

Integrated Watershed Management Programme

GOA State Perspective and Strategic Plan (GSPSP)



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Chapter I

1. INTRODUCTION

1.1 Introduction

The State of Goa, located between 14° 53' 57"– 15° 47' 59" N Latitudes and 73° 40' 54" – 74° 53' 11" E longitudes covers an area of 3702 sq. Km. and accounts for about one percent of the total geographical area of the country. Its length from the extreme south to north measures 105 kms. And the width from east to west measures 60 kms. The boundaries of this state are well defined in the north by Terecol River which separates the state from Maharashtra State, in the east and south by Karnataka State and in west by the Arabian Sea. Goa was elevated to the status of 25th State in Indian Union on 30th May 1987.

The name of the territory "Goa " seems to have been derived from *Gomanta*, which is referred to in the Bhishmparva of the great epic Mahabharat and also the Harivamsa and Skandpuran. It is referred to in old inscription variously as Gomanchala, Gomanta, Gopakpura and Gove. It is connected with the Sanskrit "Go"(cow) in the sense of "Cowherds "region. According to Pauranic tradition, Parashuram, the 6th incarnation of God Vishnu, is said to have reclaimed the land of Gomant from the sea and the people were settled by him on the banks of the rivers Gomati and Aghanasini, which are now popularly known as Mandovi and Zuari respectively.

History of Goa has been traced back to the Satvahana Empire, the Rashtraculas, Chalukyas, Shilharas and Kadambas followed. Goa passed into hands of Vijaynagar Empire for about a century and later was taken over by the Bahamani Kings and Adilshah of Bijapur. Portuguese invaded Goa in 1510 and ruled till 1961. Goa got freedom on 19th Dec. 1961.

1.2 An overview of the state

The State of Goa has a hilly terrain especially on its eastern side, where lies the southern end of the Sahyadri ranges. These mountains, after skirting a considerable portion of the northeastern and southeastern boundaries, branch off westward across the state with many spurs and ridges. The terrain is interspersed by a number of rivers flowing westwards, which provide a network of internal waterways. The important rivers worth mention are Mandovi, Zuari, Terecol, Chapora, Sal, Betul and Kushavati. The rivers are navigable for a total length of 256 Kms. The coast is full of creeks and estuaries formed by these rivers which provide a good shelter for fishing crafts. The 105 Kms. long coastal line of Goa is endowed with some of the loveliest beaches in the world which have earned the fame of bearing idyllic beauty spots.

Goa receives rain from the South – West monsoons. The annual rainfall of the state ranges between 2600 to 4000 mm. Rainy season is spread over four months from June to September. Occasional thunder showers are experienced in May and October. Goa experiences warm and humid tropical climate. The summer temperature ranges from 24°C to 36°C. In winter, the mercury hovers between 21°C to 30°C. Due to Global Warming effect, the picture seems to be slightly changing.

The land elevation ranges from sea level to 1022 meters. The highest point is the Wagheri hills in Sattari taluka. The natural vegetation of Goa consists of dense forest and dry deciduous to moist deciduous type. Moderately sloping lands with laterite outcrop are covered by grass and shrubs. The habitat of the flora is of semi- evergreen type. Evergreen forests are seen only on high hills. The vegetation consists of trees, shrubs, herbs climbers, sedges and grasses. The coastal tracts are abundantly covered by palms. The border line of Arabian Sea is partly covered by mangroves.

The state consists of 2 administrative districts – North Goa and South Goa and is further divided into 12 talukas viz. Pernem, Bardez, Bicholim, Sattari, Tiswadi, Ponda, Marmugoa, Salcete, Sanguê, Dharbandoda, Quepem and Canacon. North Goa district has its headquarters at Panaji and South Goa at Margaon. In all there are 359 revenue villages and 190 Village Panchayats, 13 Municipalities and 1 Corporation in the State.

Table 1.1: State Profile

1	2	3	4	5	6	7									
						Population (As per the 2011 Census)									% of BP L to total population
						Male			Female			Total			
SC	ST	Others	SC	ST	Others	SC	ST	Others							
1	North Goa	5	213	121	173600	8712	27824	380141	8894	28782	363655	17606	56606	743796	5.09
2	South Goa	7	146	69	196600	3915	45124	273424	3928	47545	266601	7843	92669	540025	
Total	2	12	359	190	370200	12627	72948	653565	12822	76327	630256	25449	149275	1283821	

(Source: Goa Govt. portal & Economic survey 2013-14)

The state of Goa supports a human population of 14,58,545 (Census 2011) persons. The decadal growth rate of the population of the state for the decade 2001-2011 was 8.23%. As much as 5.09% of the population of the state lives under poverty line. The literacy rate of the state is 88.7% which is 4th highest in the country. The population of the state primarily depends on service sector and agriculture for livelihood. Out of total reported area according to the village papers for land utilization (361113 ha.), 131587 ha.

is under cultivation. According to 2005-06 agriculture census of the state, the net irrigated area was 14070 ha. which was 24.2% of the net sown area in Goa. The same year cropping intensity was 100.64. The landholdings are small and the average land holding is around 1.15 ha.

Table 1.2: The district wise population details

District	Male	Female	Total	Rural	Urban
North Goa	416677	410331	818008	324927	493081
South Goa	322463	318074	640537	226804	413733

[Source : Census of India 2011]

Goa has 104Kms. of coastal length, 250Kms. of inland waterways and about 100 ha. area covered under inland water tanks provide huge opportunities for fishing activity. Annual fish landing is about 95000 MT. The export of marine fish products earn good amount of foreign exchange.

Agriculture is one of the major economic activities of the rural people of the State. Agricultural sector plays a vital role in the distribution of regional income. A study of principal characteristics of this sector such as land utilization, cropping pattern, extent of inputs and other related factors become very important from the point of view of proper planning at the micro level so that the share in the State income of particularly the small and the marginal farmers improves. Major problem being faced today is the exodus of rural population to urban areas for employment especially for white collar jobs. In the year 1960-61, 64 per cent of the work force engaged in agriculture and allied activities, which has declined to 16.6 per cent in 2001. While decadal censuses indicates continuous decline of work force in agriculture sector, the agriculture production in the State is showing an increasing trend. However, its contribution to GSDP has declined sharply and is now at only 7 per cent. Declining interest towards agriculture may be attributable to structural shifts in all economies.

The soils of the State are largely acidic in nature having laterite in plains / midlands and in hilly areas while sandy to sandy loam in coastal areas. Brackish water salt pans also exist in the low laying areas of the coastal regions. About 30 percent of the area of the Goa has shallow soils, 5 percent has moderately deep soils, 46 percent has deep soil and about 7 percent has shallow to very shallow soils. Soil erosion is a surface feature which signifies loss of soil from a particular area. Goa has about 48 percent of the area severally eroded, 34 percent in moderately eroded and 14 percent is affected by slight erosion. The main cause of the erosion is mainly due to mining of minerals. The surface layer of the soil upto depth of 25 cm. is normally used by the crop plant. About 38 percent

has silty clay and gravelly silty clay surfaces soil texture, 26 percent has gravelly clay land clay texture, and 20 percent sandy loam and loamy sand, 6 percent gravelly sandy clay loam and gravelly clay loam, a 5 percent loam and sandy clay loam surface soil texture.

The total geographical area of the state is 3, 61,113 ha. The cultivable agricultural and plantation area has reduced from 3,26,671 ha during 1989-90 to 3,23,976 ha in 2009 - 10. The area has sown more than once fluctuate between 3 to 6 percent. Conversely there has been a decrease in the area of cultivable waste land from 21 to 16 percent. This indicates that there is an awareness to use the irrigation potential for double crop and greening the State. Large area in Sanguem, Sattari, Canacon and Quepem talukas are under woodland forests and cultivable waste lands.

Animal Husbandry sector plays an important role in the State economy. The State supports around 2.0 lakh livestock population out of which about 72 thousand are cattle, 38 thousand are buffaloes, 59 thousand are sheep and 11 thousand are goats as per 2010-11 Economic Survey. There is an enormous demand in the State for milk, eggs and meat and also their products. Beside the floating population and present population, milk required is about 4 Lakh Liters Per Day (LLPD). In comparison to this state is producing 1.40 LLPD milk, thus having deficit of 2.80 LLPD. This deficit predicts huge demand of milk production and milk marketing in the state. Grazing area for cattle is largely encroached by mining, industrial and housing activities. This has largely hampered the availability of green fodder and there by decreased the production.

The State of Goa has more than 33 % of its geographic area under forest (1254.73 sq.km.) of which 1054.73 sq.kms is Government forests and the remaining 200 sq.kms is private forests. Out of the total area under forests, about 62 % has been brought under Protected Area (PA) of Wildlife Sanctuaries and National park. There is a substantial area under private forest and a large tract of plantation under cashew, mango, coconut etc. The total forest and tree cover constitute 56.6 % of the geographic area.

To reverse this order of deterioration of natural resources and support livelihood activities for the inhabitants' watershed management has been taken up as the functional and planning tool for conservation of natural resources and sustainable development by the Government of India through its Common Guidelines for Watershed Development Projects 2008. The State of Goa, through its State Level Nodal Agency for the same will be formulating State Level Perspective Plan (SLPP) for Integrated Watershed Management Project (IWMP) in Goa for 15 years period (i.e. 2015-30).

1.3 Drainage System

Rivers, rivulets and brooks bathe the Goan soil before discharging into the sea, the important rivers are Mandovi, Zuari, Terecol, Chapora (Colvale), Sal, Talpona, Galgibag

and their tributaries like Kushavati, Nanore, Nanus, Valvonti, Mapusa etc. However, of the many rivers and streams that drain the land of the state and its two districts, the Terecol, Mandovi, (North Goa) and Sal, Talpona and Galgibag (South Goa) are the most important because of the extent of their drainage area and the human attractions they held.

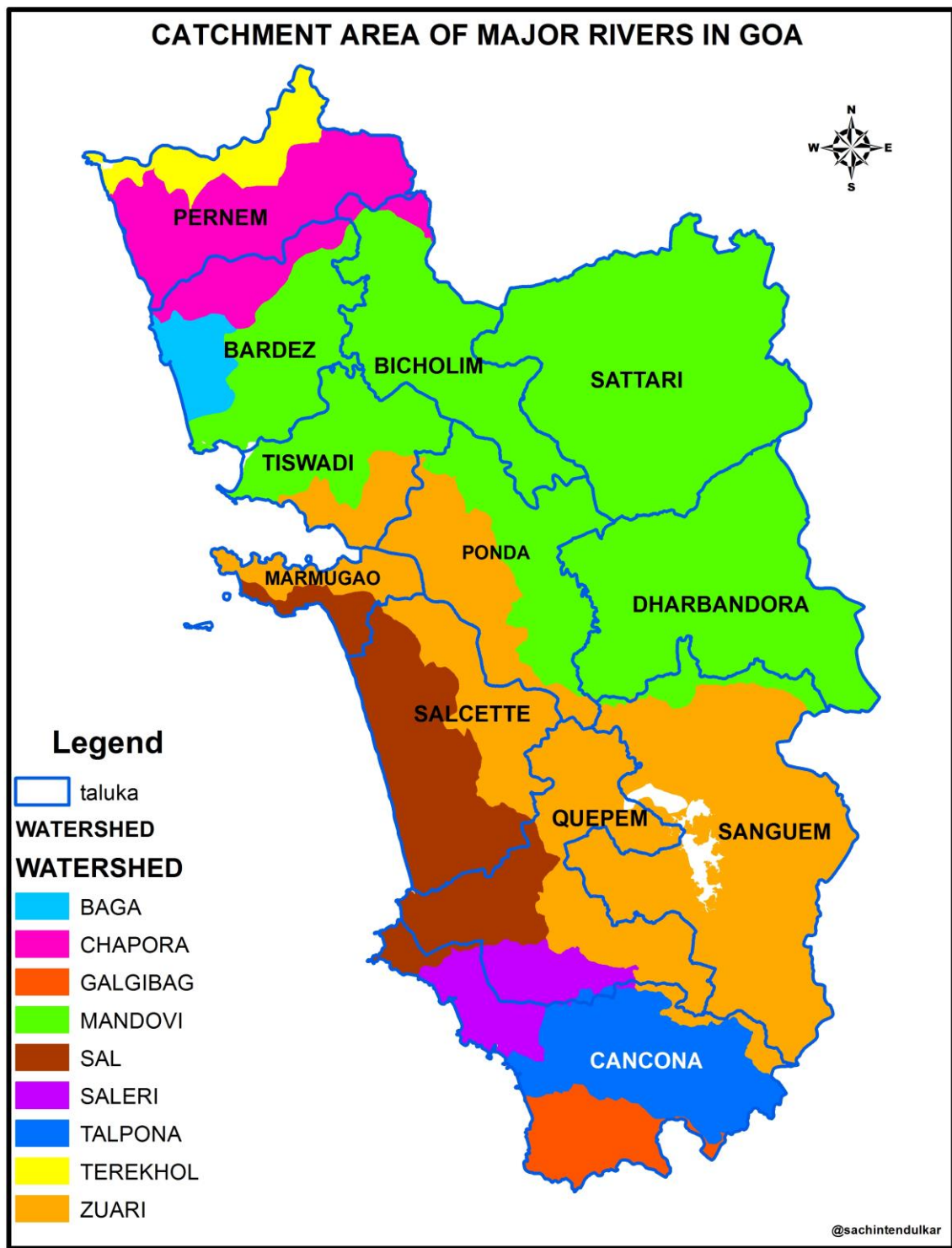
The river Terecol flows to the north of Pernem Taluka, where as Chapora (Colvale) river bathes the southern part of Pernem and Northern part of Bardez and Bicholim talukas of North Goa District. Both these rivers, which run almost parallel way, have their sources at Banda and Maneri towns respectively of Sawantwadi taluka of Sindhudurga District of Maharashtra. The river Sal has its sources at Verne in Salcete and meets the Arabian Sea at Betul after passing through Salcete and Quepem talukas of South Goa District. These three rivers have length of approximately 20 km each. But the two most important rivers, which have largely influenced the economic growth of Goa, are Mandovi also known as Gomati and Zuari also known as Aaghanashani.

The river Mandovi, which has its rise at Bhimgad in the main Sahyadri range of Karnataka State, flows through Sattari taluka (North Goa) and reaches Ganje as Mahadei River. At this point the water becomes saline. A few small tributaries of Mahadei River confluence at Narvem in Bicholim taluka (North Goa District) which is popularly considered to be holy place where Hindu devotees flock on Janmashtami day for holy Dip. This river during its course passes through Cumbharjua, Jua, Divar, Chorao etc. all in North Goa District before it meets, the Arabian Sea at Cabo- Aguada. Old Goa, the ancient capital of Goa, and Panaji the present capital of Goa state are located at the left bank of river Mandovi. With river Ragora and Kushavati as main left bank tributaries and the Nanore, Nanus, Valvonti and Mhapasa as the main right bank tributaries, the river Mandovi has the largest drainage basin in Goa. In Goa, the river has a length of about 77 km a wide meandering course through the irregular and increasingly plateau like forms. The river course is dotted with islands in the stream e.g. Divar and Chorao (North Goa District).

River Zuari is the southern counterpart of Mandovi. It rises at Hemad – Barshe and runs through Sangué, Salcete, Quepem, Mormugoa, (South Goa District), Ponda and Tiswadi taluka of (North Goa District). The longer stream draining the hilly area of southwest Sangué must be considered as the main stream. The river has a length of 34km. Kushavati is the main tributary of river Zuari.

The Cumberjua canal which joins the river Mandovi and Zuari has helped Goa to maintain its iron ore export operation during the monsoon when the Agwad bar is not Navigable. Both these major rivers have influenced the competitive characteristics of Goa's ore by reducing to a sizable extent the distance between mining pitheads and Mormugoa harbour. Goa's river network has an estimated total extension of 250 km. and presently barges make use of these water ways to carry ore from the different loading points to Mormugoa harbour.

Map: 1 Catchment Area of Major Rivers in Goa



1.4 River Basins

The State has nine rivers, of which six rivers originate and flow exclusively within the State boundaries and do not have any interstate implications. However, Terecol and Chapora rivers originate in Maharashtra while Mandovi river originates in Karnataka State. All the rivers except Sal in the South originates on the western slopes and

subsequently meanders over falls and rapids into the coastal plains (during young/initial stage), from where they tend to become sluggish (during mature stage) and then ultimately joins estuary mouth and then into the sea (old stage). Most of these rivers are subject to tidal variations and salinity upto a distance of 20-40 kms upstream from their respective mouth regions as such these have been referred to as estuaries. Most of these rivers are excellent navigational channels and are used mostly for transporting ores through barges from ore loading jetties to Mormugoa harbour for onwards export.

Out of nine rivers in the State, rough estimation reveals that basin-wise average runoff is to the tune of about 8436 million cubic meters (MCM). This entire water resource should not be mistaken as available for harnessing. As assessed by Central Water Commission (CWC), the water resource of Goa is 8570 MCM. Many of these rivers are tidal prone upto a distance of 20-40 kms, and utilizable part of the yield should necessarily be identified basin wise.

Table 1.3: Details of river basins in Goa

S. No.	Name of the River Basin	Length within the State (km)	Length within the salinity Zone (km)	Basin area (sq.kms.)	Average runoff (MCM)
1	Terekhol	26	26	71	164.25
2	Chapora	32	32	255	588.35
3	Baga	10	10	50	116.42
4	Mandovi	52	36	1580	3580.04
5	Zuari	145	42	973	2247.4
6	Sal	40	14	301	694.39
7	Saleri	11	5	149	343.04
8	Talpona	32	7	233	515.59
9	Galgibag	14	4	90	187.11
	TOTAL	362	176	3702	8436.59

Source: Master Plan for Madei / Mandovi River Basin A Report by The Panel of Experts, Vol. I, Vol. II

1.5 Economic Development

The growth rate of Gross State Domestic Product (GSDP) at constant (2004-05) prices, over its previous year, show that the economy of the State grew at 8.47 percent in 2012-13 (quick estimates). This was inspite of the fact that mining sector in the state which in the past had a growth rate of around 25 percent in 2009-10, had registered a negative growth rate of (-)68.33 percent in 2012-13.

As per the quick estimates for 2012-13 (Q), the contribution of Agriculture and Allied services to Gross State Domestic product at current prices has gone up from 5.57 percent in 2010-11 to 6.78 percent in 2012-13. Agricultural sector plays a vital role in the distribution of regional income. A study of principal characteristics of this sector such as

land utilisation, cropping pattern, extent of inputs and other related factors become very important from the point of view of proper planning at the micro level so that the share in the State income of particularly the small and the marginal farmers improves.

The Net State Domestic Product (NSDP) at constant (2004-05) prices for the year 2012-13 (Quick estimates) is estimated at Rs. 26952 crore as against Rs. 24537 crore for 2011-12 (provisional estimates) reflecting a growth of 9.84 percent. Sector wise growth of NSDP for 2012-13 shows that Primary sector registered a growth of (-) 48.86 percent, while Secondary and Tertiary sectors grew by 3.90 percent and 18.26 percent respectively.

Goa leads the country with per capita income of Rs. 1,92,652/- (2011-12) and all India per capita net national income during same period is Rs. 60972/-.

Table 1.4: Net State Domestic Product at Factor Cost by Industry of Origin from 2005-06 to 2012-13(Q) at Constant Prices (2004-05 Prices)

(Rs. in lakh)

Sl. No	Industry	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12 (P)	2012-13 (Q)
1	Agriculture, Forestry & Fishing	105370	85544	87671	87671	83357	84289	78117	65243
1.1	Agriculture	69966	51897	56582	52983	53193	53082	47757	38353
1.2	Forestry & Logging	7733	7671	7871	8760	8373	8675	8972	11364
1.3	Fishing	27671	25975	23218	23218	21791	22532	21388	15527
2	Mining & Quarrying	48185	67828	54278	39504	47173	30601	67997	9477
Sub Total - Primary		153555	153372	141949	123287	130530	114890	146114	74721
3	Manufacturing	338197	378847	391605	409095	440807	491829	494421	494774
4	Electricity, Gas & Water Supply	15478	19240	18073	20332	25992	29789	21618	30140
5	Construction	130419	142635	151012	159228	170091	219736	239637	260249
Sub Total - Secondary		484094	540722	560689	588655	636890	741353	755675	785164
6	Trade, Hotels & Restaurant	164169	173033	148539	135890	149049	161781	190696	215923
7	Transport, Storage & Communication	160201	181236	218451	291947	319587	477695	811071	880016
8	Financing, Insurance, Real Estate & Business	146127	169346	195863	220420	245676	268056	310433	360298

	Services								
9	Community, Social & Personal Services	83499	90807	100003	112565	130135	165477	239734	379068
Sub Total – Tertiary		553995	614421	662857	760822	844446	107300	155193	183530
							9	4	6
Total Net State Domestic Product (NSDP)		119164	130851	136549	147276	161186	192925	245372	269519
		4	5	4	5	7	1	3	1

Note: 'P' for Provisional estimates & 'Q' for Quick estimates

(Source: Economic Survey 2013-14)

Finance Institutions

The State can boast of a well knit banking network, with as many as 674 banking offices as on 31st March 2013. There is one bank branch for approximately every 2,200 persons. As on March 2013, Goa tops the list amongst States and Union Territories in the country with regard to population covered per bank branch. 58% of the total bank branches are in North Goa District. South Goa District accounts for only 42% of the total bank branches.

The bank deposits as on 30th June 2013 stood at Rs. 44203 crore, which registered a growth rate of 11.45 percent as compared to the deposit level in March 2013. The level of advances in the State as on 30th June 2013 was Rs. 13019 crore, registering a growth rate of 4.24 percent as compared to the level of advances in March 2013.

