and Beohari Tehsils of Shahdol district on the east. The district is divided into the tehsils of Amarpatan, Maihar, Nagod and Raghuraj Nagar. Satna town is situated in Raghuraj Nagar tehsil.

Physical Features:-

Satna district lies on Vindhyan Plateau, which has an average altitude of 1000' to 11000'. The southern portion of Nagod Tehsil below 24"30' north latitude is a hilly country consisting of a tangled mass of low hills, and enclosing considerable stretches of level ground. The height of the plateau enclosed by these hills is from 1700' to 1800' generally but occasionally, some of the hills in the south of the tahsil rise to more than 800 feet in height above the plateau. The general slope of the country of the tehsil is towards the east, inclined towards the north in the centre of the tehsil.

Satna, the important river of the tehsil rises from the Panna hills and flows east as long as it is in Nagod tehsil. Near village Kathkone in Nagod Tehsil it is joined by the Amran river, and from this point of junction, it bends towards the south, making the boundary of Nagod and Raghuraj Nagar tehsils, till it meets the Tons river a few miles to the south-east of Satna town. Barua is another river of some importance in the tehsil, which rises from the hills in the south of the tehsil and flowing almost due west joins the Tons a few miles below village Karaia, at the border of Maihar and Nagod tehsils.

Amarpatan Tehsil is bounded on the south by the Son river. The Kaimur ridge, with its scarp side to the south, rises suddenly like a wall about eight miles to the north of Son river, going towards the east, with slight northerly inclination, almost parallel to the Son river. North of Ram Nagar, an isolated small hill rises to 2,354'. Rest of Amarpatan tehsil is again an alluvial plain draned by the Behar river, which flows more or less parallel to the Mirzapur road, in a north-easternly direction.

The south western Maihar tehsil consists mainly of sandstones of Bhander series, concealed in great part by alluvium. Beyond 80"44' east longitude the Kaumur ridge runs through the heart of the broader eastern portion of the tehsil dividing the basin of the Mahanadi from that of the Tons. The river Tons, which drains the tehsil runs between the railway line and the Kaumur and is joined by numerous small nullahs which run along the northern slopes of the Kaimur. The south eastern extremity of Maihar tehsil is bound by river Mahanadi, which marches with the boundary of Maihar tehsil first with Murwara tehsil of Jabalpur district and then with Beohari tehsil of Shahdol district.

Raghuraj Nagar tehsil consists in the south of an alluvial plain watered by the Tons and its tributaries the Satna, and the Simrawal from the north-west and the Magardha and Nar from the south. The Panna hills cross the narrowest portion of the tehsil in a west-east direction slightly inclined to the north and separate the valley of the Paisuni, in part ravinous, from the plateau to the south. Further north is Vindhyachal range running from west to east, almost parallet to the Panna hills, through the former sanad states of Baraundha, Patharkachhar and the Chaube jagirs

Mountains and Hills:-

Tha Kaimurs, the Panna hills, and the Vindhyachal ranges, all belonging to the Vindhya system togeter with their spurs constitute the principal hills of the district. The Kaumur range enters Maihar tahsil of the district at village Jhukehi on the border of Murwara tehsil, and runs through the entire length of Maihar and Amarpatan tahsil in an easterly direction slightly inclined to the north. At Jhukehi, the strike of the Kaumurs is displaced, producing the only gap in the whole length of the Vindhyas. Advantage of the gap is taken in the construction of the

Name of Range	Territorial constitution	Reserved forests(inacres)	Protected forests(inacres)	Remarks
Satna	Amarpatan and adjoining parts of Raghuraj Nagar tehsil.	51,840	22,400	Mostly spread over Kaumur and Nara hills and to some extent also on the plains.

Rainfall:-

Like any other part of the State, Satna district receives its rainfall from the precipitation of the Arabian sea monsoon. June to September are the months when most of the rainfall is received. The downpour, as well as the number of rainy days are maximum in the months of July and August.

Climate:-

The year is more or less elearly divided into three seasons; namely the hot season extending roughly from middle February to middle June; the rainy season from middle June to

September and the winter from November to middle February. Ther month of October witness the transition from the rainy to the cold weather.

History

Satna district is part of the Baghelkhand region, a very large portion of which was ruled by the Rewa. A small portion of the western region was ruled by feudatory chiefs under the British. There were eleven such states, namely Maihar, Nagod, Kothi, Jaso, Sohawal, Baraundha and the five Chaube Jagirs of Paldeo, Pahra, Taraon, Bhaisundha and Kamta-Rajula.

