

## Water, Households & Rural Livelihoods

# Water and Sustainable Rural Livelihoods in Andhra Pradesh: Background paper

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Research promoting  
access of the poor  
to sustainable water  
supplies for domestic  
and productive uses  
in areas of water  
scarcity

### WHIRL Project Working Paper 3

Preliminary results of research for  
discussion and comment

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## ACKNOWLEDGEMENTS

A background paper has to depend on secondary sources. Four were used extensively and are acknowledged:

1. TARU/DFID (2000) "Situational Analysis for State Strategy for Water and Environmental Sanitation: Anthra Pradesh", prepared for DFIDI by TARU Leading Edge, December 2000.
2. Scott Wilson (1998) "Andhra Pradesh Water Resources Scoping Study", Final report submitted to the Department for International Development, Water and Environmental Sanitation Group, New Delhi, September.
3. Rajendra Jani (1999) "Institutional Analysis", Andhra Pradesh Water and Environmental Sanitation Sector Development, report submitted to Department for International Development, Water and Environmental Sanitation Group, New Delhi, December.
4. Batchelor, Rama Rao and James (2000). KAWAD Water Resources Audit. KAWAD Report 17, June 2000, published by the Karnataka Watershed Development Society of the DFID supported KAWAD project.

Separate references are given for additional source material cited in the paper.

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# **INTRODUCTION**

## **Purpose**

This background paper draws together information concerning water supplies, rural development and rural livelihoods on Andhra Pradesh. It does not aim to be comprehensive but, instead, to give the major features of these issues. More details are available in the Annexures to the paper and in the literature cited at the end.

## **Content**

The paper aims to appeal simultaneously to - and interest - an audience with vary varied backgrounds and knowledge on the issues it covers. It therefore is written in a simple style, with a lay audience in mind, with details for the interested reader given in the Annexures and the literature cited.

## **Structure**

The paper is arranged in three basic parts. The first gives basic details about the state of Andhra Pradesh and its people. The second discusses issues of interest to the project – poverty, water, livelihoods and convergence. The third outlines one view of the way forward – covering demand management, participatory natural resource management, action research, good governance and knowledge management - and is meant to be a basis to initiate discussion, not a wish-list of future action. Annexures with relevant details, and a list of references, follow.

## **Final version of this paper**

A revised version of this draft paper will be published on the project website at <http://www.nri.org/whirl/>

## Section 1

### Andhra Pradesh: The Place<sup>1</sup>

#### 1.1 INTRODUCTION

Semi-arid India looks much the same - dry and brown in summer, with rocky outcrops, few trees, water bodies few and far between, houses clustered in villages surrounded by fields, and rock-strewn roads connecting villages to main roads. But there are differences in the geo-hydrology, the vegetative species, the crops grown and the technologies used to capture and store water – just as there are differences in language, customs, food, dress and ornaments.

Semi-arid south India, especially Karnataka and Andhra Pradesh, have a lot in common too. The granites, the red soil tracts and the black soil tracts, paddy and groundnut, the tanks and other water harvesting structures (*kuntas*), the sparse tree cover, and the old dug wells which were traditionally good sources of water and the newer borewells (with their high failure rates).

But there is a wealth of detail that informs the lives of the people of rural Andhra Pradesh, and the following pages will hopefully give the flavour of these details.

#### 1.2 GENERAL

##### Population

Andhra Pradesh covers an area of about 275,000 sq. km. It is the fifth largest state in India and the fourth most populous. It has a population of 66.5 million in 1991, projected to be around 75 million in 2001. Nearly 3/4ths of this population live in rural areas.

##### Administrative and other divisions

Andhra Pradesh has 23 districts, each of which is divided into revenue mandals. Anantapur district, for example, has 63 mandals, while Kurnool has 28. Each mandal has around 20-35 revenue villages with Gram Panchayats (village government). Each revenue village may have between 1– 5 habitations.