1.6 Role Of Watershed Management

Watershed development approach in India with government support started in mid 50s, but group efforts existed even in early twenties. The first government scheme namely 'Soil Conservation Works in the Catchments of River Valley Projects (RVP)' was launched in 1962-63 to control the siltation of multi-purpose reservoirs. The second Mega-Project 'Drought Prone Area Development Programme (DPAP)' started in 1972-73 for drought-proofing the vulnerable areas and mitigating the impact of drought. Later in 1976-77, 'Desert Development Programme (DDP)' was also added for development of desert areas. The DAC of MoA launched a scheme of propagation of water harvesting/conservation technology in rainfed areas in 19 identified locations in 1982-83. In October 1984, MoRD adopted this approach in 22 other locations in rainfed areas. In these 41 model watersheds ICAR/SAUs were also involved to provide research and technology support. The scheme of National Watershed Development Project for Rainfed Areas (NWDPA) was launched in 1990-91 in 25 States and 2 UTs based on twin concepts of Integrated Watershed management and sustainable farming system. During IX Plan, the scheme was extended to three newly formed States. The scheme of NWDPA has been subsumed with "Scheme for Macro Management of Agriculture Supplementation/Complementation of the state efforts through Work Plans in 2000-01. At present, the scheme is being implemented as a programme in Centrally Sponsored Scheme of Macro Management of Agriculture in 28 States and UTs. During the VIII Plan Ministry of Rural Development (MoRD) launched a new initiative in 1994-95 incorporating the essential elements of WARASA guidelines and providing for NGO participation as

implementing agents. Number of projects assisted by bilateral donors and international funding agencies like World Bank were also launched in the 80s. Besides, a number of NGOs are also working for Integrated Watershed Development Projects in different parts of the country.

In Goa, Watershed Development programmes have been so far implemented by Directorate of Agriculture and District Rural Development Agency (DRDA) with the help of NGOs and Govt. & semi-Govt. agencies. The programmes have been implemented under NWDPRA and IWDP schemes.

The 25 year perspective plan for development of rainfed areas prepared by the planning commission in 1997 highlighted the resource base and development potential of rainfed areas in different agro-climatic zones and the major constraints in development of rainfed areas and suggested a perspective plan for the treatment of degraded and rainfed areas in the country over 25 years. Hence, a 25 years' perspective plan was prepared to treat and improve the problem areas of the country. The basic approach recommended in this plan was to accelerate the pace of progress by involving the beneficiaries (land owners and users) as Government alone cannot finance the entire requirement for treatment of the total area. Promotion of low-cost technologies and progressive increase in the overall government allocation in the next twenty-five years were necessary. Besides, increase in the cost sharing by people and the beneficiary groups progressively becomes important, in addition to the government allocated funds, so that maximum possible area can be covered with peoples' contributions. The perspective plan also envisioned that alleviation of poverty should be the main objective of the Watershed Development Programme, as livelihood of the rural poor households is closely linked with the improvement of land productivity and reclamation of the village commons in rainfed areas.

Rationale for Preparation of a Perspective and Strategic Plan

The State Level Nodal Agency (SLNA) constituted by the State Government will sanction watershed projects for the State on the basis of approved state perspective and strategic plan as per procedure in vogue and oversee all watershed projects in the state within the parameters set out in the common Guidelines, 2008. The main function of SLNA is to prepare a perspective and strategic plan of watershed development for the state and indicate implementation strategy and expected outputs/outcomes, financial outlays and approach. The departmental nodal agency at the central level will allocate budgetary outlay for the projects among the states keeping in view the following criteria and past performance of the state (physical and financial) viz. unspent balance, outstanding utilization certificates, percentage of completed projects out of total projects etc. except in those schemes where States have the flexibility to allocate funds between watershed and other schemes.

- _ State level perspective and Strategic plans in watershed based development projects
- _ Percentage of rainfed area in the state to total cultivated area in the country
- _ Percentage of wastelands/degraded lands in the state to the total geographical area of the country

In the above context, the preparation of perspective plan for the state of Goa by Directorate Of Agriculture will enable the Goa State Level Nodal Agency to project the demand before the Central level nodal agency for sanction of projects to the state. The perspective plan provides strategic road map for implementation of watershed projects in the state. This also provides a strategic direction for development and management of rainfed area in the state and scope for improvements of livelihoods of the watershed community.

Structure of the Perspective Plan

The report contains 11 chapters .Chapter 2 deals with climate and status of natural resources. Chapter 3 deals with Demography, Land distribution & Land use pattern and Chapter 4 deals with trends in agriculture and food productivity. Chapter 5 deals with implementation of watershed programme in the state and Chapter 6 deals with strategy for implementation of IWMP. Chapter 7 deals with livelihood promotion and Chapter 8 covers institutional arrangements. Capacity building plan, monitoring and evaluation and expected outcomes are covered in Chapter 9, 10 and 11 respectively.

Chapter II

AGRO-CLIMATIC ZONE & NATURAL RESOURCES

2.1 AGRO-CLIMATIC ZONE

The climate of Goa can, in general terms, be summed up in one word: coastal. Goa is a part of the coastal country known as the Konkan, which is an escarpment rising up to the Western Ghats range of mountains, which separate it from the Deccan Plateau. Being in the tropical zone and near the Arabian Sea, the climate of Goa is warm and humid for most of the year. The month of May is the hottest, with day- time temperatures touching 35⁰C (95⁰F). To top it, the heat is coupled with high humidity. The South West Monsoon arrives around early June and provides a much needed respite from the heat. Then Goa receives the full blast of the Indian monsoon with sudden downpours and tropical thunderstorms. It is during the monsoon that Goa is at its most beautiful - with greenery sprouting all around. Most of Goa's annual rainfall is received through the monsoons which last till late September. Goa Weather has a short cool season too which lasts between mid-December and February. These months are marked by cool nights with temperatures of about 20⁰C (68⁰F) and warm days of about 29⁰C (84⁰F). Humidity remains in moderate amounts. The average relative humidity is 75.9%.

The monsoons are the main feature of the climate of Goa. The average rainfall is approximately 325cms, the average daily hours of sunshine is nine to ten hours in summer and three to five hours during the monsoon. During the two months preceding the onset of the monsoon the humidity increases dramatically, and the normally clear skies become hazy and then cloudy. During the monsoon, 260cm to 400cm of rain is recorded in the state, although in the Western Ghats the downpour is considerably high than on the coast. Once the monsoon has run its course the skies clear and the weather becomes pleasant.

Table 2.1: Details of Agro-climatic zone

1	2	3	4	5		6	7	
S. No	Name of the Agro-climatic zone	Area in Ha.	Name s of the districts	Major soil types		Average rainfall in mm (preceding 5 years average)	Major crops	
				a)Type	b) Area covered %		a) Name	b) Area in Ha.

1	West Coast Plains & Ghats Region	370200	North Goa & South Goa	Lateritic (Sandy loam to silt loam) Sandy to sandy loam Alluvial	81 11 8	3634.2 3604.9	Paddy Pulses Groundnut Cashew Coconut Mango Vegetables Spices	47237 9949 3194 55737 25730 4760 6498 894
			2		100			163991

(Source: Directorate Of Agriculture)

Rainfall

Goa receives rain from the South - West monsoons. The average rainfall ranges from 2600 to 4000mm. Rainy season is spread over four months from June To September. Occasional thunder showers are experienced in May and October. Maximum precipitation is recorded in the areas located in the ghat

Table 2.2: District wise monthly rainfall

(Rainfall in mm)

Sr. No.	Distri ct	Year/ Month	Jan	Feb	Mar ch	Ap ril	M ay	June	July	Aug ust	Sep t	Oct	Nov	De c	Tota l rainfall
1	North Goa	2009	0.0	0.0	0.0	0.5	4.0	649.2	138.1.8	347.5	436.1	354.7	155.2	0.0	3329.0
		2010	10.4	0.0	0.0	7.7	60.2	828.3	129.1.1	811.9	497.9	312.3	185.9	12.6	4018.3
		2011	0.0	0.0	0.0	13.6	5.4	108.4.1	111.9.5	889.7	524.6	88.6	13.4	0.0	3738.9
		2012	0.0	0.0	0.0	0.1	0.6	110.1.0	901.5	821.8	333.0	118.3.0	5.0	0.0	3281.3
		2013	0.0	15.7	0.0	0.0	70.5	896.0	173.5.8	553.3	335.1	189.4	7.9	0.0	3803.7
2	South Goa	2009	--	--	--	--	--	--	--	--	--	--	--	--	--
		2010	--	--	0.0	7.2	54.1	764.2	140.1.5	818.3	532.3	311.6	200.5	14.1	4103.8
		2011	0.0	0.0	0.0	35.0	3.2	110.7.3	134.2.2	836.4	456.9	65.6	47.2	0.0	3893.8
		2012	0.0	0.0	0.0	8.7	0.0	100.7.1	705.4	758.2	233.6	105.5	25.2	0.0	2922.0
		2013	0.0	10.0	0.0	0.9	86.3	838.0	146.1.3	492.3	425.8	178.9	6.6	0.0	3500.1

(Source: Indian Meteorological Department)

Droughts and Floods

Heavy rains flood the lower reaches at many places making losses to the paddy fields. During last 10 years, there are no regular incidences of floods. The floods were

registered during 2005 at Panaji and Bicholim. Other than properties, agricultural losses were also seen. During 2007, the floods were again noted in Bicholim. On 2nd Oct. 2009, heavy rains poured in just some hours in Canacona taluka affecting 6 villages. There were huge losses registered as far as houses, infrastructure facilities and agriculture are concerned. Recently, Cuncolim municipal area and surrounded fields were flooded during July 2013.

There are no incidences of drought in the state. The incidences of water shortage are seen at many places. Such situations are handled by way of arranging water for domestic uses by supplying water tankers.

2.2 PHYSIOGRAPHY

The state of Goa being a part of the West Coast region of India has many physical features that are common to both the Districts of North Goa and South Goa. Broadly, there are three main physical divisions of Goa (i) Mountainous region of the Sahyadris in the east, (ii) the middle level plateau in the centre and (iii) the low lying basins and the coastal plains.

Table 2.4: Area as per Landscapes

<u>Sr. No.</u>	<u>Landscapes</u>	<u>Area Ha.)</u>
1.	Hills & hillocks	120002
2.	Lateritic mounds / plateaus	145192
3.	Foot slopes	10315
4.	Pediments & PIC	23698
5.	Pedi plains	17090
6.	Alluvials & valleys	16610
7.	Coastal plains	4614
8.	Beach ridges	6216
9.	Mud flats / Mangrove swamps	6579
10.	Misc.	19884
	Total	370200

The Mountainous region of the Sahyadris

The portion of Sahyadris lying in Goa covering both the districts has an area of about 600 square kilometer and an average elevation of 800 meters. Its Crestline extend almost as an arc and is about 125km long. Most of the mountain peaks are known by traditional name. The water divided act as a source region for most of the Goan rivers. Upgraded streams, many of which in the steep fall have waterfalls, furrow the scarp face. The Dudhsagar waterfall is the most well known of such cascades. Of the isolated peaks with which the ranges of mountains are studded, the most conspicuous are Sonsogad 1, 186 meters, Katlanchi Mauli 1,054 meters in Sattari taluka, Siddhanath at Phonda taluka

440 meters all located in the North Goa District, and Chandranath at Paroda 370 meters in South Goa District.

The Plateau

The central portion of the Goa consist by and large of plateau at varying levels, not exceeding about 100 meters and not less than 30 meters. On the coastlines, the plateau have typical landforms that are quite characteristics of the Goan scenery. On the coastlines, the laterites plateau end in headlands. The Aguad and Cabo in North Goa district and Mormugoa heights in South Goa district are leading examples which have their counterparts both along the coastlines to the North and South. While, the plateau level are flat, bare and rolling in topography, the scarp faces and the hollows of gullies fullest support good vegetation cover of strands of typical monsoon forest; the gullies , in particular verdant region with many springs feeding the rivers down below. The laterites plateau with clumps of grass and thinly spread cashew shrubs, skirted by greenery of coconut palms and natural growth, deeply entrenched notched of low ground of betel (areca garden) and coconut gardens, and the plateau base sharply merging into the alluvial flats below, form a recurrent theme in the landscape of most of central and coastal Goa.

The River Basins and the Coastal Plains

These are the in filled stretches of the rivers, which have deposited the eroded material from the Sahyadrian elevation along their banks, on losing their gradient when they emerge form the high lands to meet the sea. The major riverine plains in Goa are those of the Mandovi and Zuari which together, constitute a major alluvial embayment in the otherwise narrow and uneven aspects of the whole konkan coast land. Those of Chapora in the North and of Kushavati and Sal in the South are lesser basins. Along the coastline these basins develop alluvial flats behind sand bars to develop rich agricultural tracts.

The coastlines of Goa are an alteration of bays and headlands significantly broken by the large estuaries of the river Mandovi and Zuari and interspersed with minor estuaries. Of the bays, the Baga, Calangute in North Goa District and Colva in South Goa are extensive curved stretches with which their near white sands and palm fringes form one of the main tourist attractions of Goa. The headlands on the other hands have played a significant role in Goa's history as sites of forts and landmark for marine and coastal navigation. The Aguada on the northern bank of the Mondovi, with its adjacent Reis-Magos and Chapora Fort at the mouth of the Chapora river in North Goa District were important as strongholds in the Portuguese colonization, so was the Cabo on the Southern bank of the Mondovi in the same district, still serve well as the official residence of the Governor of Goa. The crumbling fortifications on the Mormugoa plateau

overlooking the harbor are a reminder of the historic importance of the headland. The Cabo Rama in the South Goa District is another headland.

The island of Goa are of two types (i) the rocky island like those of Mormugoa coast and the Piedade Island right in the estuary of the Mondavi; and the Anjadiva, which are the protrusions of a drowned topography separated from the mainland of faulting. The other types are the alluvial islands like those of Cumbarjua group created by the heavy deposition of alluvial islands are not so obvious in the landscapes as roads and bridges now connect them.

Lakes and Canals

Lakes Constitute a scenic feature in Goa, though most of them have a limited and local use for irrigation. Most of them owe their origin to bunds across stream valleys, large and small and along plateau margins and in alluvial flats. The lakes that are found to be immediately behind the coast and are mainly due to the diversion of the estuarine stream by sand bar and fill in alluvium on the flats behind the sand bars. Here the lakes appear as detached remnant of marsh and flats; such are the several lakes of the river Sal basins; south of Margao (South Goa). Similar shallow stretches occur in the alluvial flats of the Tiswadi (North Goa), so indeterminate is the expanse of fresh water in such lakes that the transition to rice lands and salt flats is hardly noticeable. The lakes of the interior are mostly impounded creations in the small streams and serve as a valuable irrigation course to rice lands and betel nut garden. The more important of the lakes of Goa are Maye, Chimbél, Karamali, Calapor (North Goa District), Banauli, Cacoda, Curtorim (South Goa District).

Goa has presently three canals viz: Thivi (North Goa District), Paroda and Salauli canals (south Goa District). However, they are not navigable. The first two are essentially used for irrigation purpose, whereas the third is a part of a composite project giving water for irrigation as well as potable purpose.

2.2 GROUNDWATER RESOURCES

The Central Ground Water Board (CGWB), Ministry of Water Resources has prepared "Master Plan for Development of Ground Water in Goa State" in March 1997. In this report, taking into account only the annual safe dynamic recharge, it has been stated that the ground water potential that can be exploited in the State is 150 million cubic meter (Mm³). The present use is 9Mm³. Therefore the balance left for safe exploitation is about 141 Mm³ in the state.

Table 2.5: Groundwater Resource Potential

Dynamic Ground Water Resources	Potential
Annual Replenishable Ground water Resource	0.28 BCM
Net Annual Ground Water Availability	0.27 BCM
Annual Ground Water Draft	0.07 BCM
Stage of Ground Water Development	27%

(Source: Central Ground Water Board)

During post-monsoon periods, river flow starts dwindling and very few rivers remain perennial throughout its entire length. This obviates the developmental water resources scenario thereby forcing the developmental authorities to focus on water storage measures for its optimal surface water utilization. The nature has bestowed abundant opportunity for groundwater recharge in the State by way of copious rainfall during the monsoonal period. As the overburden mantle is made up of laterites & lateritic soils along the foothills and plateau tops, the recharge is relatively faster. However, on the other hand, it enables effluent seepage through nallahs, creeks to lower the water table at a faster rate. The macro-level surveys indicate groundwater draft of about 525 MCM. Taking the water supply for domestic water requirements to be accorded top prioritization, as per the regulatory measures of about 15%, the rest is available for irrigation and other allied uses which work out to about 450 MCM.

2.4 SOILS

The soils of Goa are mostly lateritic (81%). They are sandy loam to silt-loam texture, well drained and highly acidic (5.5 to 6.5 pH). These soils have moderate organic carbon and are poor in potash. About 11% of the soils located along the seacoast and estuaries are sandy-to-sandy loam. They include the Ker lands and beach fronts. The remaining 8% of the soils are alluvial in nature. The Khazans and adjoining areas have alluvial soil with high water tables and are subject to inundation by saline water.

In the upper reaches of the topography, the soils are coarse and gradually become dense towards the valley regions. The percolation is better upto pediplain areas from hills and gradually decrease in the valley regions. Particularly in the lower areas, i.e. the soil along the river banks and major streams, heavy textured soils are encountered. In some cases, sub soils are affected by sodicity. The surface layer of the soil upto depth of 25 cm. is normally used by the crop plant. About 38 percent has silty clay and gravelly silty clay surfaces soil texture, 26 percent has gravelly clay land clay texture, and 20 percent sandy loam and loamy sand, 6 percent gravelly sandy clay loam and gravelly clay loam, a 5 percent loam and sandy clay loam surface soil texture.

The National Bureau of Soil Survey and Land Use Planning [NBSS & LUP], Nagpur has brought out the publication on "*Soil Series of Goa*" in 2002. In all 32 soil series have

been identified in the state. The following table gives information about Soil series, their area, classification and use.

Table 2.6: Details of Soil Series

Sr. No.	Soil Series	Area *[ha.]	Classification	Present land use	Suggested land use
1	Arukot	17,629	Very fine, Kandic Paleustalfs.	Pasture with Cashew, Bamboo etc	Coconut with intercrops
2	Batim	6,857	Fine, Kanhaplic Haplustalfs	Wetland rice	Rice in Kharif and pulses/ vegetables in rabi
3	Bandoli	29,242	Clayey, Typic Haplustults	Pasture land	Coconut with intercrops / Cashew
4	Chapora	9,950	Fine – loamy, Typic Ustropepts	Coconut, Mango etc.	Coconut with intercrops / Cashew
5	Dabolim	6,289	Loamy, Lithic Ustorthents	Grazing land	Forest / Natural vegetation
6	Dande	793	Clayey, Kanhaplic Haplustalfs	Thin forest / Pasture land	Forest; may be interspersed with cashew
7	Darbandora	5,247	Very fine, Ustoxic Humitropepts	Forest interspersed with cashew	No change
8	Devabag	816	Clayey- Skeletal, Typic Ustropepts	Thin forest	Forest; may be interspersed with cashew
9	Gavane	22,583	Clayey- Skeletal, Typic Ustropepts	Coconut with intercrops	Forest interspersed with cashew
10	Gudi	1,061	Fine – loamy, Ustoxic Dystropepts	Thin forest	Forest interspersed with cashew
11	Harmal	1,334	Typic Ustipsamments	Coconut	Coconut / Casuarina plantations
12	Karmali	3,034	Clayey, Lithic Dystropepts	Cashew	Forest interspersed with cashew
13	Kalangute	10,495	Fine – loamy, Typic Trophaquepts	Wetland rice	Wetland rice
14	Karven	12,287	Clayey- skeletal, Oxic Ustropepts	Thin forest	Forest interspersed with cashew
15	Kolva	558	Fine loamy, Typic Sufaquent	Wetland with natural vegetation	Wetland with natural vegetation
16	Madgaon	22,860	Loamy- skeletal, Fluventic Ustropepts	Forest interspersed with cashew	Forest interspersed with cashew
17	Mandavi	616	Typic Ustipsamments	Barren land	Natural vegetation
18	Metavada	18,409	Clayey- skeletal, Lithic Dystropepts	Forest	Forest interspersed with cashew
19	Nagowa	13,592	Fine, Ustoxic Dystropepts	Coconut	Coconut with intercrops
20	Netravali	44,312	Clayey- skeletal, Ustoxic Dystropepts	Forest	Forest interspersed with cashew
21	Panaji	385	Typic Psammaquent	Rice / Salt pans	Wetland rice
22	Padi	3,572	Loamy- skeletal Ustoxic Dystropepts	Forest	Forest interspersed with cashew
23	Pali	4,198	Fine loamy, Ustic Dystropepts	Rice / Pasture	Coconut, arecanut, rice, sugarcane, vegetables etc.

24	Raya	3,080	Clayey- skeletal, Lithic Ustorthents	Grazing land	Forest
25	Saligao	2,570	Clayey- skeletal, Typic Kanhaplustults	Pasture land	Coconut with intercrops
26	Surla	1,076	Very fine, Typic Ustropepts	Cashew	Forest interspersed with cashew
27	Torse	52,005	Clayey- skeletal, Lithic Dystropepts	Thin forest / Grassland	Forest / Natural vegetation
28	Ugeum	5,451	Very fine, Fluventic Ustropepts	Rice	Wetland rice
29	Velge	13,325	Loamy – skeletal, Lithic Ustorthents	forest / Grassland	Forest
30	Verna	8,191	Clayey- skeletal, Lithic Dystropepts	Forest	Forest interspersed with cashew
31	Zaimolo	10,824	Clayey, Typic Paleustults	Coconut	Coconut with intercrops
32	Zuari	17,639	Very fine, Aquic Ustropepts	Rice	Wetland rice

*Excluding area covered by waterbodies and rock outcrops.

Soil Erosion

Areas covered by severe and very severe erosion is observed to be about 96375 ha. of the survey area where anti-erosion measures should be introduced on priority basis. Agronomical measures like introduction of vegetative hedges, taming of gullies have to be taken immediately in this area. Slight erosion is noticed in about 30195 ha. which is mostly under irrigated agriculture. These areas are well managed for taking paddy crop or sugarcane. The moderate erosion is noticed in 240206 ha. where soil conservation measures are to be adopted. Moderate to severe erosion is observed in 298729 ha. These areas are mostly fallow or grazing lands or under bushy vegetation. These areas can be improved by taking up of afforestation, plantation crops etc.