The early Budhist books, the Mahabharata etc. link the Baghelkhand tract with rulers of the Haihaya, Kalchuri or Chedi clan, who gained sufficient importance in the 3rd century CE. They had their capital at Mahishmati (identified by some with Maheshwar in Khargone District), from where they seem to have been driven eastwards. They had acquired the fort of Kalinjara (a few miles beyond the border of the district, in Uttar Pradesh), and with that as base, they extended their dominious over Baghelkhand. During the 4th and 5th centuries, the Gupta dynasty held sway over the area. The feudatory chiefs of Uchchakalpa (Unchehra in Nagod tehsil) and the Parivrajak Rajas of Kot (in Nagod tehsil) held their own. The chief stronghold of the Chedi clan was Kalinjar, and their proudest title was Kalanjaradhishwara (Lord of Kalanjar). The Kalchuris received their first blow at the hand of Chandel chief Yashovarmma (925-55), who seized the fort of Kalinjar and the tract surrounding it. The Kalchuris were still a powerful tribe and continued to hold most of their possessions until the 12th century.

The chiefs of Rewas were Baghel Rajputs descended from the Solanki clan. Vyaghra Deo, brother of the ruler of Gujarat, made his way into northern India about the middle of the 13th century and obtained the fort of Marpha, 18 miles north-east of Kalinjar. His son Karandeo married a Kalchuri (Haihaya) princess of Mandla and received in dowry the fort of Bandhogarh (now in the tehsil of the same name in Shahdol district), which, until its destruction in 1597 by Akbar was the Baghel capital.

In 1298, when Ulugh Khan drove the last Baghel ruler of Gujarat from his kingdom. It caused a considerable migration of the Baghels to Bandhogarh. Until the 15th century the Baghels of Bandhogarh were engaged in extending their possessions and escaped the attention of the Delhi kings. In 1498-9, Sikandar Lodi failed in his attempt to take the fort of Bandhogarh. The Baghel king Ramchandra (1555–92), was a contemporary of Akbar. After the death of Birdhabra, Ramchandra's son, a minor named Vikramaditya acceded to the throne of Bandhogarh. His accession gave rise to disturbances. Akbar intervened and captured and dismantled the Bandhogarh fort in 1597 after a seize of eight months. It is after this that the town of Rewa started gaining in importance.

In 1803, after the treaty of Bassein, the British made overtures of alliance to the ruler of Rewa, but the latter rejected them. In 1812, during the time of Raja Jaisingh (1809–35), a body of Pindaris raided Mirzapur from Rewa territory. Upon this Jaisingh was called upon to accede to a treaty, in which he acknowledged the protection of the British Government, and agreed to refer all disputes with neighbouring chiefs to their arbitration and to allow British troops to march through or be cantoned in his territories. At the mutiny of 1857, Maharaja Raghuraj Singh helped the British in quelling the uprisings in the neighbouring Mandla and Jabalpur district, and in Nagod which is now a part of Satna district. For this, the king was rewarded by restoration to him of the Sohagpur (Shahdol) and Amarkantak parganas, which had been seized by the Marathas in the beginning of the century. The rulers of Rewa State bore the title

of 'His Highness' and "Maharaja" and received a salute of 17 guns. Most of the Raghuraj Nagar and entire Amarpatan tehsil of the present Satna district were in the Rewa State prior to the formation of Vindhya Pradesh

Economy

In 2006 the Ministry of Panchayati Raj named Satna one of the country's 250 most backward districts (out of a total of 640). It is one of the 24 districts in Madhya Pradesh currently receiving funds from the Backward Regions Grant Fund Programme (BRGF

Demographics

According to the 2011 census Satna District has Population of 2,228,619 roughly equal to the nation of Latvia or the US state of New Maxico. This gives it a ranking of 203rd in India (out of a total of 640). The district has a population density of 297 inhabitants per square kilometre (770 /sq mi). Its population growth rate over the decade 2001-2011 was 19.17 %. Satna has a sex ratio of 927 females for every 1000 males, and a literacy rate of 73.79 %.

In the 2001 census, Satna district had a total population of 1,868,648, out of which 970,114were males and 898,534 were females. Decadal growth in 1991-2001 was 27.52. Sex ratio was 926. Density of population was 249 / km².

Languages

Among the languages spoken in Satna is Bagheli, which has a lexical similarity of 72-91% with Hindi (compared to 60% for German and English) and is spoken by about 7 800 000 people in bagelkhand.

Introduction to the District area: Satna

Climate:-

Month		Average Temperature (°c)							
	Mean Maximum	Maximum	Mean Minimum	Minimum					
January	24.4	29.2	9.3	4.0					
February	27.8	33.1	11.3	6.6					
March	33.4	38.6	16.6	11.4					
April	38.6	42.6	22.2	16.9					
May	42.3	45.0	27.2	22.3					
June	39.7	41.8	28.4	23.1					
July	32.0	37.0	25.2	22.8					
August	30.5	33.5	24.5	22.4					
September	31.3	33.8	23.9	21.6					
October	31.3	33.7	19.5	14.1					
November	28.9	31.8	11.8	8.0					
December	26.1	29.5	8.8	5.0					

Tehsil Wise Population of the District (As per Census 2001):-

Tehsil Name	Total	SC	ST	Gen	Rural	Urban
Unchehra	160016	25244	31324	103448	143352	16664
Total of The District	1870104	304217	268104	1297783	1484551	385553