The state can be also divided into three regions - Coastal Andhra, Rayalaseema and Telengana on the basis of history and social and cultural divisions. The tribal dominated hilly areas which spread across the Telengana and Coastal Andhra regions can be considered a fourth zone as they are particularly under developed and have a unique set of problems.

Districts	23
Revenue Divisions	74
Mandals	1,110
Gram Panchayats in Revenue Villages	19,499
Inhabited villages or Habitations (1991 census)	26,586

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<sup>1</sup> This section is based on TARU/DFID (2000), and Jani (1999).

## Rivers and Droughts

The state is drained by three major perennial rivers, Godavari, Krishna and Pennar, and several other rivers of lesser significance. The majority of the rivers flow easterly towards the Bay of Bengal. The state has areas rich in water resources, but also has semi-arid regions where agriculture is mainly rainfed. Droughts and water scarcity in summer months are a recurrent phenomenon in these semi arid zones.

## Climate

AP falls under the semi-arid region of peninsular India and has a typical tropical climate: hot summers but relatively pleasant winters, especially in the plains of the interior. Four distinct climatic seasons can be distinguished:

- March – May                      pre-monsoon season or summer seasons
- June – September              south-west monsoon season or monsoon season
- October – November          retreating monsoon season or the autumn season
- December – February        The winter season or cool season

Traditionally, the monsoons are known to bring rains from July to September (south-west monsoon), but scattered rains from April onwards build into heavy showers in August, September and October, tapering off by December. The hot season starts from March, builds to a peak in June, and begins to taper off with the monsoon rains. Temperatures can rise above 40 degrees centigrade during the summer.

## Economic trends

Although agriculture has historically been the main source of income and livelihoods, this is changing. The share of agriculture in the state's income has reduced from 59 percent to 38 percent between 1960 and 1995. Gains have been made by both the secondary sector (e.g., mining, manufacturing, construction and utilities) – from 12 to 19 percent - and the tertiary sector (services) – 29 to 43 percent.

## 1.3 RURAL ANDHRA PRADESH

### Drinking Water

Only about 14 percent of rural households have access to piped water schemes to meet drinking and domestic water needs. Most use water from tubewells or open wells, while a small minority use tanks and springs. Hence there is a high dependence on groundwater for drinking and other domestic purposes.

Nearly 90 percent of rural households collect water from community sources, which are often remote and suggesting that a substantial amount of time and effort goes into water collection in rural AP.

By 1993, only about 60 percent reported access to safe drinking water. And only 11 percent had these sources within their own premises.

Of 69,732 habitations in the state, 38,138 habitations are currently considered not to be provided with safe drinking water throughout the year (Scott Wilson. 1998)

Nearly 70 percent of the rural population is reported to have access to safe drinking water as per planning norms (40 litres per capita per day), but this may not be accurate.

Water quality is a problem in the state. Coastal salinity and fluoride are the most common quality problems for groundwater. Seawater intrusion has occurred in the coastal regions and aquaculture is also affecting coastal zone aquifers since the tanks are located in sandy areas. Fluoride affects interior semi-arid areas, especially Nalgonda, Anantapur, Cuddapah, Gunter, Nellore, Chittoor, and Krishna. But more than half of the quality affected habitations are yet to be covered.

## **Sanitation**

The general situation is dismal. Only about 15 percent of rural households had access to sanitation facilities in 1994. And only about 3 percent of latrines had flush water facilities. The vast majority of rural households, thus, use 'the bush'.

Since 1997, however, the state has changed its emphasis from providing community latrines to individual latrines. It has been spending more money and is working through the *Janmabhoomi* campaign and the mandal development authorities. Apparently over 1 million latrines have been built under this initiative, and demand responsive approaches like Rural Sanitary Marts have been started in a few districts. But studies (e.g. by TARU) indicate that there has not been much impact on the ground.

## **Electricity**

More than 60 percent of all households report access to electricity. The proportion is lower (53 percent) among low income households and SC/STs (47 percent).

This is an underestimate given the extent of illegal electricity connections. This is especially visible in urban slums and in villages, where there is often a forests of wires hooked on to the main electricity lines.