Slope wise about 13.4% of area records less than 3% slopes and 5.5% of the area records between 5 – 25% slopes. Most of the area, which is under rainfed agriculture, possesses 3 – 5% slope grade.

2.5 FOREST COVER

The natural vegetation of Goa consists of dense forest and dry deciduous to moist deciduous type. Moderately sloping lands with laterite outcrops are covered by grass and shrubs. The habitat of the flora is of semi- evergreen type. Evergreen vegetation is seen only on high hills. The natural vegetation consists of trees, shrubs, herbs climbers, sedges and grasses. The coastal tracts are namely covered by palms. The border line of Arabian Sea is partly covered by mangroves The State of Goa has more than 33 % of its geographic area under Government forest (1254.73 sq.km.) of which about 62 % has been brought under Protected Area (PA) of Wildlife Sanctuaries and National park. Scrub vegetation mixed with xerophytic plants are found in association with tropical fruit trees like jackfruit and cashew. Highly dense forests are present at an elevation of 600 – 900 mts and occur

in the eastern, northern & south western portions of Sanguem taluka ; northern, southern & eastern parts of Sattari taluka ; eastern and southern parts of Quepem taluka & northern and eastern parts of Canacon taluka. The common species found in these forests are Teak, Xylia timber species & Shisam. There is a substantial area under private forest and a large tract of plantation under cashew, mango, coconut etc. Varieties of grasses grow luxuriantly in the rainy season and wither off during late summers. Some areas in these forests are planted with Eucalyptus hybrids, teak, rubber and bamboo by forest department under afforestation programme. The total forest and tree cover constitute 34.75 % of the geographic area.

Table 2.7: Area under Forests (2005)

<u>Sr.No.</u>	<u>Taluka</u>	<u>Area in Sq.km.</u>
1	Tiswadi	1.78
2	Bardez	Nil
3	Pernem	13.43
4	Bicholim	8.08
5	Sattari	280.99
6	Ponda	50.12
7	Sanguem	569.25
8	Quepem	114.91
9	Canacona	185.82
10	Mormugoa	Nil
11	Salcete	Nil

Also, the animals like Bison, wild boar, foxes, monkeys, various reptiles are noted at many places in the state.

Chapter III

DEMOGRAPHY, LAND DISTRIBUTION & LAND USE PATTERN

3.1 DEMOGRAPHY

The population of Goa as per 2011 Census is 14,58,545 as against the country's total population of 1,210,569,573. The population of Goa constitutes around 0.12% of the country's population as against 0.13% during the 2001 Census. Hence, there is a slight decrease of 0.01% in Goa's share in the total population of the country as compared to the previous Census. As per the last population census held during 2001, the population of Goa was 13, 47,668 which has now increased to 14,58,545 recording an increase of 1,10,877 persons during the last decade, thereby registering a decadal growth of 8.23%. The rate of growth observed during the decade of 1991- 2001 (15.21%) was quite low as compared to the earlier two decades, when the growth rate was above 25%.

The density of population in the State is on the rise. It was 364 during 2001 census. The density of population as per 2011 Census is 394 persons per sq. km. which is higher than the national average of 382. Goa stands at 16th position at national level with regard to density of population. Amongst the districts, the density of population is more in North Goa (471) as compared to South Goa (326).

Sex Ratio

Goa has a total population of 14,58,545 persons of which 739140 (50.68%) are males and the remaining 719405 (49.32%) are females indicating a sex ratio of 973 females per thousand males. This ratio is much above the national average of 940. Goa ranks at 10th position in the country in respect of sex ratio. The State had a high sex ratio till 1960. Thereafter the sex ratio began to decline gradually and dropped to a low of 960 as per 2001 Census. During last decade, it has again raised by 13. As per 2011 census, we find 963 females in North Goa district per 1000 males. While in South Goa, there are 973 females per 1000 males.

Age composition

Age group wise data of 2011 Census show that there is a gradual decline in the percentage of population in the age group of 0-14 as compared to 2001 census. The percentage of population in the age group 0-14 declined from 24.58 percent in 2001 to 21.81 percent in 2011. Further on account of better health care facilities and education, the percentage of elderly population (60 and above) has gone up from 8.33% to 11.21% during the last decade. The distribution of population on the basis of their age in 2011 census is given in the following table.

Table No.3.1: Composition of population by Age in Goa - 2011

Sr. No.	Age Group	Males	Females	Total
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1	All Ages	739140	719405	1458545
2	< 4	52017	49186	101203
3	5 – 9	54672	51296	105968
4	10 – 14	57417	53572	110989
5	15 – 19	60075	53800	113875
6	20 – 24	70616	60129	130745
7	25 – 29	67744	64882	132626
8	30 – 34	63471	62388	125859
9	35 – 39	63541	62757	126298
10	40 – 44	55504	53008	108512
11	45 – 49	47867	46869	94736
12	50 – 54	38782	37810	76592
13	55 – 59	32021	33532	65553
14	60 – 64	29100	32004	61104
15	65 – 69	19005	22014	41019
16	70 – 74	12890	16165	29055
17	75 – 79	7228	9308	16536
18	80 – 84	3599	5647	9246
19	84 – 88	1452	2441	3893
20	89 – 94	593	995	1588
21	95 – 99	265	395	660
22	100 +	183	211	394
23	Age not stated	1098	996	2094

Literacy level

Literacy and Education are important indicators of human development which impact the socio-economic development of the society. Prior to 1991 census, children below five years of age were treated as illiterates. From 1991 Census onwards, all children in the age group of 0-6 years are treated as illiterate by definition and population aged seven years and above are classified as either 'literate' or 'illiterate'.

As per the 2011 census, the number of literates in Goa is reported to be 11,65,487 of whom 6,15,823 are males and 5,49,664 are females. According to 2001 Census, the literacy rate in Goa was 82.01% which has increased significantly to 88.70% in 2011 showing an increase of 6.69% during the decade. The corresponding figure for the country is 74.04%. Goa stands at 4th position in respect to literacy in the country.

At the district level, North Goa (89.57%) had a higher literacy rate than South Goa (87.59%) in 2011. Although there has been a substantial increase in the literacy rates in both the districts, the rate of increase has been higher in South Goa District.

The literacy rates for males and females work out to be 92.65 % and 84.66% respectively in 2011. The literacy rate among males has shown an improvement to the extent of 4.23 percent over 2001 Census whereas literacy rate among females have recorded an increase of 9.29 percent during the same period.

Scheduled Castes (SC) / Scheduled Tribes (ST) Population

The scheduled caste population in the state stands at 25,449 as compared to 23,791 in 2001, while the schedule tribe population has registered a tremendous increase in population. As per the 2001 census the ST population was 566, which increased to 1,49,275 in 2011. The huge increase in the ST population may be attributed to inclusion of three communities from the other backward classes viz. Kunbi, Velip and Gawda under the category of ST.

3.2 AVAILABLE WORKFORCE

As per the Census 2011, the State's workforce is about 577248, which constitutes 39.58% of the total population in the state. The workers comprise of 476053 main workers i.e those workers who had worked for the major part of the reference period (i.e. 6 months or more) and 101195 marginal workers i.e. workers who had not worked for the major part of the reference period i.e. less than 6 months). It is to be noted that there is a significant sex differential among the number of male and female worker in the total workforce. Of the total 577248 workers, 419536 are males and 157712 are females. This would mean that 56.76 % of the total males and 21.92 % of the total females are workers. In terms of proportion, 72.68 % of the workers are males and 27.32 % are females.

Main workers constitute 82.47 percent of the total workers. The remaining are marginal workers. Among the main workers, female workers, are only 25 % and 75% are male workers. Majority of female workers are from urban areas.

Table No. 3.2: Gender wise distribution of workers and non workers in Goa - 2011

Category	Category	Females	Total	% to total population
Total Population	739140	719405	1458545	100
Total Workers	419536	157712	577248	39.58
Main Workers	356967	119086	476053	32.64
Marginal Workers	62569	38626	101195	6.94
Non Workers	319604	561693	881297	60.42

The workers are further classified into four broad categories viz. Cultivators, Agricultural Labourers, Household Industry Workers and Other Workers. Of the total workers, 31354 (5.43%) are cultivators, 26760 (4.64%) are Agricultural Labourers, 14708 (2.55%) are Household Industries Workers and the remaining 504426 (87.38%) belong to other category of workers.

3.3 LAND HOLDINGS

An "Operational Holding" for the purpose of Agricultural Census is defined as "all land which is used wholly or partly for agricultural production and is operated directly or

managed as one technical unit by one person alone or with others without regard to the title, legal form, size or location. A holding may consist of one or more parcels of land provided they are within the same Talukas and form part of the same management and has the same means of production such as labour force, machinery and animals”.

According to the Agricultural Census, 2010-11 there were in all 78,020 operational holdings covering an area of 88,994 hectares. There were 52,821 operational holdings covering an area of 60,742 hectares during the Agricultural Census 2005-06. Thus, there was an increase of 48 percent in the number of operational holdings and increase of 47 percent in the area during the 2010-11 Census, as compared to the Census of 2005-06.

Table 3.3: Distribution of number & area of operational holdings by 5 major classes of holdings

Sr. No.	Major Size Classes	Size Group (in Ha.)	Number of Operational Holdings				Area (In Ha.) of Operational Holdings			
			Numbers		Percentages		Hectares		Percentages	
			2005-06	2010-11	2005-06	2010-11	2005-06	2010-11	2005-06	2010-11
1	Marginal	Below 1.0	42745	59900	80.92	76.77	12422	28103	20.45	31.58
2	Small	1.0-2.0	5788	9817	10.96	12.58	7183	17591	11.83	19.77
Sub-Total		Below 2.0	48533	69717	91.88	89.35	19605	45694	32.28	51.35
3	Semi-Medium	2.0-4.0	2681	5707	5.08	7.32	6725	16770	11.07	18.84
Sub-Total		Below 4.0	51214	75424	96.96	96.67	26330	62464	43.35	70.19
4	Medium	4.0-10.0	1195	2010	2.26	2.58	6813	12378	11.22	13.91
5	Large	Above 10.0	412	586	0.78	0.75	27599	14152	45.43	15.90
All Categories			52821	78020	100.00	100.00	60742	88994	100.00	100.00

The distribution of number and area of the operational holdings according to the five classes indicated above shows a preponderance of marginal farmers. The holdings of less than one hectare accounted for more than three fourths (76.77 percent) of the total holdings in the State, whereas the area covered by these operational holdings formed only 31.58 percent during 2010-11 of the total operated area. If small farmers are also taken into account along with the marginal farmers then the percentage of these holdings to the total number of holdings was observed to be 89.35 percent and the area operated by these two categories of holdings (upto 2.0 hectares) worked out to 51.35 percent. If the holdings upto 4.0 hectares are considered, then it covered 96.67 percent of the total holdings and 70.19 percent of the total operated area. In the upper strata the holdings of more than 10 hectares were only 0.75 percent but their area coverage was almost 15.90

percent. During the 2005-06 census 1528 holdings or 2.89 percent were joint holdings but according to the present census 2279 holdings or 2.92 percent fall under this category. The average size of holding for the State, which was 1.15 ha. in 2005-06, is 1.14 ha. in 2010-11.

Table 3.4: District wise distribution of operational holdings by classes

State/ Districts	No. of holdings & area operated	Less than 1.0 ha. (Marginal)	1.0 to 2.0 ha. (Small)	2.0 to 4.0 ha. (Semi Medium)	4.0 to 10.0 ha. (Medium)	10.0 ha. & above (Large)	Total
Goa State	Number	59900	9817	5707	2010	586	78020
		(76.78)	(12.58)	(7.31)	(2.58)	(0.75)	(100.00)
	Area	28103	17591	16770	12378	14152	88994
		(31.58)	(19.77)	(18.84)	(13.91)	(15.90)	(100.00)
North Goa	Number	36520	4994	2901	1102	374	45891
		(79.58)	(10.88)	(6.32)	(2.40)	(0.82)	(100.00)
	Area	17326	8865	8554	6951	9679	51375
		(33.72)	(17.26)	(16.65)	(13.53)	(18.84)	(100.00)
South Goa	Number	23380	4823	2806	908	212	32129
		(72.77)	(15.01)	(8.73)	(2.83)	(0.66)	(100.00)
	Area	10777	8726	8216	5427	4473	37619
		(28.65)	(23.19)	(21.84)	(14.43)	(11.89)	(100.00)

Note: Figures in brackets indicate percentages.

(Source: Agricultural Census 2010-11)

3.4 TENANCY

In order to give rights to the cultivators, 'The Goa, Daman & Diu Agricultural Tenancy Act' was passed in 1964. By this act, the cultivator of the land has been given deemed ownership of the same land. But since inception of this act, though many cultivators have been declared 'Tenants', most of them have not gained their ownership rights in totality.

Table 3.5: DISTRIBUTION OF AREA OPERATED ACCORDING TO TENANCY

Sl. No	Major Size Classes	Total Operated Area	Wholly Owned And Self Operated	Wholly Leased In	Wholly Otherwise Operated	Partly Owned, Partly Leased In And Partly Otherwise operated			
						Owned	Leased In	Other-wise Operated	Total
1	Marginal	28103	23706	2608	1017	331	253	188	772
		(31.58)	(32.23)	(49.14)	(50.65)	(0.37)	(0.28)	(0.21)	(0.87)
2	Small	17591	14165	1037	546	695	458	691	1843
		(19.77)	(19.26)	(19.54)	(27.22)	(0.78)	(0.51)	(0.78)	(2.07)
3	Semi Medium	16770	12307	1116	292	1190	915	950	3055
		(18.84)	(16.73)	(21.03)	(14.56)	(1.34)	(1.03)	(1.07)	(3.43)
4	Medium	12378	9711	457	152	1200	411	446	2058
		(13.91)	(13.20)	(8.61)	(7.58)	(1.35)	(0.46)	(0.50)	(2.31)
5	Large	14152	13663	89	0	288	49	63	400
		(15.90)	(18.58)	(1.68)	(0.00)	(0.32)	(0.05)	(0.07)	(0.45)

All Categories	88994	73552	5307	2007	3704	2086	2338	8128
	(100.00)	(82.65)	(5.96)	(2.25)	(4.16)	(2.34)	(2.63)	(9.14)

Note: Figures in brackets indicates percentages. Total may not tally exactly due to rounding off.

(Source: Agricultural Census 2010-11)

3.5 CONTRIBUTION OF AGRICULTURE TO STATE INCOME

Agriculture proper contributes sizably to the regional income. The contribution of Agriculture Sector to the State Gross Domestic Estimates for the year 2010-11 as prepared by the Directorate of Planning, Statistics and Evaluation on the basis of standard methodology recommended by the Central Statistics Office of the Government of India; work out to Rs. 1,03,919.00 lakh at current prices which represent 3.09 percent of the total gross regional income. These estimates at constant prices (2004-05) works out to Rs. 62,990.00 lakh, i.e. 2.80 percent of the State Domestic Product for the year 2010-11.

The Net State Domestic Product at current prices and constant prices for Agriculture Sector estimated for the year 2010-11 was Rs. 88384.00 lakh and Rs. 53082.00 lakh respectively. The percentage to the total net income works out to 3.01 % and 2.75 % respectively at current and constant prices.

The total Gross Income at Current and Constant Prices during the last 2005-06 Agricultural Census (8th Census) was recorded at Rs. 84062.00 lakh and Rs. 82977.00 lakh respectively while net income during the said Census was Rs. 70485.00 lakh and Rs. 69966.00 lakh respectively.

3.6 LAND USE PLANNING & AGRICULTURE LAND IN STATE

According to the Agricultural Census 2010-11 total operated area of all the holdings was 88994 hectares. Out of this area 87214 hectares or 98.00 percent was net sown area and 305 hectares or 0.34 percent was current fallow. Thus the net cultivated area formed 98.34 percent of the total operational area in the State. The share of the cultivable waste land was 353 ha. or 0.40 percent. The proportionate share of the land not available for cultivation was 509 ha. or 0.57 percent.

Table 3.6: Utilization of Agriculture land

(Area in Ha.)

Sr. No.	District	Net area sown	Current fallow	Net cultivated area	Other uncultivated land excluding fallow	Fallow land other than current fallow	Cultivable waste land	Total uncultivated land	Land not available for cultivation
1	North Goa	50179	191	50370	160	250	251	661	344
2	South Goa	37035	114	37149	174	29	102	305	165
	Goa State	87214	305	87519	334	279	353	966	509

(Source: Agricultural census 2010-11)

Irrigated Areas

The Agriculture Census 2010-11 for the state has revealed that excluding the purely current fallow holdings, there were 40007 holdings receiving irrigation while 37958 holdings were wholly unirrigated. Out of the total irrigated holdings, 30468 holdings were wholly irrigated and 9539 holdings were partly irrigated.

Table 3.7: Area and holdings as per irrigation status (Area in Ha.)

Wholly Irrigated		Partly Irrigated Total			Wholly Unirrigated	
No. of holdings	Net area sown	No. of holdings	Net Area Irrigated	Net area sown	No. of holdings	Net area sown
30468	27097	9539	8473	20366	37958	39751

Irrigation Sources

Short lengths of rivers, deep marine ingress, steep slopes in the Western Ghats and reserved forests place constraints on large storage structures. However, the State has provided adequate storage dams to meet the domestic, industrial, irrigation and other water supply needs of the State. Due to thin soil cover and the highly rugged configuration of the topography, heavy rainfall leads to high run off. An estimated 89,660 Ha of agricultural area can be brought under irrigation as indicated in the Master Plans prepared for the State, out of which 82,260 Ha will be by surface water and 7,400 Ha by ground water.

Major and Medium Irrigation Projects:

The *Salaulim Irrigation Project (SIP)* is a major project which caters to the irrigation needs of Sanguem, Quepem and Salcete Talukas and provides raw water for domestic and industrial use to Mormugao, Sanguem, Quepem and Salcete Talukas. The total cumulative irrigation potential created upto Dec 2013 is 4620 Ha Ult and potential of 3915 Ha Ult have been utilized. The *Anjunem Irrigation Project (AIP)* is a medium project which caters to the irrigation needs of Sattari and Bicholim Talukas. The entire project is covered under Participatory Irrigation Management Programme (PIM). The total cumulative irrigation potential created upto Dec 2013 is 4620 Ha and potential of 3208 Ha Ult have been utilized. The total cumulative irrigation potential created by major inter-state Tillari Irrigation Project (TIP) upto Dec 2013 is 14993 Ha Ult and potential of 2101 Ha Ult have been utilized. Another 2000 Ha Ult are expected to be created by the end of March 2014.

Minor Irrigation:

Towards covering maximum area under irrigation, various schemes such as irrigation wells, storage tanks, lift irrigation schemes, bandharas, subsidy to farmers for

construction of new open wells/bore wells under the subsidy for wells scheme etc. are implemented to achieve optimum potential as per resource availability. Irrigation potential to the tune of 30,242 Ha has been created, out of which 187 Ha have been created upto December 2013. Potential utilized is 25,523 Ha.

There are 3 minor irrigation dams constructed in the State to conserve water for irrigation purpose at Chapoli- Canacona, Panchwadi-Ponda and Amthane-Bicholim with a combined storage of 20.89 mcm and having a water supply component of 35 mld. Construction of another minor irrigation tank at Gavnem in Canacona taluka, an on-going project to serve the ST community is in an advanced stage. The project has a water supply component of 5 MLD for domestic use and will also irrigate 100 Ha of command area in the villages of Gavnem, Tollem, Saturlim and Fulamol.

In addition to this, there are other traditional sources like lakes, ponds, springs, wells etc. which are used and maintained by local community.

Table 3.8: Source wise classification of irrigation holdings and area irrigated in 2010-11

Sl. No.	Source of irrigation	No. of holdings	Net area irrigated (ha.)
1	Canals	5941	5745
2	Tanks	1037	1163
3	Wells	7205	7002
4	Tube Wells	191	284
5	Other Sources	27489	21376
All Sources		41863*	35570

* Total number of holdings include those irrigated from more than one source.

(Source: Agricultural census 2010-11)

Chapter IV

TRENDS IN AGRICULTURE & FOOD PRODUCTIVITY

4.1 Status of Agriculture

Agriculture has been an age old profession of Goans since past. Paddy was the main crop grown during pre-liberation days being the staple food of all Goans. Other crops grown were horticultural crops like cashew, coconut, arecanut coupled with some mixed crops like banana, elephant foot yam, jackfruit, mango etc. Seasonal vegetables were grown in kharif season in pockets of Ponda and Sattari taluka; particularly hilly vegetables like cucumbers, gourds, root vegetables etc., and during winter, vegetables like brinjal, okra, red amaranthus in the low lying fields. Mixed horticultural crops were grown in typical gardens called 'Kulagars' mostly in Ponda, Sattari, canacona talukas. Soon after liberation, many schemes and cropping patterns were introduced which led to changes in this sector.

VARIOUS CROPS:

- 1) **Paddy**: A high yielding variety programme was launched in kharif season of 1966 along with rest of the country. Introduction of new varieties like Taichung Native-I, IR-8, Jaya and Jyoti greatly enhanced the production of the state. Recently, the Directorate of Agriculture has introduced hybrid variety called KRH-2.

It is to be noted that a special salt tolerant variety of paddy called 'Korungut' is very popular in Goa. However, its production has gone down considerably due to shrinking of Khazan lands, mainly due to breaches in embankments.

- 2) **Ragi**: Ragi or nachani was a crop grown mostly in hilly areas during Kharif season and formed a major part of food item of many families. The Dept. of Agriculture introduced two improved varieties called Annapurna and Purna from Karnataka to boost the production. However as on today, the cultivation of this crop has gone down considerably. Being an important food crop from its nutritive qualities and having increasing demand, there is need to revive its cultivation in the state.
- 3) **Groundnut**: It was a totally new oil crop introduced in Goa in mid 70's. The crop was most ideal to be grown in rice fallows in Rabi season with enough moisture in the field requiring no additional irrigation facilities. The yields obtained were comparatively good. There is need to encourage cultivation of this crop in larger areas, as the income accrued from this crop is quite remunerative.