(Source - District Statistical Book 2008-2009, Satna)

Subdivisions/Tehsils/RI Circles/Patwari Circles:-

Name of SubDivision	Name of Tehsils	No. of RI Circles	No. of Patwari Circles
Nagod	Nagod	3	57
	Unchehra	3	40
Total		28	438

(Source - District Statistical Book 2008-2009, Satna)

Demography (Census 2001):-

S.No	Particulars	Unit	India	M.P.	Satan
1	Population Density	km²	324	196	249
2	Decade Growth rate %		21.34	24.34	27.52
	Sex Ratio	1000/Male	933	920	926
	SC to total population	%	16.48	14.54	16.26
	ST to total population	%	8.08	23.27	14.23
	Rural population	%	73	74.7	79.28

(Source - District Statistical Book 2002-2003, Satna)

Literacy 2001:-

S.No	Particulars	Unit	India	M.P.	Satan
1	Total	%	65.38	64.11	65.12
2	Male	%	75.85	76.8	77.82
3	Female	%	54.16	50.28	49.1
4	Rural	%	59.4	58.1	61.66
5	Urban	%	80.3	79.67	78.30

(Source - District Statistical Book 2002-2003, Satna)

Block wise details of the District:-

S.No.	Name of the Block	Area in Hectare	Inhabited villages	Village Panchayats	Nagar Panchayat	Nagar Palika	Nagar Nigam	Weekly Haat Bazars
1	Unchehra	89691	202	70	1	0	0	2
	Total	742432	1784	704	09	01	01	28

(Source - District Statistical Book 2003-2004, Satna)

Health (Census 2001):-

S.No	Particulars	Unit	India	M.P.	Satan
1	Infant Mortality rate	Per1000	67.6	64.11	90.5
2	Mother Mortality rate	Per1000	5.4	6.0	7.13

(Source - District Statistical Book 2002-2003, Satna)

Block Wise Breakup of SC/ST Population:

S.N o.	Name of the Block	SC	ST	Total Population	SC % to Total Pop	ST % to Total Pop
1	Unchehra	25244	31324	143352	17.61	21.85
2	Total	304217	266959	1484551	20.49	17.98

(Source - District Statistical Book 2002-2003, Satna)

Block wise Demographic Details:

Name of the Block	Total Population		Sex Ratio	Population Density (2003)	Decadal Growth per cent(2003)
	Male Female		Per 1000 male	Per Sq. Km	
Unchehra	74286 69066		931	160	28

(Source - District Statistical Book 2002-2003, Satna)

Major Occupational Groups:-

Name of the Block	Total Popu- lation	Agricultu	ıre	Agricultı Labour	ural	Cottage Industries		Others		%of Working popu- lation
		Male	Female	Male	Female	Male	Female	Male	Female	
Unchehra	143352	16033	4404	7440	5850	7085	2591	1310	181	31.32
	1484551	158413	53355	86411	64938	63746	16549	16934	1251	31.09

(Source - District Statistical Book 2002-2003, Satna)

Agriculture 2001:-

S.No	Particulars	Unit	India	M.P.	Satna
1	Double cropped area to NSA	%		35.5	29.47
2	Net irrigated area to NSA	%	40	31.6	27.00
3	Fertilizer consumption (per Ha.)	kg.	86.7	40.5	45.00
Electi	ricity(2003-2004)				
1	Electrified villages	%	86.65	97	94.45
2	Power consumption (per person)	kwh	333	250	280.45
3	Power consumption-Urban	%		48.4	63.21
4	Power consumption-Rural	%		51.6	36.69
5	Population below poverty line	%	28.6	37.43	51.72

(Source - District Statistical Book 2002-2003, Satna)

Land Use Pattern (Area in Ha):-

S.No	Name of the Block	Total Area	Forest Land	Waste Land	Net sown area	Double cropped
1	Unchehra	89691	40264	2493	32945	9598

(Source - District Statistical Book 2002-2003, Satna)

Blockwise Details of Irrigated land (in ha.):-

S.No	Name of the Block	Total Area	Fully Irrigated land	Partially Irrigated land	Unirrigated
1	Unchehra	85000	3317	1340	28120

(Source - District Statistical Book 2003-2004, Satna)

Irrigation facilities:-

S.No.	Source	Total Irrigated land (ha)
1	Canal	5765
2	Tube well	61429
3	Well	34565
4	Pond	849
5	Others	21500

(Source - District Statistical Book 2003-2004, Satna)

Tehsil wise description of non forest waste land:-

S.No.	Name of Tehsil	No.of Villages	Total Survey No.	Non forest waste land	Cultivable waste land
1	Unchehra	81	434	961-156	669-590
	Total %	761	6459	6168-168	

Poverty distribution:-

Name of the Block	Total Rural Fam- ilies	Rural BPL Fam- ilies	Percen tage of BPL fam- ilies	Category wise BPL Families						
				SC	ST	Women	Small Farmers	Marginal Farmers	Rural Artisan s	Agricul ture Labour ers
Unche hra	28555	14415	50.48	2183	2970	627	1035	2451	1090	9715
	303374	156918	51.72	34402	3351	8205	13851	33861	6587	101170