The main problem, however, is of supply. The electricity supplied by the state electricity board is extremely erratic, of low voltage, and for barely 6 hours a day. There are currently no private suppliers.

## **Housing**

There were about 10 million rural houses in the state in 1991. Compared to the past, there has been a visible shift towards brick and cement concrete. But compared to the rest of India, more families in rural Andhra Pradesh rent houses, which are comparatively smaller too.

## **Health Conditions**

While the government provides most of the preventive health measures, the private sector plays a dominant role in diagnostic and curative services. About 85 percent of the doctors work for the private sector in AP. The private sector collects about 80 percent of the expenditure on health.

But quality private health services are not available to large sections of the rural

Fertility rates in the state have been declining rapidly in recent years.

Communicable diseases are a major health problem.

There are about 70,000 diarrhoea deaths per year.

The infant mortality rate is marginally lower than the national average (77 as opposed to 81).

*Source:* TARU/DFID (2000), pp. 4-5



population. Also, these do not cater to many of the diseases most common among the poorest and most vulnerable sections of society.

### **Disabilities**

Disability is severely neglected. Andhra Pradesh has a high prevalence of people with disabilities (1.5 million disabled people in the 1981 census), with females accounting for about 47 percent of the disabled in the state (blind and physical impairment of limbs). Women and girls with disabilities are handicapped not only by negative attitudes towards disability, but also by gender discrimination and poverty. No one, for example, would choose to marry his or her son to a disabled girl, however minor the disability.<sup>2</sup>

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<sup>2</sup> A woman whose leg was broken in a road accident when she was a teenager remained unmarried and childless in her forties because poor care of the fracture had left her with a bad limp. Her case is not unusual. In a culture where marriage and children are important signs of social status such women suffer considerable stigma. (Janet Seeley (2000), "In search of a healthy life... skeletal fluorosis, disability and the rural livelihoods framework", pre-publication draft.

## Section 2

# Andhra Pradesh: The Rural Economy and People

### 2.1 INTRODUCTION

This section takes a look at the rural economy and people from slightly unorthodox point of view. It is more descriptive and meant to give a flavour of rural life in Andhra Pradesh. Obviously these have to be broad generalisations, but they will hopefully be supplemented, adjusted and updated with field experience along the travelling workshop.

### 2.2 THE RURAL ECONOMY

Agriculture is the mainstay of the rural economy in AP and Karnataka, and agriculture related activities support the largest proportion of people and provide the largest share of total income to the people. But rice mills, flour mills, and oil presses sit side by side with motor repair shops, provision stores, drug stores and small hotels in the small rural towns. There are also granite and limestone mines in these parts, which provide employment to local labour but export the produce. By and large, private enterprise is dynamic in these rural towns. Transport industries are therefore important, but road links are not always good.

Local produce markets in district towns and tehsil towns are often controlled by market operators, and there are established codes of conduct which ensure the exploitation of those who either don't know or do not have the 'clout' to get a good deal. Commission agents buy produce on auction, and small farmers who venture to sell directly here have little negotiating power and have to take the offered price. Larger farmers have the leverage to negotiate good price with commission agents, often withholding their produce from the market till they get the right price (most usually done in cotton). Others may be able to market in other towns for better prices (e.g., Bangalore farmers sold their tomatoes in Kurnool market during the cyclone of 1999 which destroyed a large part of the AP crop).

### 2.3 THE RURAL PEOPLE

In the absence of a full-fledged sociological profile of the various groups in a rural community, the best way to get a feel for rural life in AP is perhaps to take a hypothetical 'walkabout'. Imagine yourself in a typical AP village. Who you may meet and what you may find are probably something like the following.

#### *Farmers and Labourers*

Agriculture is the mainstay of the overwhelming majority of Indian villages. Most of the land, however, is concentrated in the hands of a few large and well-off farmers, while about 80% of the farmers cultivate about 20% of the land. These are the poor and marginal farmers with land holdings below 1 hectare (2.5 acres), who often have fragmented land holdings (because of sub-division on inheritance), frequently of poor soil quality, and with limited access to water. Such farmers typically cultivate only one rainfed crop in kharif (sown in June-July). Studies have shown that it is extremely difficult for a farmer with 1 hectare or less of land – even given the best of seeds, agro-chemicals and water - to earn enough in a year to keep a family of 5 (the average family size here) to keep them above the poverty line.