- 4) **Sugarcane:** An improved variety called CO-740 was introduced after liberation. Many of the sugarcane growers from neighbouring areas of Maharashtra came over to Goa and purchased or took the field on lease and started growing cane in talukas of Sanguem, Quepem, Sattari etc. Thus over 1200Ha. area was brought under sugarcane cultivation till 1970. This prompted the state Govt. to set up Sanjivani co-operative sugar Factory, which started in Feb. 1973. Unfortunately since inception till now, the said factory has to depend on outside cane to run to its optimum capacity.
- 5) **Cashew:** This is the most important commercial crop of Goa occupying largest area. This crop has done extremely well. Both area, productivity and overall production has increased considerably over the years. In the 1970's, department introduced improved varieties from Regional Fruit Research Station, Vengurla namely V-4, V-7, V-8. The production has shown an upward trend. This crop provides maximum employment to the local people in harvesting & collecting the produce and processing.
- 6) **Coconut:** This is the traditionally important crop of the state. Many improved technical inputs have been developed and used in cultivation of this crop. Recently, this crop is badly affected by mite. There is good scope for growing dwarf varieties to get tender coconuts, which are in great demand.
- 7) **Arecanut:** This crop is grown in traditional 'Kulagar'. After 1990, new plantations have come up because of increasing rates for the nuts. The crop is also used as standard for growing black pepper. Other remunerative crops like nutmeg, banana are grown as intercrops. Spice cultivation in arecanut and coconut gardens is taking great momentum because of higher market rates.

Greenhouse cultivation

Many farmers are getting attracted to newly coming up technology called, 'Controlled Farming' or 'Greenhouse Farming'. The state Govt. gives additional subsidy to the farmers to take up this venture, though the farmers are getting some from the Central Govt. The lower crops like Gerbera, Anthurium, Orchids and vegetables like cucumber and pepper have been tried by the farmers.

Table No 4.1: Area, Average yield and production of various crops

Sr. No.	Name of the crop	Area (Ha.)	Average yield (Kgs/Ha)	Total production (Ton.)
1	<u>Paddy:</u> Kharif	31247	3781	118145
	Rabi	15990	4052	64800
	Total	47237	3872	183945

2	Ragi	150	913	137
3	<u>Pulses:</u> Kharif	212	703	149
	Rabi & Summer	9737	835	8137
	Total	9949	833	8286
Total food grain production including pulses		--	--	130176
4	<u>Groundnut:</u> Kharif	357	2862	1022
	Rabi	2837	2459	6978
	Total	3194	2504	8000
5	Sugarcane	915	50911	46584
6	Cashewnut	55737	417	23240
7	Coconut	25730	5014 (nos)	129.28 (million nuts)
8	Arecanut*	1728	1659	2867
9	Mango	4760	1793	8536
10	Banana	2283	11311	25824
11	Pineapple^^	275	16589	4562
12	<u>Vegetables:</u> Kharif	2893	12073	34930
	Rabi	3605	12000	43271
	Total	6498	12034	78201
13	Other Fruits (Chikoo, Papaya, Jackfruit, Lemon etc.)	3807	10750	40925
14	Oil palm	834	2586	2157
15	Pepper	731	320	234
16	Tree Spices^^	163	30	5
Total		103461		

(Source: Directorate of Agriculture)

Note : *25% arecanut & 50% banana area is cultivated as an intercrop with coconut crop.

^^ Pineapple and tree spices are cultivated as intercrops.

Chapter V

Implementation of watershed programmes in the State at present

5.1 Watersheds implemented by Agriculture Department:

The Directorate of Agriculture, at the State level, received funds from the Ministry of Agriculture along with the State Government share and released it to the District Nodal Agency (DNA) for watershed development programmes, at the District level for implementing watersheds under NWDPRA.

The Project Implementing Agencies (PIA) which included NGOs and GOs, implemented the watersheds through the Watershed Associations, at the village level. The PIAs and Watershed Associations are registered bodies under Societies Registration Act, 1860. The PIAs are equipped with a multi disciplinary team, namely the Watershed Development Team (WDT), which guides the Watershed Associations in execution of the watershed projects. The PIAs are identified by inviting Expression of Interest for executing such works and need to possess previous experience in participatory management. They also need to submit a detailed information on their three years financial performance and activities undertaken. Their asset base and staff are also assessed before empanelling such organization as PIA.

Before taking up watershed developmental works in any micro watershed the DNA obtains a ten point resolution from the Gram Sabha about their voluntary participation in the program. This resolution is facilitated by the Project Implementing Agency (PIA). After resolution is obtained and project is awarded to PIA, the PIA constitutes Watershed Development Team (WDT) which mobilizes the local community into Self Help Group (SHG) and User Group (UG). The SHG and UG together form a registered Watershed Association (WA) with the help of WDT. The WDT also identifies Entry Point Activities (EPA) with the help of community to build rapport with the watershed community. A Strategic Plan (SP) and Annual Action Plan (AAP) is prepared in participatory manner and passed by the Watershed Association (WA). This plan defines the broad action point for the five years and action point for a particular year.

The Watershed Associations convene a meeting, where in local demands are placed before it, discussed and the resolutions are then put up for approval, to the DNA committee through their respective PIAs. The DNA then releases the funds to the PIAs and WAs, as per the demands approved in the DNA meeting. The PIAs and WAs submit quarterly internal Utilization Certificate (UC) and Audited Utilization Certificate by Comptroller Auditor General Office certified Chartered Accountant after the end of every financial year (FY).

5.2 Watershed implemented by DRDA:

At the district level, the DRDA is the nodal authority for implementing of all the area development programme under the supervision and guidance of the State Government and the Government of India.

At the field level the Gram Panchayats are implementing the projects under the overall supervision and guidance of the Project implementing Agencies (PIA).

The PIA provides necessary technical guidance to the Gram Panchayat for preparation of development plans for the Watershed through Participatory Rural Appraisal (PRA) exercise, undertake community organization and training for the village communities, supervise watershed development activities, etc.

The PIA executes its duties through a multi disciplinary team designated as the Watershed Development Team (WDT). Each WDT should have at least four members one each from the disciplines of forestry/ plant sciences, animal sciences, civil/ agri engineering and social sciences.

5.3 Area covered under watershed programmes in the State

The state government started execution of watershed activities from the 8th Five year plan period and as per the guidelines issued by Govt. of India (GoI) from time to time. Initially only Govt Organization were involved in execution of the program. Later it adopted the National Watershed Development Program for Rainfed Areas (NWDPA) wherein along with GO the government also invited NGO as PIA. The area covered under watershed programmes in the State is as below:

- 1) Directorate of Agriculture : 43670 ha
- 2) DRDA : 974 ha

Table 5.1 : Talukawise total, treated, to be treated and remaining watershed

Sr. No.	Taluka	Total No. of Watershed	Treated Watershed	Watershed Selected for treatment	Pending Watershed
1	Pernem	33	9	21	3
2	Bardez	24	1	13	10
3	Tiswadi	16	2	3	11
4	Bicholim	28	7	21	0
5	Sattari	60	0	43	17

6	Ponda	30	15	15	0
7	Marmugao	9	1	0	8
8	Salcett	32	0	13	19
9	Canacona	47	0	35	12
10	Quepem	37	15	19	3
11	Sanguem	50	2	27	21
12	Dharbandora	56	0	34	22
		422	52	244	126

Table 5.2: Status of District-wise area covered under the watershed programme (ha) *

1	2	3		4						5	
				Micro-watersheds covered so far							
				Dept. of Land Resources		Other Ministries/ Depts.		Total watersheds covered			
				Pre-IWMP projects (DPAP +DDP +IWDP)		Directorate of Agriculture project					
No.	Area (ha.)	No.	Area (ha.)	No.	Area (ha.)	No.	Area (ha.)	No.	Area (ha.)		
1	North Goa	161		5	597	29	24965	34	25562		
2	South Goa	261		3	327	20	18705	23	19032		
	Total	422		8	924	49	43670	57	44594		

* Of the 3 microwatershed taken up by DRDA in South Goa, the same have not been completed and hence proposed to be revived. Two watershed out of 49 covered by Directorate of Agriculture, Govt. of Goa could not be taken up due to fund crunch and also poor response from local community. The same are proposed to be revived.

* (DRDA): After the expiry of the Project period of 5 years, the projects came to a standstill, since no sanction was received from the Government of India for extending the time limit for completion of the Projects.

Table 5.3: Details regarding the watershed projects sanctioned by DoLR in the State:

1 S. N o.	2 Item	3 Total	4		
			Pre-IWMP scheme details		
			DPAP	DDP	IWDP
1	Area sanctioned in ha. (as per column 4 of DoLR area in ha. Table SSP 14)	10,000			10,000
2	Names of the districts covered	North & South Goa			North & South Goa
3	No.of Blocks covered	• 4			• 4
4	No.of watershed projects sanctioned by DoLR	--			--
5	No. of projects completed out of those taken at Row (4)	--			--
6	No.of projects foreclosed of Row (4)	** 2			** 2
7	No.of on-going projects of Row (4)	--			--
8	Area already treated by completed projects of Row (5)	924 ha but the projects are not completed			924 ha but the projects are not completed
9	Area for treatment by on-going projects of Row (5)	--			--
10	Total area treated and under treatment (8)+ (9)	924			924
11	Area yet to be treated and proposed to be treated by DoLR (column 1-column 10)	9076			9076

- Out of the 4 watershed projects sanctioned by DoLR, 2 projects couldn't be taken up in the absence of PIA

** The Projects could not be completed due to administrative reasons.

Table 5.4: Details of the watershed projects implemented in the State with the financial assistance other than DoLR

1 S. No	2 Item	3 Total	4						
			Watershed schemes of other Ministries						
			Ministry of Agriculture Gol	Ministry of E & F, Gol	Planning Commission	NABA RD	State Govt.	EAP	#Others (Pl. Specif y)
1	Area sanctioned in ha. (as per column 4 of Table 14)	43670	43670						
2	Names of the districts covered	2	2						

3	No.of Blocks covered	7	7						
4	No.of watershed projects sanctioned other than DoLR	49	49						
5	No.of projects completed out of those taken at Row (4)	48	48						
6	No.of projects foreclosed of Row (4)	1	1						
7	No.of on-going projects of Row (4)	NIL	NIL						
8	Area already treated by completed projects of Row (5)	39035	39035						
9	Area for treatment by on-going projects of Row (5)	NIL	NIL						
10	Total area treated and under treatment (8)+ (9)	39035	39035						
11	Area yet to be treated and proposed to be treated by other than DoLR resources (column 1-column 10)	NIL	NIL						

5.4 Details of pending utilization certificates and unspent balance available with State under DPAP, DDP & IWDP, reasons for not sending due UCs, reasons for unspent balances which should have been utilized, time-frames proposed for clearing the backlog, fixing of responsibilities for slow progress and pendencies and also for clearing backlog, interest earned on unspent balances and its utilization, etc.

Table 5.5: Details of pending UCs

1	2	3	4	5	6	7	8		9	10	
S. No.	District	Project	Installation no.	Financial year of release of fund	Amount released (Rs. in lakh)	Amount utilized (Rs. in lakhs)	Date of submission of UC		Reasons for not submitting/delayed submission of UC	Pending UCs	
							Date	Amount (Rs. In lakhs)		Period	Amount (Rs. in lakhs)
1	North	Tuem	1	2003-04 2004-05	41.25 (C)	38.79	(03-04) 04.01.05 (04-05) 10.01.06 (05-06)	-- 0.01	The delay in submitting the UC for the year 2005-06 was due to the fact that the CA had to revise the statement of accounts.	2009-10 2010-11 2011-12 2012-	-- -- -- (Amt of Rs. 50.46 lakhs has

							28.04.08 (06-07)	11.34	The reasons for not submitting the UCs for the year 2009-10 to 2011-12 was due to the fact that the PIA had not submitted the accounts to the DRDA.	13	been refunded to DoLR on 26.07.12
						28.04.08 (07-08)	12.94				
						14.01.09 (08-09)	9.63				
						09.12.10	4.87				
		Morjim Saligao	1	2005-06	24.10 (C) 2.20(S)	*	--	--	--	--	--
2	South Goa	Khola	1	2003-04	41.25 (C) 3.75 (S)	15.78	19.10.04	--	--	--	--
							22.08.05	--			
							14.10.06	2.74			
							30.09.07	0.86			
							05.12.08	10.71			
							10.11.09	1.47			
							22.10.10	--			
							03.11.11	--			
							17.10.12	--			
							19.11.13	--			
							20.11.14	--			

*The watershed projects of Morjim and Saligao could not be started due to the non availability of PIA.

Table 5.6: Details of Unspent balance

1	2	3	4	5	6	7	8
S. No.	Distri ct	Project	Instal- ment no.	Financial year of release of fund	Amount released (Rs. in lakh)	Amount utilized (Rs.in lakhs)	Unutilise d funds (Rs. In lakhs)
1	North Goa	Tuem	1	2003-04 2004-05	41.25 (C) 3.75 (S)	Rs. 38.79 lakhs is utilized during the period from 2004-09	*50.46
		Morjim Saligao	1	2005-06	24.10 (C) 2.20 (S)	--	
2	South Goa	Khola	1	2003-04 2004-05	41.25 (C) 3.75 (S)	Rs. 15.78 lakhs is utilized during the period from 2004 - 2009	**38.75

*Rs. 50,46,196 which included interest was refunded by DRDA (North) to the DOLR, MoRD, New Delhi vide DD No. 435392 dated 26/07/2012, as per directions received from the DoLR, MoRD, New Delhi vide letter No. M-11016/01/2009-M&E(DDP) dated 21/05/2012

** DRDA (South) has requested the Central Ministry to revive the project as per the prevailing norms laid down in the Guideline vide letter No. 85/DRDA-S/IWDP/2013-14/2274 dated 13/01/2014

5.5: Linkages with Credit Institutions

During the project lifetime the PIA and WDT will work to develop linkages with the credit institutions such as the Regional Rural Banks, Cooperative Banks, etc. The credit requirements of the watershed should get reflected in the District Credit Plan. Credit requirement of treated watershed should form a regular agenda item in the District Credit Coordination Committee, the State Level Coordination Committee as well as at the National Committee. Credit would flow to constituents of the watershed through: (i) credit for production activities as reflected in the watershed plan such as short term crop loans, medium-term loans for livelihood systems such as dairy animals, etc.; and (ii) credit support to Self Help Groups. Linkage with credit institutions should be facilitated during the initial years of the project (soon after the SHG/UG has started operating their own credit and thrift activities successfully).

Chapter VI

Strategy for implementation of Integrated Watershed Management Programme (IWMP)

6.1 Prioritization of available area based on the criteria as per the Operational Guidelines of DoLR

Though the state receives very high rainfall through south west monsoon, the steep gradient of terrain and quick draining soil transport all the runoff downstream and allow very little time for rain water to retain in upper areas. Further, brief spells of heavy rainfall lead to erosion in the mixed forest predominantly cashew and open plateau areas with sparse vegetation. The traditional system of cultivation of vegetable and finger millet on slopes also add to the erosion. The increasing population, industrial and irrigation demand for water coupled with demand for ecological services is exerting huge pressure on natural resources. The aggressive extraction of mineral ore in the midland within the catchment and close vicinity of the rivers and often below ground water level may disturb the entire hydrological balance. The over extraction of water in the coastal area and salinity levels in the rivers 20-40 km upstream from mouth of river may lead to salt water intrusion and deterioration of water quality. There is urgent need to manage the catchment in upper and middle areas of the state to ensure pollution free and sufficient amount of water.

The total cultivated area in the state is ---- lakh ha of which ---- lakh ha. is rainfed. The rainfed areas are prone to erosion and degradation resulting in less productive soil, depleting ground water table and fragile ecosystem. The area exhibit low rainwater use efficiency, poor livestock productivity, fodder and fuel shortage, poor grain and chaff yield, under investment in water use efficiency, lack of assured and remunerative marketing opportunity and poor infrastructure. These area are also inhabited by the indigenous people whose sole livelihood is agriculture and do not have financial capacity to invest in high input agriculture. The challenge in rainfed areas is to improve rural livelihoods through participatory watershed development with focus on integrated farming system for enhancing income, productivity and livelihood security in a sustainable manner. A number of watershed management projects were being executed in the state under different schemes. The micro watershed where these schemes were implemented have been selected more on the grounds of suitability of working areas to the Project Implementing Agency (PIA) than on the basis of any priority made in objective manner. For overall integrated development in the state, it is important to implement development activities in the untreated micro watershed on the basis of priority made in an objective manner. The criteria of selection of micro watershed to be taken up under the Common Guidelines have been followed.

In past a number of projects/schemes were undertaken for micro watershed treatment. Hence, only microwatershed which have not been treated so far and confirming to the guidelines have been shortlisted.

A total of 422 micro watershed are delineated in the State of which 51 have been treated. Out of 370 untreated micro watershed, 244 micro watersheds have been identified for watershed treatment. Many of this micro watershed are partly or fully covered by reserve forest/ wild life sanctuaries and are inhabited. The MWS in Coastal Zone Area, Area with high density of population and area with major industrial activity have been avoided as participatory watershed development may not be feasible or the existing activity may not be favourable for this project. Care has also been taken to avoid areas with assured irrigation and command facility but many of the micro watershed in command area with little area under command are also included. All of the micro watershed have slopes more than 8%. Besides, there is high prevalence of rainfed activity. A total area of 2,11,010 ha have been prioritized for treatment. These micro watersheds would be taken up for treatment on the basis of prioritization made in the manner given below. The micro watershed have been selected in both the district of state and total area available for treatment under the plan has also been calculated for each district .

Table 6.1: The criteria and weightage for selection of MWS has been done on the following criterion

Sr. No.	Criteria	Max	Ranges and Score			
1	% of SC/ST population	10	More than 12% (10)	6 to 12 % (5%)	Less than 6 % (3)	
2	Actual wages	5	Actual wages are Significantly lower than minimum wages (5)	Actual wages are equal to minimum wages (0)	Actual wages are higher than minimum wages (0)	
3	% of small and marginal farmers	10	More than 80% (10)	50 to 80% (5)	Less than 50% (3)	
4	Area under assured irrigation	15	Less than 20% (15)	20 to 30% (10)	30 to 40% (5)	Above 40% (Reject)
5	Degraded land	15	High—above 30% (15)	Medium – 15 to 30% (10)	Low- less than 15% of TGA (5)	
6	Contiguity to another watershed that has already been	10	Contiguous to previously treated Watershed	4 to 6 MWS in cluster (5)	2 to 4 MWS in cluster (3)	

	developed/treated		and contiguity within the MWS in the project (10)			
7	Cluster approach in the plains (more than one contiguous MWS in the project)	15	Above 6 MWS in cluster (15)	4 to 6 MWS in cluster (10)	2 to 4 MWS in cluster (5)	
8	Shortage of drinking water	10	Shortage of drinking water for 6 months (10)	Shortage of drinking water for 3 months (5)	Shortage of drinking water for less than 3 months (3)	
9	Peoples participation	10	Entire area participating (10)	More then 50% population participating (5)	Less then 50% population participating (3)	
	Total Score	100				

The selected micro watersheds can also be taken up under various convergence schemes of various Line Departments like Forest, Agriculture, Rural Development etc. Another effective convergence tool can be NREGS/ RGSRY scheme implemented by Rural Development.

6.2 Planning Process - Details of Scientific criteria/Inputs used in Planning

Planning of a Watershed Development Project involves the use of GIS in various aspects of prioritization, development of action plan and later for monitoring and evaluation of these projects. The initial process involved creation of different spatial layers from the non-spatial dataset collected from various sources.

Goa government through its Goa State Council for Science & Technology had initiated spatial mapping of different natural resources through a project by ISRO as part of Integrated Mission for Sustainable Development. Different layers developed from data obtained through Toposheet, False Colour Composites obtained through IRS satellite. This data was validated through extensive ground truthing and the same was populated through secondary data obtained. Based on different layers the watersheds were delineated.

Table 6.2: Details of source used to derive the feature data for generating maps

Category	Features	Source
Land	Land Use & Land Cover	Satellite Data
	Landform	Satellite Data, Toposheets
	Soil Type	National Bureau of Soil Science & Land Use Planning, Indian Remote Sensing Agency Survey, Agriculture Department
	Slope/ Elevation	Satellite Data & Toposheet
Water	Surface Water Bodies	Satellite Data
	Ground Water Condition	Satellite Data & Toposheet
	Wells	Toposheet
Vegetation	Agriculture	Satellite Data, Toposheet
	Forest	Satellite Data, Toposheet
Household	Socio-Economic Facilities, SC & ST data, Actual Wages, Drinking Waters, % of SF & MF, % Poverty Index	District Census Data
	Village Map	Toposheet
Infrastructure	Roads, Canal, Command Areas	Line Department, Toposheet, CADA
Others	Sanctuaries, Mining areas, CRZs, Industrial Area	Line Department

Different parameters were categorized into the natural resource base (including the historical data) of the area and the socio-economic aspects.

The implementation of IWMP was initiated with the GSCST preparing district-wise watershed maps and later Prioritization maps on a scale of 1:50000 using satellite data. The selection of the project sites was then made on the predetermined criteria (developed by DoLR) according to the ridge to valley approach and the New Common Guidelines for Watershed Programme, 2008, Government of India.

The approach followed for planning involved three basic activities:

☐ Creation, development and management of the geo-spatial data base depicting current conditions of land, water and vegetation with respect to watershed incorporating different ownerships and administrative boundaries at village level.