(Source - District Statistical Book 2002-2003, Satna)

Introduction to Block area: Unchehara

Place: Unchehara PIN Code: 485661 District: Satna

Tehsil/Taluka: Maihar State: Madhya Pradesh

Latitude: 24.38663(24° 23' 34" N) Longitude: 80.74898(80° 47' 08" E)

Unchehara is a town and a nagar panchayat in Satna district in the Indian state of Madhya Pradesh. It is a block and one of six tehsils of Satna district (i.e. Majhganwa, Sohawal, Rampur Baghelan, Nagod, Unchehra, Amarpatan, Ramnagar, Maihar) situated around 24 degrees 20 minutes North Longitude, 80 degrees 44 minutes East Latitude in the vicinity of Vindhya Range in Central India. In this block total population of unchehara:- 463384 out of which total Male:- 240214 & Total female:- 223170.

Unchehra Janpad-Panchayat consists of 20 members and its Vikas-Khand consists of 66 Gram-Panchayats which includes a total of 322 villages. Langargawan Railway station (about 15 km from Unchehra towards Satna) comes under Unchehra Tehsil. Work of Unchehra Tehsil started systematically from 2001. In Unchehra, infrastructure and facilities e.g. office block, Tehsil, police-station (under a Town Inspector), hospital, Office of Forest Department, post-office, Telecom-Office, waiting rooms at Bus Stand and railway station (completed in around 1948), schools up to higher secondary, Madhya Pradesh Bhoj university, two Dharmashalas are available for people.

Major business is of copper and brass metalworking by Subhansu Metal Industries Rakesh Tamrakars and other businesses for general local needs. There are no other factories or industries around except the cement factories in Maihar, Satna, and Rewa. This area is treated as backward because educated persons cannot find employment, except keeping shops for local needs. Now there is an awareness of service opportunities and jobs in government and public sectors. Students are performing well in their school exams and bring their names onto the state's merit lists. Further, there is new zeal among students, as few of them have performed best in national level examinations.

Unchehara block is mainly a rain fed area where large numbers of small holder farmers are existing from the SC/ST and other poor and weaker sections of society. They have to face the problem like food security because of adverse situation of environment/resources and weather which affects the crop production in a negative way where they have to suffer the loss due to natural calamities or lack of information/awareness. The condition of small holder farmers is bad and equal in all sections and class of society may be some risk takeing and aware farmers avoid it but their number is very few. The need of agriculture research can be observed in area very easily. Most of people in Villages from Unchehara block migrate to city areas to earn as their land production is low and they are not able to support the food and other requirement of their family which leads to the decrease in land cultivation or sown area which can be seen as national problem too apart from that the main problem is people are dieing and facing food insecurity problem in the given region. The need is to use traditional practices and organic farming to decrease the cost of input and increase the production of their small land holding.

Primary Statistical Figures related to the Project Area

Name of the District	Satna	Longitude : 80"21' and 81"23' east			Latitude : 23" 25"12' north	58' and
Altitude	317 m	Agro- Ecological zone		-		
Total Area (ha.)	4473.023 ha.	Agriculture Area (ha.)	3817		2772
Single Cropped area (ha.)	1617.497	Double Cropped area (ha.)	1	581.133	Triple Cropped Irrigated Area (Ha.)area (Ha.)	618.33
Area under Horticulture	155.45	Area under Pasture		95.773	Forest Area	124.54
Average Rainfall (mm)	817.6 mm	Highest Temperature	41.6°C		Lowest Temperature	4°C
Main Soil Type	Black		Type of Land		Plain, Undulat	ing
Population	16472	Total Households	2524		Total HHs of SHF	1343
Hhs of ST	337	Hhs of SC		505	No. of other vulnerable HHs	-
Percentage of school going girls.	-	Reach to subsidized food		Yes	Average IMR (Less than 5 Yrs.) per 1000 births.	6
Accessibility to road	Throughou t year	Electricity	Yes		Mobile Network	Yes
No. of SHG	22	Grain Bank	No		No. of Farmer's Institutions	0
No. of Nursery raisers	0	No. of large - farmers		No. of farmers practicing organic farming	75	