Hence most of these farmers (and definitely their wives and daughters) look for alternative sources of livelihoods when they cannot cultivate their own fields. Earlier most used to work on larger farmers' fields as agricultural labour, especially during the second (rabi) and third (summer) cropping seasons. Some used to migrate to nearby towns and cities in search of work. More recently, however, migration seems to have increased. Villages in Andhra Pradesh (Dhone mandal, Kurnool district) report a shortage of agricultural labour because they are migrating to factories in nearby towns.

But it is not just the small farmers and their families who work on larger farmers' lands or migrate in search of work. About 20% of the typical village population comprises landless labour, who were available to work on larger farmers' fields. During the off-season, they also work as truck loaders in neighbouring towns, returning to their villages with daily wages. Today, several of them migrate for longer periods of time search of work outside the village.

### *Artisans and Craftsmen*

Both artisans and craftsmen are a dwindling group in villages, because of a lack of patronage. Both depend on demand for the output, and are finding it difficult to compete with cheaper (or better) manufactured goods coming into towns and cities. The cobbler, the tailor, the potter, the weaver, the blacksmith, and others are surviving on the bare minimum of village demand. Reading the changing times well, many are not passing their skills on to their children.

In fact, apart from interior villages where competition has not been that severe, these arts and crafts have survived largely because of support from government schemes or private initiatives (e.g., the sari and khadi weavers, handicrafts and toy makers).

### *Women*

Rural women may belong to relatively well-to-do upper caste families or poor lower-caste families.

Traditionally, poor rural women have worked alongside their husbands in fields, brought up children, managed the house, kept accounts, collected water, fuelwood, fodder, looked after the animals, and looked after their husbands, children and in-laws. They are poorly educated (mostly illiterate), either due to the prevailing custom of not educating girl children or a lack of means while growing up, and they have little time or opportunity once they are married off. They have also to manage medical emergencies, including during pregnancy and childbirth, and often have only the traditional midwife or senior women in the village to go to for help. Widows and other women running female-headed households have to work even harder to support themselves.

Some of this drudgery, however, is alleviated by the support groups rural women form with other women in the village. These groups provide a basis for positive social networking while doing common chores – like collecting water, fuelwood and fodder. But this also depends on the kind of ties that grow within these groups.

Thus, theirs continues to be a harsh existence, with little relief from their daily drudgery, little control over their own time or money. But this is alleviated somewhat by their daily meetings with their support group, celebrations like festivals and weddings and the joys of bringing up children.

The elite rural women tend to have power and prestige in the village, though this may not always be true in their own homes. While some of these women are said to exercise considerable power over their husbands, including taking decisions on crop choice, this may not be true in all cases.

### *Children*

Children are perhaps the most cheerful and omnipresent facet of rural villages. Curious, unafraid to stare, and ready to smile, they are unconcerned about their running noses, bare feet, unkempt hair and ragged clothes. If they are fortunate enough to have a school and a regular and dedicated teacher – and if their parents can spare them from work - they get an education. But more often than not, the conditions are not ripe. They are often uninformed about health issues, hygiene and sanitation, since their mothers are often uninformed too. Diseases can still kill and infant mortality is still high in many parts of rural India.

### *Youth*

The fortunate few among the educated youth go off to cities to study further and get city jobs, preferably in the government. These are either from well-off homes or good academic performers. The rest stay on in the village, joining their parents in labour in their own or others' fields or working as daily labourers in nearby towns. Some of them hang out in district government offices or with local politicians in search of livelihood. Some try to start small businesses like tea-stalls in their own village. Only a few manage to get regular work. But some smart and fortunate ones may be able to start agricultural marketing businesses – buying the produce of entire mango orchards from large farmers and selling it to local town tradesmen at a margin. Such ventures, however, are few and far between.