PROJECT AREA

The entire state of Goa comprising of 2 districts will be the project area. However actual work will be carried out only in selected prioritized untreated micro watersheds shown in (Map No. 2 - State Map showing the areas proposed for treatment under IWMP)

Keeping in mind the Common Guidelines for Watershed Management a Perspective Plan of Integrated Watershed Management is envisaged which aims at sustainable utilization

and management of natural resources like water, land and vegetation. It will also address the issue of sustainable farming system and rural livelihood opportunities with the participation of local communities for ensuring long term ecological and economic security. As per the common guidelines the plan has been based on the following principles.

INCLUSIVENESS: The poor, small and marginalized farmers, landless, shepherd, SC, ST & OBC persons within MWS boundaries and with agro based livelihood would be mobilized to form SHG/ UGs. These SHG/ UGs would be provided revolving fund and capacity building in various income generating activities besides building their social, organizational and managerial capacities. Due importance will be given to ensure gender balance.

DECENTRALIZATION: Within the framework of Panchayat Raj Institution Watershed Committees shall be constituted along with Self Help Groups, User Groups and individual beneficiaries. The Watershed Committee formed would be given financial autonomy in implementing the project. These empowered committees would plan and implement and monitor the plan at the Gram Panchayat Level.

SOCIAL MOBILIZATION: The project functionaries will have shift in roles from controller and regulators to facilitators. For this purpose professional team including Zonal Agriculture Office and Voluntary Organizations would be selected for social mobilization, community organization. Capacity building of communities shall be done for planning and implementing the project.

COMMUNITY PARTICIPATION: All the stakeholders would be involved in planning, budgeting, implementing and monitoring of the projects. To inculcate sense of ownership amongst the stakeholder's community, contribution in the form of Corpus Fund and enterprises to continue beyond the project period would be there to ensure the sustainability after the withdrawal of the project. The project would give special emphasis on the vulnerable groups of the community.

The main project components would be:

- i) Participatory Watershed Development and Management
 - ii) Enhancing Livelihood Opportunities
 - iii) Institutional Strengthening
-
- i) Participatory Watershed Development and Management
 - Promotion of Social Mobilization and Community Driven Decision Making
 - Holistic Natural Resource Management
 - ii) Enhancing Livelihood Opportunities
 - Diversification and improvement of farming system
 - Farm and Nonfarm based income generating activities for the SHG's & UG's
 - Value Addition and Marketing Support

iii) Institutional Strengthening

- Capacity Building of SHG, UG, Watershed Committees, Gram Panchayat
- Information, Education and Communication
- Monitoring, Evaluation and Learning System

Within these components the following activities would be undertaken.

Table 6.3: List of watershed projects, along with area coverage selected for treatment during XIIth Five Year Plan (2012 -17)

TALUKA	Sr. No.	Name	Area (ha)	TALUKA	Sr. No.	Name	Area (ha)
PERNEM	1	Dhargalim	1636.54	DHARBANDORA	1	Dabal	924.77
	2	Ozari	1051.52		2	Codli	750.76
	3	Pernem	1268		3	Camarcond	546.55
	4	Dhargal	571.05		4	Savargal	813.78
	5	Porascade	264.08		5	Bandoli	1068.37
	6	Nagzar	1156.23		6	Karmane	493.69
BARDEZ	7	Verla	819.94	SANGUEM	7	Dhullai	769.74
	8	Soccurro	1243.4		8	Antorem	683.47
	9	Sagolda	663.31		9	Santona	857.04
	10	Pilerne	663.31		10	Zambauli	1182.41
	11	Soccoro 1	496.6		11	Tudva	1214.89
	12	Salvador Mundo	1434.45	12	Porteem	870.08	
TISWADI	13	Chorao	880.78		13	Vichundre	886.31
	14	Carambolim	1170.67		14	Netorli	1179.28
	15	Mandur	1363.14		15	Salgini	1134.7
PONDA	16	Priol	1196.56		16	Colomba	850.63
	17	Veling	1020.36		17	Sulcorna	871.21
	18	Apewal	800.28		18	Verle	972.88
	19	Kerye	783		19	Assolna	1077.68
	20	Madkai	815.8	20	Taripanto	456.7	
SATTARI	21	Charavane	789.95	QUEPEM	21	Cuncoli	854.1
	22	Ivre	946.43		22	Ambeli	1006.42
	23	Naneli	909.27		23	Sarzora	749.43
	24	Satore	883.18		24	Balli	626.09
	25	Dhave	931.43		25	Karla	476.18
	26	Bramhakarmali	493.96		26	Nagve	1117.14
	27	Rive	962.56		27	Bendorde	588.03
	28	Xelpe	840.8		28	Tiloi	721.18
	29	Uste	822.58	29	Ambaulim	795.76	
	30	Golauli	1024.28	30	Khangini	624.52	
	31	Ponsuli	1230.28	31	Naquerim	529.89	

	32	Pali	1227.54	CANACONA	32	Gaodongari	1231.78
	33	Anjune	1230.28		33	Gocolde	763.67
	34	Maloli	960.31		34	Kindale	1007.34
	35	Podocem	900.27		35	Badde	857.16
BICHOLIM	36	Haturli	1348.48		36	Sristhal	1017.42
	37	Narve	773.85		37	Yede	544.55
	38	Pilgao	798.28		38	Ponsule	1071.51
	39	Sankhali	688.61		39	Cotigao 1	844.3
	40	Virdi	861.95		40	Cotigao 2	1157.11
	41	Harvale	675.8		41	Gaval Cola	1170.83
	42	Cudne	970.72		42	Popoidando	983.01
					43	Cola	860.6

Table 6.4: List of watershed projects, along with area coverage selected for treatment during XIIIth Five Year Plan (2018 -2023)

TALUKA	Sr. No.	Name	Area (ha)	TALUKA	Sr. No.	Name	Area (ha)
PERNEM	1	Mopa	530.12	SALCETTE	1	Verna	1365.78
	2	Paliem	613.39		2	Rachol	1544.09
	3	Amberem	769.18		3	Curtori	1578.48
	4	Paliem 1	283.04		4	Lotuli	1393.64
	5	Corgao 1	72.66		5	Raia	894.26
	6	Torxem	681.69	SANGUEM	6	Sigao	1073.92
	7	Camurli	1425.58		7	Costi	1117.23
	8	Morjim	337.67		8	Kalay	610.1
	9	Tambose	1079.76		9	Dudhal	395.18
SATTARI	10	Dongurli	552.03		10	Tudou	934.54
	11	Mauxi	1213.16		11	Potre	1131.57
	12	Codiem	939.17		12	Sanguem	364.8
	13	Bhuipal	1312.86		13	Maulinge	1320.12
	14	Onda	606.87		14	Uguem	1162.13
	15	Saleli	820.51	QUEPEM	15	Quedem	1003.1
	16	Queri	591.35		16	Cordem	851.56
	17	Zorme	1139.82		17	Borighoto	752.35
	18	Vaghuriem	745.51		18	Maina	818.39
	19	Vantem	1239.37		19	Karmalghat	521.49
	20	Morlem	864.69	CANACONA	20	Quedem 1	930.34
	21	Vovalye	603.44		21	Cotigao	705.09
	22	Naguem 1	666		22	Patiem	884.55
	23	Ravan	620.15		23	Cotigao 4	678.09
	24	Siroli	973.42		24	Cotigao 3	1185.15
	25	Gonteli	530.45		25	Padi	526.04

BARDEZ	26	Revora	1043.43	DHARBANDORA	26	Quiscond	643.22
	27	Colvale	1044.79		27	Cotigao 1	793.88
	28	Marna	798.04		28	Chaudi	771.85
	29	Assagao	599.27		29	Talpan	856.04
BICHOLIM	30	Pale	1227.54		30	Poiguini	661.31
	31	Cudchire	813.89		31	Cotigao 5	512.63
	32	Surla	1618.64		32	Barcem	675.93
	33	Velguem	1107.93		33	Paigini 1	649.64
PONDA	34	Ganje	960.46		34	Vaidev	935.38
	35	Usgaon	968.02		35	Suktoli	859.89
	36	Shiroda	987.58		36	Piliem	792.79
	37	Karai	720.8		37	Okamb	956.23
	38	Shigneval	474.92		38	Davkond	979.78
	39	Bori	568.47		39	Tatodi	645.19
	40	Codar	901.31		40	Sangod	1240.39
	41	Candepar	813.23		41	Collem 2	796.62
					42	Sonauli	510.32
					43	Sigao 1	802.37
					44	Boma	858.53

Table 6.5: List of watershed projects, along with area coverage selected for treatment during XVIth Five Year Plan (2024 -2029)

TALUKA	Sr. No.	Name	Area	TALUKA	Sr. No.	Name	Area
PERNEM	1	Chandel	848.62	DHARBANDORA	1	Aglote	587.65
	2	Ibrampur	894.66		2	Sacorde	1152.15
	3	Alorna	531.58		3	Shivde	879.14
	4	Alorna1	832.11		4	Dharbandora	1167.77
	5	Chandel	944.03		5	Talsai	572.6
SATTARI	6	Advoi	860.76		6	Molem	748.04
	7	Xelpecurd	1083.74		7	Collem	1069.22
	8	Damoce	859.95		8	Tambdisurla	1211.24
	9	Ambeli	757.87		9	Sanjivani	816.77
	10	Malpon	1239.53		10	Moissal	811.7
	11	Bhirondem	1129.29		11	Collem1	564.14
	12	Sonal	693.58	CANACONA	12	Partagal	679.52
	13	Caranzol	952.11		13	Loliem 2	866.25
	14	Conquirem	1392.03		14	Loliem 1	597.92
	15	Melauli	1042.77		15	Galgibag	718.2
	16	Budruk	630.6		16	Mashe	572.78
	17	Savarde	634.33		17	Mayne	254.37
	18	Caramboli	811.49		18	Loliem	639.7

BICHOLIM	19	Assnora	985.72	QUEPEM	19	Shelli	496.64	
	20	Mencure1	809.68		20	Polle	419.71	
	21	Sal	735.71		21	Lolien 3	703.74	
	22	Nanoda	795.43		22	Avede	794.83	
	23	Mulgao	699.58		23	Paroda	560.98	
	24	Latambarce	835.39		24	Malakpan	593.7	
	25		598.68		25	Undorna	454.01	
	26		981.65		26	Xeldem	942.23	
	27	Ladphe	849.24		SANGUEM	27	Kevon	581.67
	28	Moitem	786.61			28	Curdi	576.74
29	Dhumace	822.39	29	Usgalimal		639.82		
BARDEZ	30	Corjuem	1044.61	30		Shivsore	903.05	
	31	Ucassaim	462.36	31		Curpe	871.22	
	32	Thivim	1471.63	32		Vilien	541.27	
	33	Panchwadi	555.82	33		Bhati	1006.24	
	34	Amlai	880.68	34		Salauli	858.19	
				35		Naiquini	798.02	
				36		Dongar	1193.19	
				37	Kapxe	1005.72		
				38	Guirdolim	721.73		
				39	Assolda	641.65		
			40	Cavorim	1123.25			

Table 6.6: Plan-wise phasing of physical (area in ha) & financial (Rs. in Crore) targets of IWMP for next 15 years*:

Sr. No	District	XII Plan (2012-13 to 2016-17)		XIII Plan (2017-18 to 2021-22)		XIV Plan (2022-23 to 2026-27)		Total for 15 years	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
1	North Goa	39569.83	47.48	33860.21	40.63	2954.23	35.34	102884.3	123.46
2	South Goa	37202.96	44.64	38683.98	46.42	30336.76	36.40	106223.7	127.46
	TOTAL	76772.8	92.12	72544.72	87.05	59791	71.74	209108	250.92

*Data for the entire State regarding each item may be given in the same format at the end of the table

Convergence between Watershed Project and On-Going Production and Rural Development Programmes

The PRA may not be able to reflect all the needs of the watershed community which can be financed through the Project resources. Advantage will be taken of the regular on-going production programmes of the Line Departments, -- Agriculture, Horticulture,

Livestock, Fisheries, Forest as well as rural development programmes of the DRDAs/ ZPs to bring about requisite convergence. The District Watershed Committee which comprises representatives from Line Departments and where the Watershed Plans would be coordinated and reviewed would be the appropriate forum wherein dovetailing with on-going programmes would be achieved. Field experience has shown that such a convergence can be achieved effectively if there are mature SHG, UG (having a sustainable common fund) and there is a management body of these groups (WC) to provide a platform for convergence of schemes / activities of different development departments. Hence the above groups under the watershed programme may be utilized for convergence of individual oriented as well as community oriented schemes available with the departments. Regular inter-face of extension functionaries of line Departments with the watershed community during implementation phase will ensure convergence and permanent linkages. Mandatory preparation of district level plans will be in a position to enable convergence and synergies at the grass-root level.

The DPR may elaborate gaps to be filled or watershed activities to be taken up out of BRGF, NREGS, artificial ground water recharging, renovation and repairs of tanks, water bodies and any other available sources. Marketing and value addition is also possible under the revised APMC Act. Efforts should be made to converge all relevant schemes at project level.

Public – Private Partnership

Briefly describe scope for Public – Private Partnership in watershed projects

The state government is making efforts to rope in private partners in the implementation of watershed project. Goa being a small state there is limited scope for such partnership. There are other industries and commercial establishment which have undertaken few activities aiding soil and water conservation and they form smaller part of the watershed concept. Department will also make effort to rope in proposed District Mineral Foundation for partnership in implementing watershed development project in the mining belt of Goa. Microwatershed which have major area notified as Protected Area (Reserved Forest or Wild Life Sanctuaries) will be decided in consultation with the Forest Department and Joint Forest Management Committees.

Chapter VII

7.0 Livelihood concerns:

The village community have a complex and diverse livelihoods and focus only on improved financial resources may not address the multidimensional poverty issues. The socio-economic condition of the community, dependence of households on farm and non-farm activities, social protection to the women and children, safeguarding fundamental rights and entitlement are also a major concern for the development facilitators to consider and educate people to give a thought for long terms maintenance of quality of life. In the context of watershed based livelihoods projects, several basic issues such as economic and social development are already taken care of. So, livelihoods should not be interpreted as “just income”. Livelihoods support should aim at reducing vulnerability of the poorer families of the village. This support is generally targeted towards resource poor families in the watershed area. A rural household meets its livelihoods requirements from three to four sources. So diversification of livelihood portfolio is important for promotion of livelihoods of rural families.

A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living a livelihood is sustainable when it can cope with and recover from stresses and shocks, and maintain or enhance its capabilities and assets both now and in the future, while not undermining the resource base. What kinds of capabilities and assets do people draw on to make a living and achieve their livelihood objectives? These have been grouped into the five categories that are used in Sustainable Livelihoods Framework.

Watershed development primarily helps conserve soil and water, raise farmer’s income through enhancement of agricultural productivity while generating rural employment and encouraging crop diversification in rainfed areas.

As WSD approaches have evolved from externally imposed biophysical interventions towards more participatory approaches encompassing a broader range of activities, the potential impact of WSD on household assets has increased. This has implications for all five types of assets defined in the Sustainable Livelihood (SL) framework viz., human capital, social capital, financial capital, natural capital and physical capital.

Physical Capital — through increase in durable assets such as house, machinery, livestock and irrigation facilities

Natural Capital — through changes in access to or improvements in land, water and other common pool resources (CPRs)

Human Capital — through changes in education, skill development and capacity building activities

Social Capital — through formation and strengthening of community based organizations such as watershed committee, self help groups, user groups, common interest groups and women’s participation in decision-making process

Financial Capital — through savings, access to credits and other income generating activities

The sustainable livelihoods approach is a way of putting **people** (and especially the poor) at the centre of development. This is different from many traditional projects and programmes, in which **things** are the main focus of development. Watershed development is has traditionally focused on **things** - such as water harvesting structures, bunds and plantations – rather than people, although attempts are being made in the third generation watersheds(including WORLP) to shift the emphasis. This has been outlined also in the Common Guideline for watershed development 2008.

The SL approach aims to be holistic in identifying the most pressing constraints faced by, and promising opportunities to, people. It is non-sectoral. It builds upon people's own definitions of these constraints and opportunities. The SL approach aims to build upon people's strengths.

In conventional projects performance is measured in terms of the number of things done and number of inputs provided – structures built, animals vaccinated, health camps organised, training sessions provided etc. In livelihoods projects performance is measured in terms of improvements to livelihoods and reductions in poverty.

Improvements to livelihoods (especially of the poor) can be measured in terms of better quality of assets, better access to them, reduced vulnerability, increased incomes and increased well being etc.

The third generation watersheds in 2K have inbuilt livelihoods components in to the watershed development programme and have been successful in reducing poverty, targeting the poor and vulnerable groups and contributed in human well being. The common guide line 2008 provides 10% of funds for livelihoods activities and 13% for production system and micro-enterprises.

7.1 Livelihoods Promotion in Watersheds

The major requirement for improvement in livelihood strategies is asset improvement through long-term strategic interventions which focus on increasing the capabilities of people to manage their own resources in a sustainable manner. Appropriate physical interventions that improve the productive capacity of the natural resources along with conservation-oriented agronomic practices would also be required. Promotion of labour led agriculture would ensure that work is available for the landless households in the village. Development of the natural resources also needs to encompass forest regeneration both for environmental protection and to restore forest income as a diversified livelihood strategy. This also requires addressing marketing issues and promoting value addition through processing of NTFPs.

Livelihood strategies comprise the range and combination of assets and choices that people undertake in order to achieve their livelihood outcomes. Livelihood outcomes are the achievements of lively strategies, such as more income (e.g., cash), increased well being (e.g., non-material goods like self-esteem, health status, access to services, sense of inclusion), reduce vulnerability (e.g. better resilience through increase of asset status), improved food security (e.g., increased financial capital in order to buy food or to produce more food), and more sustainable use of natural resources (e.g., appropriate property rights and their management). Livelihood security encompasses food security, social

security and psychic security. Each one of them has basic minimum threshold levels to achieve and maintain and also must be pursued in a balanced way.

Livelihood options are different for landholders and landless people living inside the micro-watershed.

The possible livelihood options in the State are given in the following table.

Table 7.1: Possible livelihood options for landholders and landless in watershed area

Livelihood options for landholders	Livelihood options for landless
Crop diversification, crop production, community nursery and plantation, cultivation of medicinal plants, agroforestry, commercial cultivation, dryland horticulture, seed production, JFM	Livestock promotion, fishery, mushroom, apiary, sericulture, artisans, back yard horticulture, agro-processing, value addition, fruit and vegetable preservation, oil extraction, rice hulling, petty business, collective marketing, NTFP collection and marketing, labour society, PDS, MDM, tailoring, handlooms, grain bank etc.

The key issues for livelihood promotion are discussed below.

7.2 Natural Resource Management

There has been serious degradation of natural resources affecting the livelihoods of the people. In a village ecosystem the natural resources may be viewed as one amongst different components which are interrelated with each other. There is a need for a village ecosystem planning for enhancement of total natural resource base of the village ecosystem, production of basic biomass needs of the village community on a priority basis and equity in distribution of biomass resources. The village plan has to be both sustainable and equitable and would have to be matrix of solutions keeping in view specific natural resource base of the village, its biomass needs and its social structure. For planning and management purpose, it is not enough to sub-divide the natural resource base merely on ecological terms. It will also have to be sub-divided in legal terms, that is, in ownership terms. The people must be educated to take care of both private and common lands for their livelihoods security.

Agriculture

The possibilities for increasing agricultural production can be achieved by expanding the area for planting crops (horizontal expansion), by raising the yield per unit area of individual crops (productivity) or by growing more crops per year in time and/or in space (intensification). Since the scope for horizontal expansion is limited due to shrinkage of land resources and decreasing landman ratio, more area need to be brought under cultivation by increasing cropping intensity, inter cropping and multi-tire cropping. During *Kharif*, non-irrigated upland can be covered by pulses (green gram, black gram, and pigeon pea), oilseeds (groundnut, sesame) and vegetables (brinjal, tomato) by substituting unremunerative paddy crop. Intercropping of maize+ cowpea, rice+

groundnut, rice+ pigeon pea etc. can be adopted to further intensify the system with higher land equivalent ratio (LER) in rain-fed uplands.

Diversification

Diversification has greater significance in ensuring livelihoods security. Diversification of crops to the existing cropping system is referred to as horizontal diversification. For instance, cultivation of field crops (non-rice) in rice fields or growing various types of other crops in uplands has been defined as crop diversification. However, this type of crop diversification means the broadening of the base of the system, simply by adding more crops to the existing cropping system utilizing techniques such as multiple cropping techniques coupled with other efficient management practices. The other type of crop diversification is vertical crop diversification, in which various other downstream activities are undertaken. This could be illustrated by using any crop species, which could be refined to manufacture products, such as fruits, which are canned or manufactured into juices or syrups as the case may be. Vertical crop diversification will reflect the extent and stage of industrialization of the crop. It has to be noted that crop diversification takes into account the economic returns from different crops. This is very different to the concept of multiple cropping in which the cropping in a given piece of land in a given period is taken into account. In order to achieve the above benefits the process of diversification should be changed from very simple forms of crop rotations, to intensive systems such as relay cropping and intercropping or specialization by diversifying into various crops, where the output and processing etc., could be different.

NTFP

The livelihood of the tribals in the State is very much linked with the forest. They use to collect fuel wood, siali leaves, mushrooms, honey, lac, medicinal herbs, jungle brooms, roots & tubers, fruits, flowers etc. Apart from meeting domestic consumption and a greater part is sold at the market to meet family expenses. The tribes usually get 15-20% of their income from collection and marketing of NTFP. Infrastructure support and skill upgradation of the tribes in processing and value addition of such commodities would improve the economic return to a greater extent.

In this sub component such activities will be undertaken directly by the PIA to increase the productivity of land and other natural resources in the Gram Panchayat with the objective to increase income levels of the people. The arrangement of Funds for these activities is Budget envelope of GP. However the community/ individual beneficiary will make available contribution like land, manure which will not require direct cash contribution.

Who: WDT in consultation with WC.

When: After approval of the GPWDP.