Rain fed Main food crop-1	Black Gram	Yield/ha	8	Total Area (ha)	300
Rain fed Main food crop-2		Yield/ha		Total Area (ha)	
Rain fed Main food crop-3		Yield/ha		Total Area (ha)	
Irrigated Main food crop-1	Wheat	Yield/ha	15	Total Area (ha)	650
Irrigated Main food crop-2		Yield/ha		Total Area (ha)	
Irrigated Main food crop-3		Yield/ha		Total Area (ha)	
Food Scape-1		Food Scape-2		Food Scape-3	
Main Cropping System- Rain fed	Black Gram/	Rice		Area (ha)	450
Main Cropping System- Irrigated	Wheat			Area (ha)	650
Total village food availability (Q)	91019	Own Production	43034	Procured from outside	47985
Loss of crop (Food crops) in last 5 years	Yes (Frost & Drought)	Situation of famine in last 5 Years			No
Percentage of food insecure HHs having insecurity of more than 2 months	-	SHF HHs percentage having food insecurity of more than 2 months.			-
Main Storage technology for food crops	Traditional	Main Processir crops	ng techn	ology for food	Traditi onal
Varities of main food crops	WH- 306,Lok-1 & Sujata	Indigenous/ H	YV/ Hybr	id	HYV
Seeds of main food crops	-	Local/ Exotic			Both
Area under Integrated Farming	0	Area Under IPM	0	Area Under INM	0
Cow, Bullock, Buffalo	2211	Goat, Ship, Pig	1896	Chicken	266
Milk Production	1245	Meat Production	298	Egg Production	29
Trend of Temperature	Increasing	Trend of Rainfall	Decre asing	Trend of Extreme events	Fluctua ting

Climate Change Indicators and Perceptions

S.No.	Climate Change Indicator	Trend	Effect on Food Production/ Agriculture	People's Perception
1	Temperature	Increasing	 Cropping time has changed Increase in cost of cultivation & use of chemicals Use of less water consuming verities/crops. 	It is because of less rainfall and change in weather conditions due to the environmental pollution (mainly due to cement factories) and tree cut off.
2	Rainfall	Decreasing	 Short duration and less water consuming seed/varieties of crop in use. Increase in use of chemical & cost of cultivation 	It is because of less rainfall and change in weather conditions due to the environmental pollution (mainly due to cement factories) and tree cut off.
3	Disease Outbreak	Increasing	 Preferring local & home seed to avoid heavy loss. Increase in use if chemical pesticide Increase in cost of cultivation 	It is because HYV crop are not supported by the climate & weather conditions of the area. It can also because of low fertile land and bad crop management as poor or small holder farmers don't have much to risk on.
4	Food Productivity	Decreasing	 Decrease in yield Decrease in earning profit due to increase in input cost Decrease in nutrition value of food grain 	It can be result of Land degradation Change in climate/weather Excess use of Pesticides/chemical fertilizers Use of improper cropping system due to unawareness/lack of information
5	Food Production	Increasing	Total production has been enhanced.	Its main cause is use of HYV seeds and fertilizer & pesticides.
6	Diet Diversity	Increasing	Due change in need, demand and climate. It has increased nutrition and income value of farmer crop production	It is because farmers can face competition. It can be because of suitability of crop/variety on particular soil and climate to increase production for livelihood

S.No.	Climate Change Indicator	Trend	Effect on Food Production/ Agriculture	People's Perception
7	Change in Food Source	From forest & agriculture to PDS & Market.	New sources are adopted on the basis of food availability	It can be because of less resources of production and earning. It can be because of low production dependency on other sources of food security.
8	Change in Cropping Pattern	Double cropping from single cropping	 It has increased the dietary diversity It has increased yearly crop production of the land 	Due to advancement in agricultural practices they shifted to Wheat- Paddy cropping system and later due to scarcity of irrigation water shifted to Wheat-Soybean cropping system.

Source: PRA and FGD Unchehara, Sagar

The above table show the affect of climate change over the people and their life. In this the main focus was to see the affect of climate change over the food security and environment of the targeted area. We can see the climate change is through the indicators like Temperature Rainfall, Disease Outbreak, Food Productivity, Food Production, Diet Diversity, Change in Food Source, and Change in Cropping Pattern of the targeted area in which the observation were made through the personal observation and information collected through the discussion with the villagers of the concerned area. The change in climate shows how people are getting affected with their living and food security and accordingly they are adapting new ways of living and agriculture for their food security. The major adaptation was seen is use of less water consuming seed/variety of crops, use of HYV varieties, short duration ripening crop, change in cropping time, use of pesticides and chemicals, etc. For the food security and to increase production & income but they are ignoring the pros and cons of these new adoptions of the agriculture.

The table gives view about the increase in temperature and decrease in rainfall which shows a clear sing of change in weather and according to the people of targeted area it can be because various reasons but mainly cause of It is because of less rainfall, change in weather conditions due to the environmental pollution (mainly due to cement factories), Deforestation tree cut off, Excess use of Pesticides/chemical fertilizers and Use of improper cropping system due to unawareness/lack of information. These entire problems can be reasons for existence of each other which leads to the situation of food insecurity and Poverty.

Therefore, the need is to understand the change in climate and its affects to act accordingly by adopting organic farming and cropping system according to the availability of resources and changing climate through agricultural research.