### *The Old*

Wealth is probably the most crucial factor affecting the treatment of the elderly. Patriarchs of large and prosperous families tend to wield considerable influence both within the village and in their own homes. Several of them may have held political posts in the village or Gram Panchayat, and have built up a set of important contacts. They may hence be approached to 'solve' local problems, put in a word on someone else's behalf, or to help decide on village affairs. They usually have grand funerals.

The aged poor, on the other hand, suffer immensely because of their frailty. When the son and his family are struggling to make ends meet, the elderly parents are seen only as an extra pair of mouths to feed. It is not uncommon for old parents to be fed last, with the leftovers. Healthcare is virtually non-existent as are aids for the disabilities of age.

### *The Ill and the Disabled*

These are an important category of rural poor, often left out of development projects. The ill can be divided into those with chronic afflictions (e.g., skeletal fluorosis), and those with a high susceptibility to diseases (due to malnutrition, neglect, etc.). The disabled are the blind, lame, deaf, mute, those with bone disorders, mental handicaps, and other serious complaints. The numbers of ill and disabled persons in rural areas are unreliable if collected at all, and only health campaigns (such as the one run recently by the Collector of Anantapur district to check for poor vision) manage to make contact with these people. Redressal is another story.

Added to disability is social stigma, with disabled girls unable to find grooms, others being ostracised within society and left to fend for themselves in several instances.

With the poor state of healthcare and support mechanisms, and with superstition still rife in many parts of the country, including AP, the disabled have a much harder time than their poor but able-bodied neighbours.

## Section 3

### Poverty<sup>3</sup>

#### 3.1 STATISTICS OF POVERTY

##### Defining Poverty

Poverty is usually gauged by the amount of money to buy sufficient food. Currently, if you do not have Rs. 10 per day to spend on food that gives you adequate nutrition, you are poor. The poverty line in rural India is set slightly lower at around Rs. 250 per month per person. Thus, if a family of five (the average family size) does not have Rs. 1,250 per month (or Rs. 15,000 a year) to buy food, it is poor.

The annual per capita income in Andhra Pradesh should be roughly around Rs. 7,500 currently (in 1995 it was Rs. 7,155) – or Rs. 37,500 for a family of five.

##### Poverty in AP

Currently, about 20 percent of the population in AP below the poverty line. This is a steep decline from the past. The same trend is true of rural populations as well.

The National Sample Survey of India reports that 13 out of every 1,000 households do not get to eat two full meals a day throughout the year in rural Andhra Pradesh. During the high stress months of May and June, the number of such households rises to 18-20 per 1,000.

#### 3.2 UNDERSTANDING POVERTY

Three main reasons why people find it difficult to earn enough to stay above the poverty line are:

- *Area poverty* The area itself could be under-developed, with bad roads and other infrastructural provisions, no electricity, as a result of neglect by government development schemes.
- *Resource poverty* Coupled with area poverty, there could be a poverty of natural resources in the area – deforestation, degraded and unfertile soil, lack of surface or ground water, etc. – could make it difficult for the inhabitants to earn a living.
- *People poverty* – Linked to the two above reasons, there could be illiteracy, a general lack of awareness, malnutrition, superstition, lack of hygiene and sanitation, caste-based oppression. All of which could keep the population in poverty and despair.

Some people may not have been born into a poor family, but may fall into poverty over time. This may be due to:

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<sup>3</sup> This is a general section since the concepts are not specific to Andhra Pradesh. The schemes for poverty alleviation and rural development are also centrally-sponsored and hence not specific to Andhra Pradesh. Both, however, impact on the people of Andhra Pradesh.

- *natural reasons*: such as the fragmentation of land holdings, resulting in less than economical holdings for the later siblings
- *bad luck* – if for instance a father or husband dies or if the head of the family has an accident that makes it impossible for them to carry out their trade, or a disabling disease (e.g., polio or skeletal fluorosis). It could even be a bad business investment (e.g., a tea shop that failed).
- *indebtedness* - the slide into poverty could be because of heavy borrowing for weddings (to buy a groom for e.g.,) and festivals to keep up status and a subsequent inability to pay.