The activities to be done under this component are:

- **Farming systems improvement:** The Objective of this sub component is to: (a) disseminate technologies and provide advisory services for agriculture, horticulture, silvi-pastoral treatments and animal husbandry; (b) provide quality seeds and seedlings; and (c) establish linkages between UGs and suppliers for processing and marketing of high value crops. The major emphasis will be the

introduction of off- season vegetables and high value crops. The project will provide all the inputs (seed/seedlings, bio-agents and bio-fertilizers) of the subprojects, with the condition that the land, labor, irrigation and farm yard manure will be provided by farmers. In order to facilitate the production of marketable produce, formation of UGs will be introduced to facilitate the production, processing and marketing of high value crops. This subproject will demonstrate improvements in the productivity of crops already cultivated in the area and the introduction of new high value crops (new varieties of off-season vegetables, fruit crops, medicinal and aromatic plants will be introduced based on agro-climatic factors, demand and assured market). For this purpose the private sector and Institutions and Organizations specialized in the subject concerned can also be contracted by the WCDC. Training will also be provided in application of new technologies; storage techniques; etc.

- ❖ Identify the farmers and the lands proposed for this activity
- ❖ Identify the crops , farming system in which demonstration are required by GP

Value addition and marketing support: This sub-component will support agribusiness development. The project will make investments that would: (i) identify potential niche market opportunities; (ii) establish links with entrepreneurs who could help in exploiting the market potential; (iii) disseminate appropriate information and technology to farmers to help them to enter into production; (iv) co-finance subprojects with UGs & SHGs (on a one-time subsidy basis); (v) co finance subprojects with entrepreneurs (on a one-time subsidy basis) for storage, processing and or marketing infrastructure needed to exploit the market potential.

Income generating activities for vulnerable groups: This is designed to finance small income generating micro-enterprises for vulnerable groups (women and landless), which will promote the project's objective of equity and sustainable NRM. These SHGs would be identified during the watershed planning process through a wealth/ asset ranking PRA methods). Training will be provided to vulnerable groups to encourage their entrepreneurial development. The Income Generating Activity proposals will be developed after the implementation of the Entrepreneurial Development Program (EDP) and the GPWDP will only reflect the overall envelope and the target groups. The funds will be disbursed through the GPs to the SHGs, who will manage them. The funds will be disbursed in two installments based on the implementation performance of the SHGs who are managing the income generating activities for which specific indicators have been included. The WDT's endorsement (sign off) will be required on each proposal to ensure that the E&SA has been applied.

Revolving Fund: Revolving fund (RF) has been provided for marginalized groups, which are either left out or receive little benefits from the watershed treatment activities of the project. Most of the proposed watershed interventions are land-based and thus, to

provide benefits to these groups, special activities have to be thought that the project does not profit only the landed and affluent sections of the village. In addition, this is a mechanism to involve these people with the implementation of the project, who may otherwise remain indifferent. Since all income generation activities, from the selection of the activity to the final disposal of the product would be decided and executed by the Self Help Groups (SHGs) themselves, a participatory process methodology would serve best. This would not only result in poverty alleviation in tangible terms but also help marginalized section to organize themselves into sustainable SHGs. This would go a long way in meeting the goal of productivity enhancement of the project areas.

The overall objective of the RF is the socio-economic upliftment of women, poor, SC/ST and transhuman communities by the expansion of income earning options through on farm & off farm employment and sustainable and efficient use of natural resources. Some key preconditions are needed for this:

- Availability of infrastructure, both physical and institutional, at local level.
- Access to support services (e.g. credit, inputs, training and information)
- Access to markets and knowledge
- Safeguard against ecological problems (e.g. land degradation, overexploitation of natural resources and endangered bio-diversity)

Implementation Strategy for IGAs: The implementation of the strategy for enhancing incomes of vulnerable groups will take place in seven steps:

- Identification of vulnerable sections/individuals and their need assessment
- Formation of SHGs of identified vulnerable groups/individuals and women
- Entrepreneurship Development of the SHGs
- Selection of the Income Generating Activity (IGA)
- Formation of Sub Plan for RF
- Implementation of Sub Plan for RF
- Networking of Groups for the sustainability of IGA

Identification of Vulnerable Groups and their Needs:

Who: WDT

When: After orientation of the GP & community to the project

- Help the communities understand the reasons for their poverty, what opportunities could reduce their poverty and how they can collectively act to make this happen.
- Conduct Participatory Rural Appraisal (PRA) for the identification of vulnerable groups/individuals
- Identification of vulnerable sections of the society, poorest of the poor, through the process of wealth ranking
- Ascertain their special needs and existing gaps
- Take stock of the needs of the community for viable economic development

Formation of SHGs:

Who: WDT

When: After identification of vulnerable groups/individuals

- SHGs of groups/individuals identified as part of the above-mentioned exercise and will be formed as per the NABARD guidelines. Economic homogeneity and emotional affinity will be key factors for formation of any SHG.
- They will function as credit and thrift groups. However, to promote Income Generation Activities from the beginning itself, commodity approach will be emphasized during the formation of SHG. This will enable to develop further linkages regarding IGAs at a cluster level.
- Other factors to be considered in formation of SHGs are:
- Availability of resources, needs and demands of the community as regards taking up viable IGA in the project areas
- Scenario of other ongoing IGA schemes and their beneficiaries
- Members of those vulnerable groups, not covered under other ongoing schemes will be given priority during formation of SHGs under the project

Entrepreneurship Development Program (EDP): The EDP will be conducted after the completion of basic modules to the SHGs and within first 18 months of the project. It will assist the SHG members in identifying a viable activity, which they can take up for the enhancement of their livelihood. Aspects such as market analysis, quality control, management of finance, establishing forward and backward linkages, pricing, rights and rules etc. will be covered through this training.

For the selection of members for EDP, priority will be given to poor dependent on occupation merely adequate for subsistent living. Groups who are graded 'Good' will be eligible for this program.

- Skill Training and Exposure program:** Skill training will be conducted for those members who have participated in the EDP. It is presumed that the SHG members who start IGA activities will be given skill training and exposure.

Selection of IGAs:

Who: SHGs

When: After completion of EDP

- Following factors may be considered for the selection of a specific IGA for a specific group. The ES&A will also be applied at the time of the selection of IGA.
 - Availability of resources
 - Existing skills and capacity such as carpet weaving, handicraft, etc. which can be converted into IGAs
 - Quality and marketability of the product
 - Sufficient demand of the product
 - Risk taking capacities of the groups
 - Financial inputs required
 - Forward and backward linkages

Sub Plan for RF:

Who: WC Assisted by WDT

When: Upon receipt of IGA proposals for funding from SHGs

- Upon finalization of an IGA by the SHG, it will prepare a proposal for funding (See Attachment F-9 for format) and submit the same to WDT for appraisal. Through WC clearance by the WDT, will be submitted to WC which who shall incorporate a same into its annual sub plan for IGA activities.
- If a proposal is not viable, it will be sent back to the SHG for appropriate changes and resubmitted by the SHG to WDT for appraisal. The same shall then be submitted to the WC.

Networking of Groups for the sustainability of IGAs:

Who: SHGs, Experts including WDT

When: Upon maturity of SHGs and starting of IGAs at a certain level

- Upon maturity of SHGs and reaching of IGAs to a certain level, the project would encourage the formation of Association and Federations of SHGs.
- These would be based on production, processing and marketing of the products.
- The activities of these institutions would include Input Management, Common Storage Facilities, Grading and Packaging, Group Marketing, Market Outlet Development, Joint Market Negotiation and Transport Organization.

Utilization Mechanism for RF:

Due to the limited saving capacity of SHGs, their savings amount may not be sufficient to undertake IGAs. Thus, under the project, it is proposed to provide working capital assistance to the SHGs engaged in IGAs. It will serve the purpose of promotion of micro-enterprises and will work as a Revolving Fund. This fund will be utilized by the SHG either for a joint IGA or for individual initiatives. For additional funds, SHGs will be linked to the banks.

At revenue village level a Sub Plan will be prepared by the vulnerable groups with the assistance of WDT. This plan will include the following:

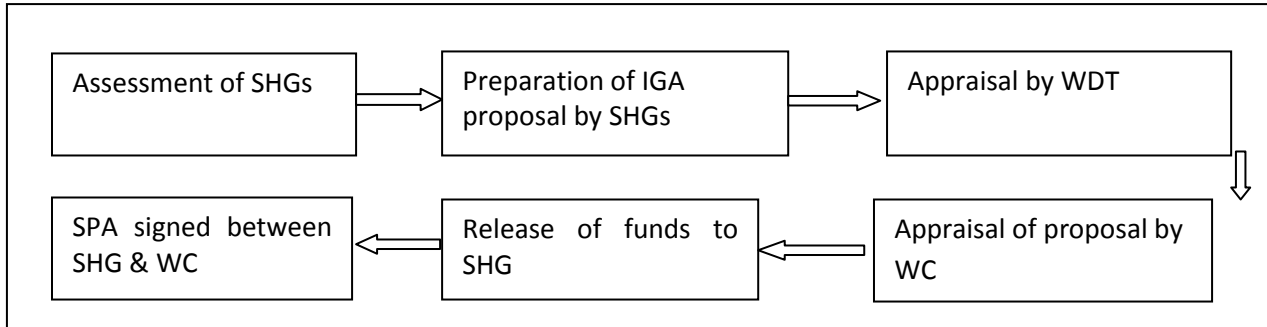
1. Prioritization of IGA for the Revenue Village based on their viability
2. Detail out the utilization and recovery mechanism of this Revolving Fund.

This evaluation will be done by WDT after EDP and skill development program. The indicators for the assessment of SHGs will be mainly as follows:

- Regularity of meeting and attendance
- Regularity of saving and common fund generated
- Bylaws formed and proceeding should be recorded
- Awareness about income generation activities
- Capacity building (EDP, skill development)

Further, the SHGs will carry out self-assessment to gauge their requirement of working capital and the availability of resources. On the basis of both these assessments, the grading of SHGs will be done and money from the Revolving Fund will be given to such groups which will fulfil the parameters. SHGs not receiving funding during the year will be reassessed the following year.

Fund Flow Mechanism



Review and appraisal of GPWDP:

Who: PIA & DWDU

When: After receiving proposed GPWDP from WC

- Receipt of the proposed GPWDP by WCDC
- Appraisal of the GPWDP by WCDC as per of E&SA
- If any shortcoming is found or if the GPWDP proposes to spend beyond the financial ceiling set for the GP, then DWDU will send it back to the WC with written observations and recommendations.
- The WC shall consider these observations and recommendations and may make appropriate changes in its GPWDP and if need be may again go to Gram Sabha for approval
- The final GPWDP shall be resubmitted to WCDC for further implementation.

Payment to WC:

Who: WCDC

When: After approval of final GPWDP by GP & submission of AWP

- After approval of GPWDP by the Gram Sabha, the WC shall prepare a detailed Annual Work Plan (AWP) for the first year. This will contain details of activities to be funded and implemented, who shall implement them and when, who shall benefit from them, details of beneficiary contribution, and the cost to be incurred for each activity.
- On-account payment' amounting to 10% of the approved AWP amount will be transferred to WC account by the DWDU.
- The WC will need to maintain and submit books of accounts and other documents while claiming reimbursement.

Process of 2nd and 3rd year AWP:

Who: WC

When: After successfully implementing 1st year's AWP

- The WC shall make a detailed AWP for the second year upon near completion of activities listed out in the first year's AWP.
- This AWP will be submitted to the DWDU for information, MOU signed for its implementation, and transfer of due funds to the WC Account.
- Same process will be followed for AWP for the third year.

Chapter VIII

Institutional arrangements

The principles of new common guidelines would be followed for implementation of Integrated Watershed Management Projects. An appropriate institutional arrangement would be made at various levels for effective decision making and professional management of the projects.

8.1 GOA STATE LEVEL NODAL AGENCY (GSLNA)

- ❖ Directorate of Agriculture, Govt. of Goa has been declared as a nodal department and State Level Nodal Agency (SLNA) has also been constituted under the Chairmanship of Chief Secretary by the State Government to implement new Common Guidelines. The SLNA will be having an independent bank account. Central assistance for SLNA will be transferred directly to the account of SLNA. The SLNA will sign an MOU with the Departmental Nodal Agency setting out mutual expectations with regard to performance, timelines and financial parameters including conditions related to release of funds to SLNA. The SLNA will be required to review the programme and provide enabling mechanism to set up State Data Cell and ensure regular reporting to the Central Government/ Nodal Agency at the central level in the Department. There would be multidisciplinary professional support team at the State level to implement the programme. The State Level Nodal Agency is having a full-time CEO who is a serving Government officer.
- ❖ The SLNA consists of one representative from the NRAA, one representative from the Central Nodal Ministry, one representative from NABARD, one representative each from the State Department of Rural Development, Agriculture, Animal Husbandry and allied sector, one representative from Ground Water Board and one representative from an eminent voluntary organization and two professional experts from research institutes / academia of the state. There is also representation from NREGA and other related implementing agencies at the state level.
- ❖ The SLNA will sanction watershed projects for the State on the basis of approved state perspective and strategic plan as per procedure in vogue and oversee all watershed projects in the state within the parameters set out in these Guidelines.



The main functions of the SLNA will be to:

- a) Prepare a perspective and strategic plan of watershed development for the state on the basis of plans prepared at the block and district level and indicate implementation strategy and expected outputs/outcomes, financial outlays and approach the Nodal Agency at the central level in the Department for appraisal and clearance.
- b) Establish and maintain a state level data cell from the funds sanctioned to the States, and connect it online with the National Level Data Centre.

- c) Provide technical support to District Watershed Development Units (DWDU) of the state.
- d) Approve a list of independent institutions for capacity building of various stakeholders within the state and work out the overall capacity building strategy in consultation with NRAA/Nodal Ministry.
- e) Approve Project Implementing Agencies identified/selected by DWDU/ District Level Committee by adopting appropriate objective selection criteria and transparent systems.
- f) Establish monitoring, evaluation and learning systems at various levels (Internal and external/ independent systems).
- g) Ensure regular and quality on-line monitoring of watershed projects in the state in association with Nodal Agency at the central level and securing feedback by developing partnerships with independent and capable agencies.
- h) Constitute a panel of Independent Institutional Evaluators for all watershed projects within the state, get this panel duly approved by the concerned Nodal Agencies at the central level and ensure that quality evaluations take place on a regular basis.
- i) Prepare State Specific Process Guidelines, Technology Manuals etc in coordination with the Nodal Ministry/ NRAA and operationalise the same.

Table 8.1: Details of SLNA

1	2	3	4	5
S. No.	Date of Notification	Type of SLNA [#]	Date of MoU with DoLR	Total no. of members of SLNA
1	21 st August, 2009	Society	Not yet done	16

[#]Whether it is a Department/ Mission/ Society/ Authority/ Others (pl. specify)

Table 8.2: Details of SLNA

6		7					
Chairperson		CEO					
Name	Designation [#]	Name	Designation	Date of Appointment	Nature of appointment [§]	Tenure (No. of years)	Contact Ph. No./ Fax/ E-mail
	Secretary, Agriculture			Not yet decided	Deputation		
At present Director(Agriculture) is Member Secretary of SLNA							

[#] APC/ ACS/ Dev. Commissioner/ Others (pl. specify)

[§] Deputation/ Contract

Table 8.3: Details of functionaries in the SLNAs*

1	2	3	4										
S. No.	Total no. of persons working in the SLNA for IWMP	Monthly emoluments of all the persons working in the SLNA for IWMP	Details of the persons engaged in the SLNA funded by DoLR										
			Names & Designation	Monthly remuneration	Date of Appointment	Nature of appointment [§]	Tenure (No. of years)	Contact Ph. No./ Fax/ E-mail	Subject of Expertise	Qualification	Experience	Role	
To be approved by State Level Nodal Agency													

* from column no. 2, total no. of persons working in the SLNA for IWMP; from column no. 3, total monthly emoluments for all the persons working in the SLNA for IWMP; from column no. 4, total no. of persons to be funded by DoLR, total monthly remuneration of the persons funded by DoLR may be indicated for the entire State at the end of the table.

* Chart indicating organizational structure of the SLNA with all the officers & staff may be enclosed

§ Deputation/ Contract

8.2 State level Monitoring/Evaluation Cell

The post of CEO will be filled by transfer on deputation of a Deputy Director of Agriculture, from the directorate of Agriculture. A Team of 4 to 7 professional experts will assist the CEO in State Level Nodal Agency. This team is selected by the State Level Nodal Agency from the line departments. Their disciplines will, inter-alia, include agriculture, water management, capacity building, social mobilisation, information technology, administration and finance/ accounts, etc. A requisite number of administrative staff is deputed to support this team of experts.

8.3 District Level Watershed Units Organizational Structure

- A) State Level Nodal Agency has already directed to establish the Watershed Cell cum Data Centre (WCDC) in each district of the State under the Chairmanship of concerning District Collector. The WCDC will oversee the implementation of watershed programme in each district and will have separate independent accounts for this purpose. WCDC will function in close coordination with the District Planning Committee. There will also be a representation in WCDC for NREGA implementing agencies at the district level.
- B) WCDC would function as a separate unit with full time Project Manager and 3 to 4 subject matter specialists on Agriculture/ Water Management / Social Mobilisation/ Management & Accounts appointed on the basis of their qualification and expertise on contract/deputation/transfer etc. An Assistant

Director of Agriculture will be posted by transfer on deputation as a Project Manager, WCDC as per present arrangements. If open market recruitment is necessary, this will be done by the SLNA. In such cases, the Project Manager, WCDC will sign a contract (for a period not less than three years) with SLNA that will spell out well-defined annual goals, against which his/her performance will be consistently monitored.

The arrangements for setting up/ strengthening the WCDCs/ Data Cell will be financially supported by the Government of India after review of available staff, infrastructure and the actual requirement.

The main functions of WCDC will be as follows:

- a) Identify potential Project Implementing Agencies (PIAs) in consultation with SLNA as per the empanelment process as decided by the respective state governments.
- b) Take up the overall responsibility of facilitating the preparation of strategic and annual action plans for watershed development projects in respective districts.
- c) Providing professional technical support to Project Implementing Agencies (PIAs) in planning and execution of watershed development projects.
- d) Develop action plans for capacity building, with close involvement of resource organizations to execute the capacity building action plans.
- e) Carry out regular monitoring, evaluation and learning.
- f) Ensure smooth flow of funds to watershed development projects.
- g) Ensure timely submission of required documents to SLNA / Nodal Agency of the Department at central level.
- h) Facilitate co-ordination with relevant programmes of agriculture, horticulture, rural development, animal husbandry, etc with watershed development projects for enhancement of productivity and livelihoods.
- i) Integrate watershed development projects/ plans into District Plans of the district planning committees. All expenditure of watershed projects would be reflected in district plans.
- j) Establish and maintain the District Level Data Cell and link it to the State Level and National Level Data Centre.

8.4 Role of Panchayati Raj Institutions at district and intermediate levels:

The full responsibility of overseeing the watershed program within the district will lie with the DWDU which will work in close collaboration with the District Planning Committee (DPC). The DPC will provide full governance support to the programme. The DPC will approve the perspective and annual action plans relating to watersheds projects in the district. DPC will integrate the watershed development plans with over all district plans and also oversee its implementation. WCDC will help the DPC in providing oversight and ensuring regular monitoring and evaluation of the programme. The District Rural Development Agency will have an important role of governance in matters relating to the

co-ordination of various sectoral schemes with watershed development projects, review of progress, settling disputes etc.

8.5 PROJECT IMPLEMENTING AGENCY (PIA)

SLNA will select and approve the PIAs following appropriate mechanisms for Districts. These PIAs may include relevant line departments, autonomous organizations under State/ Central Governments, Government Institutes/ Research bodies, Intermediate Panchayats, Voluntary Organizations (VOs).

However, the following criteria will be followed in the selection of the PIAs:

PIA should preferably have prior experience in watershed related aspects or management of watershed development projects.

PIA should be prepared to constitute dedicated Watershed Development Teams.

They should have at least three years of Audited Account Statement.

They should have at least done one participatory project with the state or central government department or public sector undertaking.

They should not have been blacklisted by CAPART or any state government department.

Voluntary Organizations (VOs): Voluntary Organizations will have an important role in the program and their services will be utilized substantively in the areas of awareness generation, capacity building, IEC and social audit among others. As far as direct implementation of the programme is concerned, Voluntary Organizations (VOs) with established credentials may be chosen as PIAs on the basis of detailed criteria as enumerated below.

The Voluntary Organizations (VOs) would need to satisfy the following criteria to be selected as PIA:

- Should be a registered legal entity of at least 5 years standing.
- Should have had at least 3 years of field experience in the area of community based Natural Resource Management and livelihood development.
- Should not have been blacklisted by CAPART or any other Department of Government of India or State Government.
- Should be equipped with a dedicated, multidisciplinary team with gender balance.
- Should furnish three years balance sheet, audited statement of accounts and income returns. All accounts of the organization should be up to date.
- Should furnish the profile of its Board of Directors.
- Should have successfully implemented projects independently.

It will be subjected to the following conditions:

- (i) At any point of time, one VO cannot be assigned more than 5,000 ha area in a district.
- (ii) At any point of time, one VO cannot be assigned more than 10,000 ha area in a State.

Selected PIAs will sign a contract/MOU with the concerned WDCs/ District Level Committee. It will spell out well-defined annual outcomes, against which the

performance of each PIA will be monitored each year and evaluated on a regular basis by institutional evaluators from a panel approved by the SLNA / Departmental Nodal Agency at the central level.

Each PIA must put in position a dedicated watershed development team (WDT) with the approval of WCDC. The WDT will be hired on contract / deputation / transfer etc for a term not exceeding the project period. The composition of the WDT will be indicated in the contract/ MOU. No programme funds for DPR and watershed works under any circumstances should be released to either the PIA or Watershed Committee (WC) unless the composition of the WDT has been clearly indicated in the MOU/ contract and the team members are fully in place.