Situation of Food Production, Storage/Distribution, Consumption-food /nutritional security & Climate Change Impacts

Food Production Scenario in the Target Villages: Land Use Pattern (ha):

S. No.	Name of the Village	Geogra- phical	Area U	Inder Agric	culture	Area under	Culti- vable	Unculti- vable	Area of Private
140.	Village	Area	Single Cropp- ing	Double Cropp- ing	Triple Cropp- ing	irriga- tion	Waste Land	Waste land	Land
1	Birpur	716.023	414.497	73.133	96.33	1109	31	65.24	504.619
2	Itamakala	161	10	120	5	85	8	0	135
3	Shivrampur	130	40	31	0	20	5	5	71
4	Aakaha	1029	200	400	400	800	6	5	1000
5	Aakahi	212	10	175	5	60	10	0	22
6	Dhaneh	1163	750	300	25	300	15	5	300
7	Gubarakala	233	50	100	0	30	5	10	300
8	Bharahata	366	58	142	82	148	7	8	380
9	Matharipath ora	241	50	150	5	150	2	3	283
10	Dadari	222	35	90	0	70	10	5	175
	Total	4473.023	1617.497	1581.133	618.33	2772	99	106.24	3170.619

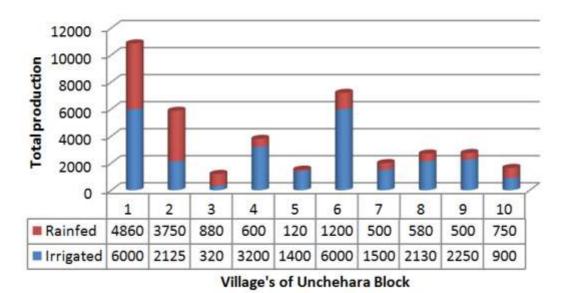
Source:- Village Survey Data, Unchehara, Satna.

The content of the above table shows that the biggest part of area is covered under the single cropping area but as we can see double cropping patter area is almost equally covered to the single cropping area which shows that how farmer started utilising the land and diversified the crop and variety in the given area to increase their production and income. On other hand we see a lot of area comes under uncultivable waste land which can be a sign of adverse affect of excess use of pesticides and chemicals in agricultural land which is another reson for food insecurity and low production of area. More on table we can see the land coverage distribution of the given area.

Food Production (q) in the target area:

S.	Village	Crop Pr	roduction (q)	Animal
No.		Irrigated	Rain Fed	Production (l)
1	Birpur	6000	4860	1000
2	Itamakala	2125	3750	900
3	Shivrampur	320	880	20
4	Aakaha	3200	600	500
5	Aakahi	1400	120	10/5
6	Dhaneh	6000	1200	1000
7	Gubarakala	1500	500	500
8	Bharahata	2130	580	800
9	Matharipathora	2250	500	500
10	Dadari	900	750	900
	Total	25825	13740	6135

Village Food production



The above graph is based on the data of the village food production table which shows that in all the targeted area production from the irrigated area is higher than the rain fed area even though the area coverage of rain fed area in target area is more than irrigated area.

Storage and Distribution Practices in the Project Area:

Storage:

In villages there is no storage facility as such most of people store some quantity of seeds according to their land requirement for next season rest of they either sell or use it for self consumption as they don't have enough storage facility or space for storage in their small houses. Storage is mainly traditional as people don't use any new technique for storage as according to them they don't get that much of production which needs extra care or technology so they use their traditional and local ways for storage.

The infrastructure used for the storage purpose is mainly the plastic bags and gunny bags and little bit farmers store their produce into some traditional earthen structures. Preservative for the storage is also mainly the natural ones and people use very little source of chemical preservatives for their storage. Preservatives used for the storage includes- Neem leaves, Fenugreek straw, Onion, Ash, Kerosene oil, Match sticks etc.

Distribution Practice (Purchase behaviour) of Food Grains:

In villages the distribution channel is mainly through the middle man, PDS distributors, Kishan Mandi and Market. Here the distribution major source of food supply is PDS shops as they are cheeper and most of the villagers are depending on these shops for their food security. In this given area a bigger part of production is directly sold in kishan mandi and Market in which the farmers have to bear loss most of time as they are unaware about their cost of production and because they don't have storage facility they have to sell before season to avoid the spoilage of produce in such condition the farmer has to adjust with the rates as if he is not selling on time he have to bear more loss so at less or no profit he sells it which leads to a big reason for the food insecurity of small or poor farmers. The distribution system is one of the resons for food insecurity as farmer produces and sell its produce at less price in which most of time he pays for transportation and uploading/unloading charges which decrease its cost even lesser and leads him to loss but when he goes to purchase food grain from market or shops he has to pay much heighe price for same crop which shows how small farmers are bearing losses due to bad distribution system which leads to the food insecurity of the Farmers.

Climate change impacts (Threats):

S. No.	Climate change Parameters	lmpacts/ Threats
1	Temperature	 Water scarcity affecting crop production. Loss of crop production due to drought/frost makes agriculture more risky due to unpredictable weather conditions. Decrease in nutritious value/elements of crop.
2	Rainfall	 Change in crops and their variety Change in cropping/sowing timings of crop. Increase in cost of production due to more dependency on motor/diesel pumps, Scarcity of irrigation water due to low & late rainfall.