### 3.3 GOVERNMENT POVERTY ALLEVIATION PROGRAMMES

#### 3.3.1 An Overview of Anti-Poverty Programmes in India<sup>4</sup>

The major focus of Indian policy on poverty alleviation in the 1950s was land reform. However, the Community Development Programme, the Rural Health Services, National Housing Programme and the Rural Water Supply Scheme, and the Public Distribution System were also programmes initiated during the 1950s to assist the rural poor.

Realising that this policy focus was insufficient to reduce poverty, the Planning Commission pushed for a direct attack on poverty, affirming that 'the central concern of our planning has to be the removal of poverty as early as possible' and that 'the stage has come when we should sharply focus our effort on providing an assured minimum income to every citizen of the country within a reasonable period of time.' (Planning Commission, 1962, p. 13). But although a large wage employment programme (the Rural Manpower Programme) and a Basic Minimum Services (BMS) programme were started in the 1960s, the focus during this period was more on improving agricultural production, with the Green Revolution programmes - the Intensive Area Development Programme (IADP), the Intensive Agricultural Area Development Programme (IAADP) and the High Yielding Varieties Programme (HYVP). The thinking behind this focus was that agricultural productivity increases can effectively decrease poverty.

This thinking led, in the 1970s, to the initiation of area development initiatives like the desert-prone areas development programme (DPAP), and the desert development programme (DDP), the Hill Area Development Programme (HADP) and the Command Area Development Agency (CADA). However, these programmes had a distinct emphasis on the poor, as did other initiatives started during this period to support special groups, like the Small Farmer Development Agency (SFDA) and the Marginal Farmer and Agricultural Labour Development Programme (MFAL).

However, agricultural development and anti-poverty programmes were not formally integrated at the policy level. Nevertheless, there is some evidence more recently that technology-driven agricultural productivity growth may not have a significant impact on poverty (Ghaia, 1991).

A significant departure from the programmes of the 1960s and early and mid 1970s was the initiation of the Integrated Rural Development Programme (IRDP) in 1979 which, for the first time, sought to focus on target groups within the poor, and enable them to obtain self-employment. There were four sub-schemes to this programme, Training of Rural Youth for Self Employment (TRYSEM), Development of Women and Children in Rural Areas (DWCRA). (Two other sub-programmes, the Supply of Improved Toolkits to Rural Artisans (SITRA), and the Ganga Kalyan Yojana (GKY) were added in the 1980s and 1990s respectively).

Along with the IRDP, two major employment generation programmes, the National Rural Employment Programme (NREP), the Rural Landless Employment Guarantee Programme (RLEGP), were begun in the 1980s, which were replaced in the late 1980s/early 1990s by the Jawahar Rozgar

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<sup>4</sup> From James and Kaushik (2000), "Review of government anti-poverty programmes in Rajasthan", report to the District Poverty Initiatives Program (Rajasthan) of the World Bank, New Delhi. Chapter 1.

Yojana (JRY), the Million Wells Scheme and the Employment Assurance Scheme (EAS). The 1980s and 1990s also saw the formulation of initiatives like the Accelerated Rural Water Supply Programme (ARWSP), the Central Rural Sanitation Programme (CRSP), the Indira Awas Yojana (housing for the poor), National Health Policy and the Tribal Sub Plan (TSP), all of which were designed to assist the poor more directly.

Agricultural growth in the 1980s failed to make a sizeable dent in rural poverty (Rajakutty, 1998), because of declining public investment in agriculture, a consequent reduction in the rate of growth of agriculture, and the limited impact of technology-driven agricultural growth on poverty reduction. This resulted in a call for more concerted and direct policies on poverty alleviation (see below).