Roles and Responsibilities of the PIA: The Project Implementing Agency (PIA) will provide necessary technical guidance to the Gram Panchayat for preparation of development plans for the watershed through Participatory Rural Appraisal (PRA) exercise, undertake community organization and training for the village communities, supervise watershed development activities, inspect and authenticate project accounts, encourage adoption of low cost technologies and build upon indigenous technical knowledge, monitor and review the overall project implementation and set up institutional arrangements for post-project operation and maintenance and further development of the assets created during the project period.

The PIA, after careful scrutiny, shall submit the Action Plan for Watershed Development Project for approval of the WCDC and other arrangements. The PIA shall submit the periodical progress report to WCDC. The PIA shall also arrange physical, financial and social audit of the work undertaken. It will facilitate the mobilization of additional financial resources from other government programmes, such as NREGA, SGRY, National Horticulture Mission, Tribal Welfare Schemes, Artificial Ground Water Recharging, Greening India, etc.

8.6 Watershed Development Team

The WDT is an integral part of the PIA and will be set up by the PIA. Each WDT should have at least four members, broadly with knowledge and experience in agriculture, dairy, soil & water management, social mobilisation and institutional building. At least one of the WDT members should be a woman. The WDT members should preferably have a professional degree. However, the qualification can be relaxed by the WCDC with the approval of SLNA in deserving cases keeping in view the practical field experience of the candidate. The WDT should be located as close as possible to the watershed project. At the same time, it must be ensured that the WDT should function in close collaboration with the team of experts at the district and state level. The expenses towards the salaries of the WDT members shall be charged from the administrative support to the PIA. WCDC will facilitate the training of the WDT members.

Roles and responsibilities of WDT: The WDT will guide the Watershed Committee (WC) in the formulation of the watershed action plan. An indicative list of the roles and responsibilities of the WDT would include among others, the following.

- Assist Gram Panchayat / Gram Sabha in constitution of the Watershed Committee and their functioning.
- Organizing and nurturing User Groups and Self-Help Groups.
- Mobilising women to ensure that the perspectives and interests of women are adequately reflected in the watershed action plan.
- Conducting the participatory base-line surveys, training and capacity building.
- Preparing detailed resource development plans including water and soil conservation or reclamation etc. to promote sustainable livelihoods at household level.
- Common property resource management and equitable sharing.
- Preparing Detailed Project Report (DPR) for the consideration of Gram Sabha.
- Undertake engineering surveys, prepare engineering drawings and cost estimates for any structures to be built.
- Monitoring, checking, assessing, undertaking physical verification and measurements of the work done.
- Facilitating the development of livelihood opportunities for the landless.
- Maintaining project accounts.
- Arranging physical, financial and social audit of the work undertaken.
- Setting up suitable arrangements for post-project operation, maintenance and future development of the assets created during the project period.

8.7 Institutional arrangements at village level and people's participation

WATERSHED COMMITTEE (WC)

The Gram Sabha will constitute the Watershed Committee (WC) to implement the Watershed project with the technical support of the WDT in the village. The Watershed Committee (WC) has to be registered under the Society Registration Act, 1860. The Gram Sabha may elect/appoint any suitable person from the village as the Chairman of Watershed Committee. The secretary of the Watershed Committee (WC) will be a paid functionary of the Watershed Committee (WC). The Watershed Committee (WC) will comprise of at least 10 members, half of the members shall be representatives of SHGs and User Groups, SC/ST community, women and landless persons in the village. One member of the WDT shall also be represented in the Watershed Committee (WC). Where the Panchayat covers more than one village, they would constitute a separate subcommittee for each village to manage the watershed development project in the concerned village. Where a watershed project covers more than one Gram Panchayat, separate committees will be constituted for each Gram Panchayat. The Watershed Committee (WC) would be provided with an independent rented office accommodation.

The Watershed Committee will open a separate bank account to receive funds for watershed projects and will utilise the same for undertaking its activities. The expenses towards the salaries of the WDT members and Secretary of Watershed Committee (WC) shall be charged from the administrative expenses under the professional support to the PIA.

Secretary, Watershed Committee: The Secretary of the Watershed Committee (WC) will be selected in a meeting of the Gram Sabha. This person would be an independent paid functionary distinct and separate from the Panchayat Secretary. He would be a dedicated functionary with no responsibilities other than the assistance to the Watershed Committee (WC) and would work under the direct supervision of the President of Watershed Committee (WC) and would be selected on the basis of merit and experience. The expenses towards the honorarium to be paid to Secretary of Watershed Committee (WC) will be charged from the administrative support to the PIA. The Secretary will be responsible for the following tasks:

Convening meetings of the Gram Sabha, Gram Panchayat, Watershed Committee for facilitating the decision making processes in the context of Watershed Development Project.

Taking follow-up action on all decisions.

Maintaining all the records of project activities and proceedings of the meetings of Gram Panchayat, Watershed Committee (WC) and other institutions for Watershed Development Project.

Ensuring payments and other financial transactions.

Signing the cheques jointly with the WDT nominee on behalf of the Watershed Committee.

SELF HELP GROUPS (SHG): The Watershed Committee shall constitute SHGs in the watershed area with the help of WDT from amongst poor, small and marginal farmer households, landless/asset less poor agricultural labourers, women, shepherds and SC/ST persons. These Groups shall be homogenous groups having common identity and interest who are dependent on the watershed area for their livelihood. Each Self Help Group will be provided with a revolving fund of an amount to be decided by the Nodal Ministry.

USER GROUPS (UG): The Watershed Committee (WC) shall also constitute User Groups in the watershed area with the help of WDT. These shall be homogenous groups of persons most affected by each work/ activity and shall include those having land holdings within the watershed areas. Each User Group shall consist of those who are likely to derive direct benefits from a particular watershed work or activity. The Watershed Committee (WC) with the help of the WDT shall facilitate resource-use agreements among the User Groups based on the principles of equity and sustainability. These agreements must be worked out before the concerned work is undertaken. It must be regarded as a pre-condition for

that activity. The User Groups will be responsible for the operation and maintenance of all the assets created under the project in close collaboration with the Gram Panchayat.

PANCHAYAT AND THE GRAM SABHA: The Gram Panchayat would perform the following important functions:

- Supervise, support and advise Watershed Committee from time to time.
- Authenticate the accounts/ expenditure statements of Watershed
- Facilitate the convergence of various projects/ schemes to institutions of watershed development project.
- Maintain asset registers under watershed development projects with a view to retain it after the watershed development project.
- Provide office accommodation and other requirements to Watershed Committee.
- Allocate usufruct rights to deserving user groups/ SHGs over the assets created.

The Goa State IWMP is based on joint relationship among three entities: (i) village communities and GPs; (ii) DoA/SLNA and (iii) PIA's. All these three stakeholders will fulfill their respective roles and responsibilities for the project to be successful. Specifically:

Village community and GP : Will plan and implement the project

DoA/SLNA: Provide overall coordination and assist the village communities & GPs

PIA: Carry out social mobilization, may provide technical assistance and undertake other activities as agreed to with GPs and WMD

Chapter IX

9 Capacity building

Training and capacity building is a ongoing process throughout the project cycle however its importance is more before beginning of any project. Different stakeholders will require different kind of Capacity Building. This depends on their roles and responsibility, their existing knowledge and skill level etc. The capacity building requirement and strategy will be different for different level i.e. at State, District and Zonal level, Project Implementing Agency, Watershed Association Committee members, Self Help Group and User Group members, field workers. Once a clear roles and responsibility are defined for each stakeholder it is easy to decide on a capacity building strategy.

a) Stake holders and capacity building requirements

ROLES AND RESPONSIBILITIES

Table 9.1: Panchayat level Institutions

S. No.	Institution	Composition	Role	Accountable to
1.	Gram Sabha	All adult voters of the Gram Panchayat	To facilitate in the constitution of WC. To elect/ appoint any suitable person from the village as the chairman of Watershed Committee. Ensure inclusion of disadvantaged groups such as women, poor, SC/ST, transhumant. To approve the DPRs. To approve / pass the rules for WDF.	Village community
2.	Gram Panchayat	Sarpanch & Panch Members	Supervise / support and advise Watershed Committee. Authenticate the accounts / expenditure statements of WC and other institutions of Watershed Project. Facilitate the conversion of various projects/schemes to IWMP. Maintain assets registers under IWMP with a view to retain it after the project. Provide office accommodation and other requirements to WC. Allocate usufruct rights to deserving user groups / SHGs over the assets created. To operate the WDF bank account.	Gram Sabha and Directorate of Agriculture
3	Watershed Committee	Chairman of WC to be elected / appointed by Gram Sabha	Assist in the preparation of DPRs. Manage the SHGs Fund. Manage the watershed development fund (WDF). Implementation of the watershed project. Maintain the accounts of the Watershed Project. Prepare the rules for operation of WDF. Submit timely monthly and annual financial reports to WMD. Ensure that the WC annual accounts are audited on a timely basis and submitted to the WMD ** should have atleast 10 members half of the members shall	Gram Panchayat

			be representatives of SHGs and user group, SC, ST community women and landless. One member of WDT to be represented in the WC.	
4	Joint Forest Management Committee	Chairman, Members of JFMC	Implement all plantation related activities under the project Coordinate with concerned Forest Department office for technical and management issues.	Gram Panchayat
5	Secretary Watershed Committee	An independent paid functionary selected by Gram Sabha	Convening of all Mandatory and all required GP , Gram Sabha and WC meetings and upkeep of minutes of the meeting Act as co-signatory along with WDT to operate the Watershed Development Project account Assist in the procurement process by being designated as Secretary of the Procurement Committee Maintain and safe custody of all records Accounts and cash Timely submission of all returns , reports and utilization certificates Timely and satisfactory Audit of GP accounts. Maintain all accounts books related to the project Make all vouchers & prepare cheques Collect dues from beneficiaries & issue receipts Ensure that records are maintained for all labor contributions from beneficiaries; Prepare all financial documentation & reports as required b the project	GP for Project reporting system to WCDC

Table 9.2: Field level institutions

S. No.	Institution	Composition	Role	Accountable to
1	WDT	3-4 experts	Assist GP / GS in constitution of the WC and their functioning. Organizing and nurturing user groups and self help group. Mobilize women to ensure that their perspective and interests are reflected in the Watershed Plan. Assist in conducting the participatory baseline surveys training and capacity building. Preparing detailed resource development plans. Common property resource mgt. and equitable sharing. Undertake engineering surveys prepared drawing and cost estimates of any structures to be built. Preparation of DPR. Monitoring, checking, assessing, undertaking, physical verification and measurement of the works done. Facilitating the development of livelihood opportunities. Maintaining project accounts. Arranging physical, financial and social audit of the works.	PIA & WCDC

			Setting up suitable arrangements for post project operation, maintenance and future development of the asset created.	
2	Project Implementation Agency (PIA)	Appointed by the SLNA	Provide technical guidance to the GP for preparation of the DPRs. Undertake community mobilization and training of the village community. Supervise watershed development activities. Inspect and authenticate project accounts. Encourage adoption of low cost technologies and build upon Indigenous Technical Knowledge. Monitor and review the overall project implementation. Set up institutional arrangements for post project operation. Submit action plan for approval to WCDC. Submit periodical progress report to WCDC. Arrange physical, financial and social audit of the work undertaken.	WCDC and SLNA
3	WCDC	Appointment by SLNA	Identify potential PIAs in consultation with SLNA. Facilitate the preparation of watershed development plan for the respective districts. Provide professional, technical support to PIA in planning and execution of the projects. Develop action plan for capacity building. Carry out regular monitoring, evaluation and learning. Ensure smooth flow of funds to watershed development projects. Ensure timely submission of required documents to SLNA. Facilitate coordination with relevant programs of other line departments with the watershed development projects. Integrate watershed development project/ plans into district plans of DPCs. Established and maintain the district level data cell and link to national level data centre.	SLNA

The State Level Institution will include the Chief Executive Officer of the State Level Nodal Agency and the Steering Committee which take up policy level decision and oversees its execution. They are also responsible for overall management of the projects in the state and has to coordinate with the State and Central Government as regards project monitoring and reporting. Since Goa will be shifting to independent mode of having a State Level Nodal Agency there will be urgent need to build the capacity of these officials. The steering committee will be from different department with diverse view on the topic and will have to be trained to coordinate their thinking and effort at watershed level.

Table 9.3: State level institutions

S. No.	Institution	Composition	Role	Accountable to
1	CEO, SLNA	Appointed by State Govt.	Prepare a perspective and strategic plan of watershed development for the state. Indicating implementation strategy, expected output, financial outlay and approach central level nodal agency for appraisal and clearance. Establish and maintain a state level data cell and connected with national level data centre. Provide technical support to the WDCs. Approve and facilitate in building a state level consortium for capacity building for various stakeholders. Approved PIAs identified / selected by WDCs. Establish monitoring, evaluation and learning system at various levels. Ensure regular and quality on line monitoring of watershed projects. Constitute a panel of independent institutional evaluators and get this panel approved by the Central Level Nodal Agency. Prepared state specific process guidelines, technologies manuals etc.	SLNA
2	State Steering Committee	Comprises Secretary level officers. Chaired by the Chief Secretary	Facilitate inter-departmental coordination Overall approval to work plans of WMD State Govt.	State Government

CONFLICT RESOLUTION: Every attempt should be made to resolve all conflicts within the Gram Sabha and Watershed Committees. The WDT will facilitate the villagers in this regard. In case of conflict among GP, WC, WDT and PIAs, the DWDUs will act as the conflict resolution officer. If Gram Sabha so feels that it requires formal arbitration, a three-member committee will be set up for the purpose of arbitration. It shall comprise the PM, DWDU, a nominee of the Gram Sabha and a nominee of the WDT.

In the above case if either party is unsatisfied with decision of the DWDUs then they can Appeal to Member Secretary, SLNA of the state. The decision of the committee at Member Secretary, level shall be final and binding on all parties.

Capacity Building of SHGs

Who: DWDU/SLNA

When: Upon identification of capacity building needs by the SHGs & PIA staff

- Prepare comprehensive capacity building plan in consultation with SHGs
- Training would cover the following areas:
 - Aspects including market analysis and trends, pricing, rights and rules, etc.
 - Production aspects of IGA including technical training
 - Value addition and storage

- Marketing
- Record keeping, bookkeeping and management of finances
- Follow up training to meet the ever-changing needs of the market
- Institutional development, cooperatives, federations

The abovementioned subjects will be covered under two sub-components of capacity building program:

Capacity Building Perspectives

Importance of CB is to be viewed from different perspectives based on its relevance to different sections involved directly or indirectly in the project. The strategic means of realization of the project goal needs to be understood in the context of delivering the services at the desired levels in qualitative and quantitative terms. Hence available human potential is required to be treated as a key and important medium of realization of such goal or the vision. Secondly, it becomes an essential condition to focus on the basic needs, relevance, operational aspects of CB which are the major concern for any project. Besides, the relevance of the adequacy of the present CB strategy needs to be examined from this perspective. It is always expected that ultimate user should have the ability to demonstrate and exercise the capacity to the possible extent in order to benefit from the activities or the project implementation phases. Accordingly relevance of CB can be examined from following perspectives.

Community Perspective

Appropriate assessment of people's problems pertaining to promoting and managing natural resource base and the related sustainable livelihood support options as indicated herewith has to be made

- Conceptualizing the problems from people's point of view in the context of the socio-economic and environmental surrounding, it's dynamics and its impact on people's livelihoods.
- Building up and enhancing community capacity in order to address local issues, like NRM, livelihoods and governance, in a collaborative and holistic manner.
- Initiatives to activate and sustain the process of development at grassroots under WORLP/JEEBIKA intervention on a long-term basis.
- Promoting and inculcating ownership oriented development initiatives.
- Accelerating quality output delivery in an integrated and participatory manner.
- Promoting effective collaboration, networking and coordination at local and regional level for influencing policy frame conditions.

Professionals' Perspective

- Appropriate attitude, interest and willingness to work with members of watershed and local institutions.
- Equipped and well versed with tools and techniques for meaningful understanding of grassroots reality.
- Enhanced conceptual understanding on situation specific livelihoods, environmental and political analysis and related issues.

- Improved delivery capacity at institutional and group levels to meet local development challenges.
- Widened spectrum of thinking and its reflection at grassroots
- Result oriented action and impact oriented drive.
- Meeting meaningfully the requirements of primary and secondary stakeholders.
- Improved operational and managerial capacity to deal with project framed components.

Project Perspective

- Meeting project requirements from social and technical aspects.
- Higher functional ability of staff for in-time delivery of project output.
- Improved delivery capacity with required conceptual understanding at various project levels to meet local development challenges.
- Fulfillment of laid out objectives through valuable action, replication and handing over of responsibility to local institutions.

Analysis of Current Processes

Though capacity building inputs are considered to be very critical, the delivery of such capacity building inputs has always been a challenge. The following are some of the difficulties encountered in delivering the capacity building inputs.

Planning and Execution of Capacity Building Action Plans

The process of developing action plans for capacity building is a recent experience. There is no action plan for capacity building inputs, for long. Though the action plans are prepared, the CBTs could not implement most of the action plans. The capacity building inputs are inconsistent with project cycle and sporadic in time line. The professional inputs are found to be inadequate – needs assessment, planning, sourcing the resource persons/ organization, delivery of capacity building inputs and follow up seem to be significantly improved. The coordination between state/ district/ PIA/ WC level seems to be inadequate in the context of capacity building. The issues related to unit costs, schedule of programs, changes in action plans, prioritization of activities are all generating considerable tension and friction between these members.

Relevance of Content

There is no uniform content and methodology of capacity building events. The capacity building is also perceived largely as “training” programs

Shortage of Resource Persons, Organizations and Material

There is always a shortage of resource persons, resource material and resource organisations. The support from line departments is available, but there are several operational difficulties in accessing their services.

Incomplete Efforts

The pilots and innovations under WORLP/JEEBIKA are not converted into capacity building modules/ resource material for other villages/ PIA/ CBTs. Though the efforts are made in some cases, the services of trained persons/ resource organisations are underutilized. The

partnerships established between resource organizations at state/ national level are not sustained. There is some kind of sporadic and adhoc approach in developing the partnerships with the resource organizations.

Financial Aspects

Unit costs devised earlier by various training organization may not be workable and inflexible, particularly when the resource centers (venues) and resource persons are not available. The approval and release of funds for capacity building activities seems to be complicated and cumbersome, particularly when the unit costs are not adequate to meet the costs of the training programme.

Human Resources Related

The priority to capacity building agenda is also low when it comes to actually delivering the capacity building inputs. The teams dedicated for this purpose are not engaged with the same responsibility. The Capacity Building Teams are asked to do other jobs, most of the time. The capacities of resource organizations/ persons are underutilized. Though considerable experience and expertise exists within the local teams, their services are not adequately used for the benefit of others. The availability of qualified WDT members is far less than requirement.

Only the WDT should be filled up immediately that would suffice the requirement. Engagement of local persons as WDT can help reducing attrition rates. (a) However, it will be necessary to provide capacity building inputs such cadre of local WDTs regularly and up grade their knowledge, skills and motivational levels.

Need for Capacity Building

Capacity building support is narrowly perceived as *training alone* approach at present. It is amply proved that the capacity building support includes several other inputs apart from training, such as hand holding support, community organization, enabling policy support, regular monitoring and review, facilitating innovations/ experimentation, interactions with experienced persons, exposure visits to successful projects sites, two-way communications and so on. In Watershed Based Livelihoods Projects, several learning opportunities are created to build capacities of watershed based institutions. "Learning by doing" principle is followed for creating all such opportunities.

A capacity building process would help the project achieve the following:

- *Empowerment of the target communities* – which would mean communities achieving control over their development processes; enhancement in their abilities to seek support from facilitating agencies; being able to speak up and challenge the situations that have suppressed them.
- *Improved Quality of Services* – which will mean greater ability in the communities to be able to access services that can help improve their lives and livelihoods; and greater ability in the facilitators to be able to support the community in their efforts; and a greater awareness of possibilities that exist.

- *Capacity for Participatory Processes* – which would mean the availability of a cadre of facilitators sensitive to the approach for development that tribal communities will require which would be more inclusive and participatory
- *Capacity for Participant Learning* – which would mean systems those allow for feedback and analysis and can impact attitudes, behaviours and promote sharing, trust, responsiveness and openness.

Activities towards capacity building focusing on awareness raising, training, exposure visits and empowerment etc with budget provisions for this purpose would be necessary

Capacity Building Strategy

It has to be realized that the CB strategy cannot be implemented without each trainer having a thorough understanding of the capacity building methods that can be used. The field of training and capacity building is a well developed and advanced field and over the past two decades or so there has been a major change in the way CB is being seen and dealt. However this understanding and more importantly its use has not been sufficiently translated into effective programmes at a large scale. This is the reason why the development sector is constantly short of capable people to take on the challenges at the field level. The CB needs are fairly varied and have been evolved over time to suit certain specific situations. Training enables three major things to happen, namely increase in knowledge, increase in skills and a change in attitude or a behaviour pattern. Different methods of capacity building would, therefore, have to be used to address different training and learning objectives. Appropriate methods in form of different learning objectives are to be decided carefully and implemented accordingly Hence redesigning the institutional arrangements for capacity building delivery of the project. It is proposed that this revised institutional arrangement be in place at cluster of project/ district/ state level and deal with the following aspects

- Giving priority to delivery capacity building inputs of the project
- Functioning at multiple levels
- Capacity building delivery to be detached from project management and administration.
- Partnership model and outsourcing the support.
- Addressing the learning needs of all stakeholders with same operating principles and mechanisms
- Depending on the resources that are already available

Guiding Principles

Recognising the need to improve the institutional arrangements for the delivery of capacity building inputs and the content in a systematic manner, following guiding principles is proposed for a detailed operational capacity building strategy for the state.