3	Disease outbreak	 Increase in Cost of production and use of pesticides & chemicals. More loss/damage of crop
4	Land Productivity	 Productivity is increased with the increase of input cost. Soil/Land fertility decreased with Increase in use of chemicals. Increase in more uncultivable waste land

Source:- PRA and FGD Unchehara, Satna

The above table shows the information on the impact of change in climate over the people of the target area as threat. In which the main threats is on food productivity as change in climate and bad resource management is going to affect the crop production directly or indirectly which is going to be the reason for the food insecurity of the people. The improper use of land and water are going to be threat on food security of the people. As we can see the change in climate is leading to change in weather condition which is adverse and threat to the human and agriculture. Agriculture is main source of life and threat on agriculture is threat on human life so the need is to adoption of the fesible tequiques in agriculture to utilise theresources properly and manage crop production to decrease the cost of production for better gains. This can be possible by changing and adopting the agriculture methods according to the changing climate. Here need is to use traditional and organic farming system in agriculture practice to maintain food security in sustainable way.

4. Ongoing adaptation/innovation practices:

Component s of FPDCS	Sub- components	Adaptation Farmer's Own Practices Received Adopted by Fa				
			Tech- nology	Insti- tution	Tech- nology	Insti- tution
Production	Crop Management	Cultivation of less water needing variety.	-	-	Selection of HYVs.	Govt. Organis ations
		Shifting to Wheat- Soybean cropping system from Wheat- Paddy cropping System.	-	-	Shifting in cropping System	Govt. Organis ation
	Seed	Use of Less water needing verities of seeds in case of major crops.	-	-	Selection of HYVs.	Govt. Organis ations
	Pest Management	Use of traditional practices for disease & pest management.*	Tradition al.	Village	-	-

Storage	Infrastructure	Storage into plastic bags and traditional earthen structure.	Traditional.	Village	-	-
	Preservatives	Use of traditional preservatives.*	Traditional.	Village	-	-
Distribution	Selling	Selling through middle men as well as direct selling into the market.	-	Middle Men	-	Market
	PDS procurement	Subsidised food through government.	-	-	-	Govt. Organis ation.
	Market purchase	Purchasing through market	-	-	-	Market
Consumption	Processing	Post Harvest Processing.	Traditional	Village	-	-
		Pre consumption processing.	Traditional	Village	-	-

Source:- PRA and FGD Unchehara, Satna

The above table shows that there is not much change in adoption of agricultural technique the production, Storage, Distribution and Consumption pattern are almost traditional. This shows the reason of food insecurity of area. People of area are not interested in improving their agriculture techniques as most of them are unaware and rest fear to take risk to invest their money from their low income. The people from area facing food insecurity chose option like PDS, other work & services in cities and villages for temporary arrangements of food security of their family. The reason is unpredictable weather which makes the agriculture more risky to invest heavy amount.

Therefore, we can see the need of change in the agriculture system and technique of the small holder and food insecure family to adopt new & better ways of food production, distribution, storage and consumption to assure the food security of small holder and poor farmers of the area.

Stakeholders' Participation & Perceptions

In this section the views and thoughts are shared with the stakeholders of the project area who affects the research work directly and indirectly with their positive & negatives. In this process in-depth Interview were conducted with the stakeholders from different departments of government and society. The stakeholders participated in this process were Government officials, Medical Officers, Local Leaders and local NGO members to provide information about the climate change and the problems of the related/ concerned area with their participation in a personal depth interview through sharing of their views/thoughts. The thoughts and views of stakeholders were informative and helpful in process of other activities

of the research. The information and perception of stakeholders were helpful in supporting the authenticity of data and information collected through primary activities of the research. The views and perception of stakeholder were useful in documenting the facts and figures about the targeted area. It provided information about the intervention done by government and other agencies for the development and food security of the people in that area to analyse the need of change and research.

The process of participation and interaction with Stakeholder was mainly useful in in developing relation and informing about our presence in the given area to have their support and cooperation for the smooth and long run of the Research in that given area. In this process of interaction we interviewed following officials:-

- B.M.O
- S.A.D.O
- C.E.O. Janpad Panchayat
- PDS Chairman
- Sarpanch
- Local NGO Member

Stakeholders' Perceptions on Vulnerability of SHF to Climate Change:

S. No.	Local Issues	Response Got	Stakeholder involved
1	Health & Nutrition level of local mass.	 The main issue of majority of people are hygiene for the increase in disease between the local people in which the major part of patients is from poor and backward class people. People are not drinking clean water due to water scarcity and use of chemical fertiliser in the local area fields. Unawareness between the local people about their health and hygiene issues. Malnutrition is prevalent in SC,ST & backward class community. The most prevalent disease of the area is Malaria, Lose motions, skin disease, anaemia along with some common cold and fever 	B.M.O
2	Expenditure habit of local mass and its affect over food security.	Health Expenditure should be high but as they are getting government facilities it cannot be calculated on other side if we see the per day visit of families and medicine distribution we can say it has increased with time due to some climatic change disease between people increased and some other unawareness issues are responsible	B.M.O.
3	Nutritional diversity of local mass.	There is no as such nutritional diversity as poor people mainly depend on their production availability of food which is common in whole area other than that some do differ due to outside purchase.	B.M.O.