All the above are centrally-sponsored schemes. The dominance of such schemes, as opposed to State government schemes, is deliberate and occurred largely because, although rural development and agriculture are state subjects, state governments were hesitant to formulate specific schemes for want of expertise, resources and political will (Rajakutty, 1998, p. li).<sup>5</sup> The dominance is also in terms of funding. While central government outlays for rural development and social sectors more than doubled from 1990 to 1995, state governments have actually been reducing their share (*id.*)

### 3.3.1 Types of Anti-Poverty Programmes

The direct 'attack on poverty', which really came into its own from the late 1970s, was centred on two types of anti-poverty programmes (APPs):<sup>6</sup>

- **Self Employment Programmes:** Programmes aimed at enhancing the capabilities of the poor for self-employment include the Integrated Rural Development Programme (IRDP), Training of Rural Youth for Self Employment (TRYSEM), Development of Women and Children in Rural Areas (DWCRA), Supply of Improved Toolkits to Rural Artisans (SITRA), the Ganga Kalyan Yojana (GKY) and the Million Wells Scheme (MWS). These have now been replaced by a single programme, the Swarnajayanti Gram Swarozgar Yojana (SGSY).
- **Wage Employment Programmes:** Programmes which aimed to provide casual wage employment to rural workers comprise the Jawahar Gram Swarozgar Yojana (JGSY) (the revamped Jawahar Rozgar Yojana (JRY)) and the Employment Assurance Scheme (EAS), and their predecessors, the National Rural Employment Programme (NREP), the Rural Landless Employment Guarantee Programme (RLEGP), the Small Farmers Development Agency (SFDA), the Marginal Farmers and Agricultural Labourers (MFAL) programme, and the earlier schemes, the Employment Guarantee Scheme (EGS) and the Rural Manpower Programme (RMP).

In addition to these 'direct' APPs, five types of government programmes and initiatives supplement the attack on rural poverty.<sup>7</sup>

- (1) **Programmes for increasing agricultural production:** These include the Green Revolution Programmes like the IADP, IAADP and the HYVP, as well as special area development programmes, to counter endemic poverty caused by hostile agro-climatic conditions and degeneration of ecosystems, which include the Drought Prone Areas Programme (DPAP), Desert Development Programme (DDP), Hill Area Development Programme (HADP), and the Integrated Wastelands Development Programme (IWDP).

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<sup>5</sup> While the lack of resources and political will are plausible, the perceived lack of expertise is more difficult to accept.

<sup>6</sup> These features are well-known. See for instance Hashim (1998).

<sup>7</sup> Authors use different schemes to classify the same group of government programmes. The classification used here is adapted from those presented in Hashim (1998), Rajakutty (1998), Ramachandraiah and Prasada Rao (1998) and Bagchee (1987). Annexure 3 has a full chronological list of government APPs.

- (2) **Programmes and initiatives for Scheduled Castes and Tribes** (SC and ST), such as the Integrated Tribal Development Programme (ITDP), the Tribal Sub Plan (TSP) and the National SC/ST Finance & Development Corporation (NSFDC).
- (3) **Programmes to ensure access to basic amenities** like Water and Sanitation, Health, Education and Housing, including the Accelerated Rural Water Supply Programme (ASRWSP), the Central Rural Sanitation Programme (CRSP) and Indira Awas Yojana (IAY), and their predecessors, the Minimum Needs Programme (MNP) and the Basic Minimum Services (BMS) for human development.
- (4) **Social welfare programmes** to compensate the poor for their inadequate access to growth, including the National Social Assistance Programme (NSAP) and the Public Distribution Scheme (PDS) and its variants.

This proliferation of anti-poverty programme has not been in an integrated or holistic fashion. A major review of anti-poverty programmes in 1992 argues that the failure to integrate the poverty alleviation objective within the overall development strategy resulted in the proliferation of poverty alleviation programmes (Rao, 1992).