- I. Building on the existing capacities, resources and experiences and Creating and building new capacities in a systematic manner

- II. Providing need based and continuous capacity building inputs
- III. Capacity building inputs need to go beyond “training”.
 - a. Institution Development
 - b. Learning Opportunities (Training, Experiential learning, hand holding support, facilitation support and others)
- IV. Institutionalized and decentralized capacity building delivery
 - a. Belief in partnerships
 - b. Capacity building inputs will be in tune with the project management cycle (Key Events, Associated Actors and Required Skill/ Knowledge/ Attitudes for perform their roles in that event)
 - c. Action plan for providing capacity building inputs at all levels
 - d. Payment for all capacity building services

The perception that the capacity building inputs are to be provided free of cost towards capacity building services has two results - a) the capacity building inputs are not valued; b) appropriate and need based capacity building inputs are not provided. Another implication is underutilization of budgets or mis-utilization of capacity building funds. The capacity building strategy should strongly believe that each capacity building input is valuable and should be valued. For each capacity building service, appropriate service charges will have to be paid by the project. It is envisioned that the capacity building services from these centers/ institutions will be accessed by several other projects and programs, apart from the watershed projects. This guiding principle will help to improve the self reliance of the CB Institutions/Organisations.

The above guiding principles have been explained below.

- (i) Building on the existing capacities, resources and experiences and creating building new capacities in a systematic manner There are several resource organizations and persons who are currently partners of OWDM and/or working in the districts. It is important to recognize these resource persons/ organizations/centers and profile them. It is important to respect the local expertise, before exploring other options. The proposed institutional arrangements respect the local experiences and expertise and provide adequate role to the local existing capacities. Efforts will be made to improve the capacities of local institutions/ resource persons to meet the capacity building needs of the project. For all those needs, which are not locally met or which are strategically important, external resource organizations/persons would be accessed.
- (ii) Need based and continuous capacity building inputs

The proposed capacity building strategy recognizes that capacity building is a continuous process and does not stop with “one training program”. Relevant capacity building inputs need to be provided during the entire time frame of the project. A separate preparatory phase is created only to emphasize the need for intensive capacity building inputs at the initial stage to trigger the process and create base for future. Capacity building inputs are necessary in other phases of the project also, for completing the tasks successfully. The performance of the

functionaries needs to be continuously improved with required capacity building inputs with an aim to improving the skill, knowledge, attitude and behavioral aspects of different actors. The financial support should be available for all phases of the project.

(iii) Capacity building inputs go beyond “Training”

Capacity building support is narrowly perceived as “training alone” approach. It is amply proved that the capacity building support includes several other inputs apart from training, such as hand holding support, community organization, enabling policy support, regular monitoring and review, facilitating innovations/ experimentation, interactions with experienced persons, exposure visits to successful projects sites, two-way communications and so on. The proposed capacity building strategy encourages diversifying the capacity building inputs as part of action plans. The Livelihoods Resource Centers need to equip themselves to provide diversified capacity building inputs. In Watershed Based Livelihoods Projects, several learning opportunities are created to build capacities of watershed based institutions. “Learning by doing” principle is followed for creating all such opportunities. Available budgets are allocated for this purpose.

i. Institution Development

ii. Learning Opportunities (Training, Experiential learning, hand holding support, facilitation support and others)

The strategies followed for Capacity Building are :

- building on the existing capacities, resources and experiences and creating and building new capacities in a systematic and regular manner; need based, focused and continuous capacity building inputs;
- capacity building interventions beyond training;
- institutionalised and decentralised capacity building delivery;
- work with different institutions and share resources in order to organise / facilitate capacity building events for rural communities
-

Table 9.4: Stakeholder and critical capacity gaps

S.No	Project Stakeholder	Critical capacity gaps
1	Target community (ST, Farm Labourer, Marginal/ Small Farmer)	Not aware about the latest knowledge development and still not able to take benefit of various schemes.
2	GPs	Lack of awareness and orientation programme about watershed
3	Watershed Committees	Lack of skills
4	SHGs	Lack of skills
5	UGs	Lack of skills
6	WDTs	Deep knowledge and experience.
7	PIAs	Lack of advanced knowledge and exposure
8	DRDA/ZP cell	Lack of knowledge of similar activities in other state
9	SLNA	More skills to manage the watershed program effectively

Training of PIA staff, GPs and Watershed Committees, on the rules and regulations of the project.

Training of Secretary Watershed Committees to provide services to the Watershed Committees

Table 9.5: List of Training Institutes[@] identified for Capacity Building at State level

1	2	3	4	5	6	7
S. No.	Name of the Training Institute	Full Address with contact no., website & e-mail	Name & Designation of the Head of Institute	Type of Institute [#]	Area(s) of speciali-zation [§]	Accreditation details
1	ICAR Research Complex for Goa	Ella, Old Goa	Dr. N. P. Singh, Director	Central Govt	Agriculture, Horticulture, Poultry, Dairy	Accredited by Central Govt
2	Goa Institute of Public Administration and Rural Development	Govt. Farm, Old Goa	Ms. Seema Fernandes, Director Incharge	State Govt	Rural Development, Micro Planning	Accredited by State Govt.
3	Farmers Training Centre	Ella, Old Goa	Mr. Madhav Kelkar, Assistant Director of Agriculture	State Govt	Community Organization	State Govt
4	Krishi Vigyan Kendra	Old Goa, Tiswadi	Mr. Vishram Gaonkar	Central Govt.	Agriculture, Self Help Group,	Central Government
5	Krishi Vigyan Kendra	Govt. Farm, Margao	Mr. U.B. Kakode, Program Coordinator	State Govt	Agriculture, Fisheries, Self Help Group, Vermicomposting	State Government
6	National Institute of Rural Development	NIRD Campus, Rajendranagar, Hyderabad	Dr. M.V. Rao, IAS, Director General	Central Government	Rural Development	Central Government
7	MANAGE	Hyderabad	Dr. V. P. Sharma, Director & Chairman	Central Government	Agriculture Extension, Management	Central Government

Central govt. Dept./ State govt. Dept./ Autonomous Body/ Research Institutes/ Universities/ Others (pl. specify)

§ Capacity Building/ Agriculture/ Horticulture/ Animal Husbandry/ Pisciculture/ Remote Sensing/ Water conservation/ Ground water/ Forestry/ livelihoods/ entrepreneurship development/ others (pl. specify)

@ The training institutes must fulfill the conditions mentioned in the operations guidelines.

- (i) Technical experts in fields required by IWMP
- (ii) Past experiences
- (iii) Annual Turnover
- (iv) Receives funds either from the Central or State Government

- (v) Publications
- (vi) Not blacklisted by any Govt. organizations
- (vii) Audited accounts
- (viii) Organizational structure

b) Information, Education & Communication (IEC) Activities:

It is necessary to reach out to every stakeholder with the message about the watershed projects undertaken, its requirement, the benefits accrued by the beneficiaries and the state and ecosystem. For this different awareness activities will have to be undertaken to reach out to maximum number of people. Different media and mediums will be used to achieve this goal.

Electronic Media -Doordarshan, AIR, Internet, Dish TV, etc are available Medias, which could be used for educating the community

Print Media - Newspapers, posters, banners, leaflets, handbills, brochures.

Krishi Melas - District officers to select venue and time as per suitability and need for the krishi melas for organizing agri camps/melas

Community newspaper/newsletter: A monthly newspaper/newsletter could be brought out in local language highlighting the watershed activities.

The photographs of the community group meetings, discussions etc. could be pasted on a chart paper briefly describing the purpose of the activity, date, time, venue, major decisions taken etc. Such newspapers/newsletter could be placed at the venue of the community meetings. This would give the community members a sense of ownership and help to connect with the programme better.

Video shows: By showing docudramas during the meetings at the block/village/Panchayat level either using electronic or folk media awareness about the watershed programme could be generated and then ask for their feedback i.e their perception/reception of the message and misconceptions to be corrected.

Folk Media – Using Tiatr, Natak, Kirtan, Khel, Street Play

Outdoor/Reminder Medias - Hoardings, wall paintings, balloons, tin plates, bus panels, etc. The size has to be determined by the implementing office within the overall unit cost.

Hoardings, wall paintings, kiosks, tin plates, neon signs to be erected/painted/placed at the following places:

Venue of the community Group Meeting of the local Panchayat

Office of the watershed committee

Public Health Centre, School, Haat /Mandis where people gather

Chapter X

10.0 Monitoring and Evaluation (M & E)

The classical soil and water conservation approach of watershed development has undergone transformation over last few years and has been replaced with sustainable livelihood approach. Today's watershed development projects operate on a participatory platform wherein beneficiary community plans, implements and monitors the project after due capacity building and skill development from facilitator.

The watershed development program design integrates participatory monitoring and evaluation. Thus, designing an M&E system for any watershed and natural resource management programme is inevitable to provide a constant guidance for the project performance at all stages. M&E is also looked at providing project learning.

Monitoring involves tracking the progress of an act on a continuous basis. It can be defined as a function that monitors the ongoing process of intervention to provide the project staff, programme managers and key stakeholders indications about the progress of, or lack thereof, in achieving the targets. It does so by measuring inputs and outputs and any change in outputs due to change in inputs.

10.1 Objectives of an M&E System

Broadly the objectives of an M&E system are to:

- Provide ongoing feedback on performance of the project
- Help meet accountability and transparency standards
- Feed into planning, strategizing and decision making
- Contribute to project learning and advocacy

10.2 What to Monitor?

There are several things that the Project can monitor. It needs to be strategic in choosing what to monitor, how and how much. Some of the broad areas, which an M&E system address includes:

- Inputs: Money, Material, human resources
- Activities: A set of tasks performed (E.g. SHG meeting held, Plan for WHS Prepared)
- Process: A set of activities, towards a common purpose (e.g. Community contribution mobilised, Building of WHS)
- Outcomes: Series of effects of some action and activities (e.g. Reduced run off, increased recharging, Increased Water table)

- Impact: Changes in people’s lives and livelihoods (e.g. Increased income, reduced morbidity, increased capacity to negotiate)
- Outputs: Project Log frame defined (e.g. The livelihood asset base for the poorest is enhanced and diversified)

10.3 Levels of Monitoring:

Levels of monitoring are identified as per the level of stakeholder’s involvement. For example, the M&E system of WORLP operates through the following four levels, which are important for management, data aggregation, learning and feed-back:

1. Watershed level – Watershed Committee(WC),Users Group(UG),Self Help Group(SHG)
2. Block level – Project Implementing Agency(PIA), Watershed Management Team
3. District level – DWDU/ Project Director (Watersheds),Subject matter Specialists
4. State level – SLNA/Directorate, OWDM

10.4 Indicators for Monitoring & Evaluation

Indicators provide main criteria for monitoring and evaluation. These specify performance standards, target group (for whom), quantity (how much), quality (how well), time (by when) and location (where).Measurement against each indicators at different points of time gives reflection of the changes that has taken place during that period.

10.5 M&E Framework

Monitoring and evaluation of the effectiveness of the activities in bringing about the desired change in the system should be an integral component of any project. M&E are the key mechanisms for:

- Reporting activities against expenditure;
- Assessing the success of various CB initiatives and revising the approach towards capacity building accordingly; and
- Reviewing progress against targets and based on this information, reviewing the level to which targets is realistic and achievable in the given time – frame.
- Regular monitoring of the project will have to be carried out at each stage. Online monitoring must become a feature of all projects. Monitoring will include process and outcome monitoring. The PIA shall submit quarterly progress reports (countersigned by the Watershed Committee (WC) President) to the DWDU for further submission to the SLNA. The DWDU will have one member exclusively responsible for monitoring.

The SLNA will ensure that the following systems are followed at the appropriate levels:

- Internal Monitoring by project teams (PIA/DWDU)
- Progress Monitoring
- GIS/ Web Based On-Line Monitoring
- Self Monitoring by communities

- Sustainability Monitoring
- Social Audits
- Independent and External Monitoring by independent agencies
- Process Monitoring

10.6 Evaluation

In any project periodic evaluations are mandatory. The evaluations are conducted either by the internal /external agencies or personal or both. This is conducted to evaluate the project performance in terms of outputs, outcomes, processes and impacts.

Based on the information, reports and field observations the assessment or evaluation is carried to quantify or rank the performance of the projects, against pre-stated performance indicators. The evaluation findings strongly influence the decision making process such as release of funds, continuity of project including mid course corrections.

Sometimes, the project evaluation framework is predefined and is a part of the guideline, where as sometimes the methodology and indicators are worked out and agreed with stakeholders. The SLNA will prepare a panel of evaluators and get it approved by the Departmental Nodal Agency. The panel will include only institutions and agencies – not individuals. The SLNA will enter into a formal contract with these agencies. The DWDU may choose any agency from the SLNA approved panel, the only condition being that the agency should not belong to the area being evaluated. Each evaluation will include physical, financial and social audit of the work done.

Evaluators are to be seen not so much as inspectors but as facilitators. However, they will be very strict in ensuring that these guidelines are being followed. Fund release will depend on a favourable report from the evaluators. The concurrent and Post-Project evaluation would be conducted to assess the status of watershed related interventions.

10.7 Monitoring Budget

The DWDU with its specialist support team should frequently guide the PIAs and WCs for effectively implementing the project interventions as envisaged in the guidelines. The district team should constantly monitor and supervise the progress of the activities and should confirm that the activities carried out are as per the intentions of the guideline.

The PIA along with the WDT members

should facilitate, support and guide the community in implementing the project activities so that the project resources at the watershed level are utilized equitably and effectively. 1% of the total watershed budget will be allocated to the DWDU which comes to Rs. 1, 20,000/- per watershed.

Ideally for a district implementing 25,000 ha; the cost under monitoring comes to Rs. 30.00 lakhs. The district will spend the cost in establishing a workable monitoring system at the watershed, PIA and district level. Some of the cost will also be spent on establishing district level monitoring unit and data cell. Part of the cost if required may be spent under supervision conducted by the district level team members. Necessary contributions may

also be rendered to the State level for establishing a workable monitoring mechanism at the State level as per the need.

10.8 Evaluation budget

One per cent of the total watershed budget will be allocated under evaluation which comes to Rs. 1, 20,000/- per watershed of 1000 ha. Ideally for a district implementing 25,000 Ha, the cost under evaluation comes to Rs. 30.00 lakhs. 1.0% of the total watershed budget will be allocated to the SLNA under watershed budget. The SLNA will ensure in carrying out periodic evaluation, impact assessment and terminal evaluations as per the guidelines and will pay the cost of Agency/institutions and production of reports etc.

10.9 Financial Audits

A major part of the watershed fund will be provided to the new community based organization at the village level which may not have previous experience in handling such large amounts. Besides training of its committee members on account keeping, there is a need to carry out internal auditing (once in three months) and external auditing (once in a year) so that maintenance of accounts could be suitably undertaken. Annual auditing of above accounts will be required under Societies Registration Act. For this purpose District Nodal Agency may identify a panel of CAs, preferably approved by CAG of which the WA/PIA may select any one. This is besides the mandatory annual AG audit of funds released to the District Nodal Agency. Accounts at both these places will have to be maintained keeping requirement of above audits in view. There is a need to orient watershed committee members that responsibility for addressing the audit paras lies with them. Discussion on the audit paras and follow up action should be worked out in the open meetings of WA. Social auditing through transparency at every stage is also a crucial requirement for proper financial management.

Hence, all developmental transactions should be approved preferably on monthly basis by the watershed association.

10.10 Gains from an M&E System

A robust M&E system establishes base line to create benchmark on which performance of a programme is evaluated. It checks the pulse of the project and informs stakeholders to take appropriate measures at different stages of the project cycle. It also informs project, to what extent project has achieved the project objectives. It creates opportunities to review the plan and encourage mid course corrections. It contributes towards the learning loop of the project so that the best practices are documented and widely replicated. The inclusion of participatory monitoring makes best use of the information at

the source. Thus community set examples in terms of empowerment, transparency and ownership of the project.

Table 10.1: List of Institutes[@] identified for M & E at State level

1	2	3	4	5	6	7
S. No.	Name of the Training Institute	Full Address with contact no., website & e-mail	Name & Designation of the Head of Institute	Type of Institute [#]	Area(s) of speciali- zation [§]	Accreditation details
1	ICAR Research Complex for Goa	Ella, Old Goa	Dr. N. P. Singh, Director	Central Govt	Agriculture, Horticulture, Poultry, Dairy	Accredited by Central Govt
2	Goa Institute of Public Administration and Rural Development	Govt. Farm, Old Goa	Ms. Seema Fernandes, Director	State Govt	Rural Development , Micro Planning	Accredited by State Govt.
3	Farmers Training Centre	Ella, Old Goa	Mr. Madhav Kelkar,	State Govt	Community Organization	State Govt

Central govt. Dept./ State govt. Dept./ Autonomous Body/ Research Institutes/ Universities/ Others (pl. specify)

§ Capacity Building/ Agriculture/ Horticulture/ Animal Husbandry/ Pisciculture/ Remote Sensing/ Water conservation/ Ground water/ Forestry/ livelihoods/ entrepreneurship development/ others (pl. specify)

@ The M&E institutes must fulfill the conditions mentioned in the operations guidelines.

Chapter XI

EXPECTED OUTCOMES

11.1 Program Outcomes/ End Results

Watershed Management works entail considerable amount of budget and hence a proper monitoring and impact evaluation is desired to assess the benefits accrued out of the expenditure incurred. Thus, to monitor the achievement of our defined project objectives certain output indicators have been designed which will help in quantifying the objectives. Any change in achievement of objectives will help in flagging our procedural shortcomings like ineffective community mobilization, poor PRA process improper prioritization of natural resource management objectives etc. The first outcome of the project is to improve the productive potential of natural resources and increase incomes of rural inhabitants in selected watersheds through socially inclusive, institutionally and environmentally sustainable approaches. Towards this the Communities are mobilized and will prioritize their own mix of watershed development technologies by actively involving all households. The Local Authorities i.e. Gram Panchayats will directly implement the mix of watershed treatments and village development investments using appropriate User Groups/sub-committees at revenue village levels (if necessary). The farmers are expected to adopt new high value crop, horticulture, fisheries and livestock technologies those are resource efficient and give better output per unit of input. Farmers are also expected to adopt appropriate technologies for processing, storage and market linkages to increase the value of their produce. The execution of the project will ensure that vulnerable groups (including women) will establish Self-Help Groups (SHGs) and implement income generating activities. Every project is expected to strengthen the WC and other relevant local institutions by developing sufficient capacity to design, prioritize, implement, operate and maintain watershed treatments. It is also expected that all stakeholders are informed and educated about key design and participation features of the project using targeted messages evolved through a comprehensive communications strategy. To establish and operationalize effective and efficient project coordination, management, monitoring and evaluation system.

Each Watershed Development Project is expected to achieve the following results by the end of the project period:

- (a) All the works/activities that are proposed for the treatment and development of the arable, non arable lands and drainage lines in the watershed area are completed with the active participation and contribution of the Self Help/ User groups and the village community.
- (b) The user groups/watershed association/ panchayats have willingly taken over the operation and maintenance of the assets created and made suitable

administrative and financial arrangements for their maintenance and further development.

- (c) All the members of the Watershed Committee and staff such as Watershed Secretary and Volunteers have been given orientation and training to improve their knowledge and upgrade technical/management and community organizational skills to a level that is appropriate for the successful discharge of their responsibilities on withdrawal of the Watershed Development Team from the Project.
- (d) The village community would have been organised into several, homogeneous self help groups or user groups for savings and other income generation activities which would have achieved sufficient commitment from their members and built up financial resources to be self sustaining.
- (e) The increase in cropping intensity, diversity of crops and agricultural productivity reflecting in overall increase in agriculture production.
- (f) Increase in income of farmers/ landless labourers in the project area either through farm or non farm based activities.
- (g) Increase in groundwater table due to enhanced recharge by watershed interventions.
- (h) Increased employment generation for wage employment and self employment.
- (i) Reduction in persons/days of migration.
- (j) Increased availability of drinking water and its improved quality.

11.2 Success Criteria

A few measurable and quantifiable criteria are to be fixed for different categories of works/activities under the projects to evaluate their success or otherwise in terms of the stated purposes. The proposed criteria are to be minimal in number as well as in performance standards.

The proposed criteria can broadly be grouped in 5 categories namely, (a) Physical development (b) Financial management (c) Human capital development (d) Social capital development and (e) Post project sustainability. Specific success criteria under each of the above categories will be decided by SLNA.

11.3 Estimated Outcomes

The estimated outcomes will be quantified at each microwatershed level which in turn will be consolidated at each Zonal Agriculture Office Level and further at each District level. There would be some tangible and others non tangible outcomes. They may be direct such as increase in water level or vegetation or indirect such as increased in confidence level of women or leadership development amongst the women members of the Self Help Group. Each district (North & South Goa) will be recording its outcome in definite measures as mentioned in the following table.

Table 11.1: Expected post project status for impact indicators

1	2	3	4	5	6	7
S. No.	Name of the District	Item	Unit of measurement	Pre-project Status	Expected Post-project Status	Remarks
1	North Goa	Status of water table	Meter	Being ascertained	30% increase in level	
		Ground water structures repaired/ rejuvenated	No.	Being collected	To be estimated	
		Quality of drinking water	Qualitative	Biological contamination	Reduction in contamination by 50%	
		Availability of drinking water	No. of months	Nine months in some hamlets	12 months in all hamlets	
		Increase in irrigation potential	Ha.			
		Change in cropping/ land use pattern	Type	Rice based cropping with single crop	Rice based cropping followed by pulse or vegetable.	
		Area under agricultural crop				
		i Area under single crop	Ha.			
		ii Area under double crop	Ha.			
		iii Area under multiple crop	Ha.			
		Net increase in crop production area				
		Increase in area under vegetation	Ha.			
		Increase in area under horticulture	Ha.			
		Increase in area under fuel & fodder	Ha.			
		Increase in milk production	Liters			
		No. of SHGs & UG	No.	SHG (members) UG (members)	SHG (members) UG (members)	
		Increase in no. of livelihoods	No.			
		Increase in income	Rs./Year			
		Migration	No. of person			
		SHG Federations formed	No.			
		Credit linkage with banks	No.			

		Resource use agreements	No.			
		WDF collection & management	Rs.			
		Summary of lessons learnt				