4	Perception to climate change.	 Water availability and rainfall is decreased. Temperature is fluctuating as in summers its very high and in winter is goes down to a freezing temperature which causes drought and Frost(paala) situations some time. Production is affected due to change in climate. Cropping pattern is changing as people are interested in growing cash crops and government is also promoting pulse crops. Use of chemical is increased with time due to climatic change. Use of tractor are also increasing as livestock are decreasing because of less availability of water resource and grazing lands another reason is cultivation or 	S.A.D.O, C.E.O. Janpad Panchayat & NGO
5	Food Security of the area.	 ploughing of land is less time consuming to utilise the climate change. Food security of the area is around 6-8 months to these villages. Better weather conditions can improve situation. Unavailability of water and electricity in most of the area. Less risk taking capacity of farmers. 	S.A.D.O, C.E.O. Janpad Panchayat & NGO
6	Adoption to climate change of small holder farmers.	 People have started dry farming. People started growing soybean in place of paddy to counter irrigation water. Also they started growing some less water needing verities in different crops. 	S.A.D.O
7	Nutrition level and dietary diversity of the area	 There is no as such nutritional diversity as poor people mainly depend on their production availability of food which is common in whole area other than that some do differ due to outside purchase. It is Average as intakes of people have calorie & Vitamin rich diet. 	B.M.O.
8	Condition of food distribution system in projet area.	 In this area food is distributed as and when stock is received. Some time people don't receive the amount of food they are own. For BPL & AY families, there is provision of wheat, rice, sugar and kerosene oil and for APL families, there is the provision of only sugar and kerosene oil. Occasionally APL family get wheat & rice. The wholesome quantum of wheat and rice for the same is 10 Kg. AY(Yellow card)-35 kg, BPL(Blue card)-20,& APL (white card)-10 Kg Kerosene 5 litre/card, Sugar 1.5-2 kg/card. 	P.D.S. Chairman
9	Role of PDS in food security.	 PDS provides regular help for the APL,BPL & AY families on regular base according to their card holding capacity. PDS makes sure that people of area should receive the ration in a proper and managed way. 	P.D.S. Chairman

10	Local issues of food production.	 Sufficient Irrigation facilities are not available which main reason for good production is. Chemicals are much in use which results in death of earthworm and micronutrients which results in low production 	Sarpanch
11	Local issues of food distribution	 Local market is not available for the sale of crop produce. Fair prices are not given for sale and purchase. As poor class and landless families are more in number so lots of food is brought in from PDS or from nearby market. 	Sarpanch
12	Food Security of the local population	 It varies from 6-8 months from person to person and also from village to village. Use of new cropping practice and water availability can increase production for food security 	Sarpanch, S.A.D.O., C.E.O. Janpad Panchayat & NGO
13	Role of extension/res earch on local food and nutritional security	People are following traditional practices and unaware of change in climate to increase their production for food security.	NGO member
14	Problems related to the food production and distribution	 Unskilled farming practices Scarcity of Water & electricity resources Use of chemicals Lack of proper channel of distribution system High transportation cost 	Sarpanch

Source- IDI of Stakeholders, Satna.

6. Models/interventions and Proposed SHFC:

In this process of activity SHFC models were developed according to the availability of resources and weather condition suitability of the crop with the preference of major crop cultivation of the area as per the data and the discussions of the farmers. In this the models are prepared on the basis of the food crops as the objective of project is to focus on the food security of the small holder farmers of the targeted area. The aim of the SHFC is to support the small and poor farmers of targeted group by providing the needed information through agriculture research to adopt better techniques of agriculture to increase their production and to assure the food security of the farmers and their families.

The models developed in 10 villages of Unchehara Block of Satna District are as Follows:-

- · Wheat
- Paddy
- Vegetable

ANNEXURES

1.Targeted District and Block













Strengthening Adaptive Farming in Bangladesh, India and Nepal (SAF-BIN) is an action research programme under the European Union Global programme on Agriculture Research for Development (ARD). It is a multi-dimensional research that address the agricultural development challenges of developing and emerging countries. It is an initiative to promote local food and nutritional security through adaptive small scale farming in four rainfed Agro Ecosystems (AES) in South Asia. The programme is implemented by the Caritas Organisations in Bangladesh, India & Nepal in partnership with University of Natural Resources and Applied Life Sciences (BOKU), Austria and in association with Action for Food Production (AFPRO), India; Sam Higginbotom Institute of Agriculture, Technology & Sciences (SHIATS), India; Bangladesh Rice Research Institute (BRRI), Bangladesh and Local Initiatives for Biodiversity, Research and Development (LI-BIRD) to address the Food Security and Climate Change Challenges of the Smallholder Farmers living in rainfed areas in South Asia.



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