Past experience has shown that targeted anti-poverty programmes require supporting infrastructural development and commercial linkages, to succeed in protecting and promoting sustainable livelihoods (Ahmed, et al., 1990). Hence, as Hashim (1998, xli) puts it, 'we cannot confine our focus to the programmes aimed at the poor...we have to consider the entire development strategy'. This includes macro-dimensions of poverty issues highlighted in the recent World Bank document (WB, 2000) on poverty in India, including movements in interest, exchange, and inflation rates, as well as welfare dimensions, such as the right to information, transparency and accountability of government, and community participation, all of which will enable 'the public to be the active agent rather than merely the long-suffering patient'<sup>8</sup>

To sum up, poverty is affected by a range of factors, not all of which are the focus of anti-poverty programmes. In addition, there are policies, rules and regulations that discriminate against the poor (especially tribals) (Hashim, 1998, xxxix - xl).

### 3.4 WATERSHED PROGRAMMES<sup>9</sup>

#### 3.4.1 Watersheds in India

Approximately 170 million hectares in India are classified as degraded land, roughly half of which falls in undulating semi-arid areas where rainfed farming is practised. Long-term experiments by a number of research organisations in India in the 1970s and 1980s confirmed that the introduction of appropriate physical barriers to soil and water flows, together with revegetation, could generate considerable increases in resource productivity. These, in turn, stimulated the formulation of a number of government projects, schemes and programmes in support of micro-watershed development.

In India, micro-watersheds are generally defined as falling in the range 500-1000 ha. A mini watershed comprises a number of micro-watersheds and covers around 5000 ha. A macro-watershed is equivalent to a river basin and may encompass many thousands of hectares. The micro-watershed concept aims to 'establish an enabling environment for the integrated use, regulation and treatment of

<sup>8</sup> Sen (1990). See also, Clack (1998), Macan-Markar (1999).

<sup>9</sup> From Farrington, Turton and James (1999) *Participatory Watershed Development: Challenges for the 21<sup>st</sup> Century*, Oxford University Press, New Delhi. Introduction. Pp. 5-8.



water and land resources of a watershed-based ecosystem to accomplish resource conservation and biomass production objectives.” (Jensen et al., 1996).

Over the last decade, the Government of India has set aside substantial budgetary provisions for micro-watershed rehabilitation and development. This initiative underpins a shift in agricultural policy, which acknowledges the neglect of rainfed and common areas during the period of the ‘green revolution’, and accepts a link between the degradation of rainfed areas and poverty of large numbers of people.

#### **Classification of Wastelands in India**

- A** lands which do not require any attention as nothing can be done about them at the moment, e.g., cold, snow-clad deserts, hot deserts, etc.
- B** lands where direct government action – in the form of subsidies, grants, etc. – aims at environmental improvement on a community basis.
  - B1** where government intervention is a must on account of poor response, low absorption capacity, etc. These lands need special attention as the role of other players is limited.
  - B2** where there is some infrastructural development, a potential for response and where some sort of linkages, awareness, etc., already exist. Catalytic action, input provision, involvement of other players, making forward and backward linkages with asset creation and individual systems are the need here.
  - B3** where proper managerial categories are required
- C** lands on the threshold of a new economic order at a local level, where second generation issues and sustainability are the main concerns. For example, overuse of pesticides in cotton production in Andhra Pradesh, waterlogging or land fatigue following unsustainable cropping patterns and excessive input use in Punjab, western UP etc.

**Source:** Kanda (ed.), (2000) *Vasundhara: An Anthology of Land Resources in India*, CAPART, Ministry of Rural Development, Government of India, New Delhi, pp. 27-28.

#### **3.4.2 Milestones in the Institutional Development of the Watershed Programme in India**

- 1942 Bombay Land Improvement Scheme Act, to enable contour bunding by all cultivators in a watershed, which enabled sharing of costs between government and the people.
- 1962 Soil Conservation Works in the Catchments of River Valley Projects, following the integrated approach for the holistic development of a whole river valley adopted by the Damodar Valley Corporation (first modern multi-disciplinary inputs from various disciplines like soil science, agronomy, engineering, forestry, social sciences, fisheries, grass land development etc.
- 1963-1967 Several institutions, such as the Soil Conservation Society of India, the Central Soil Conservation Board, Soil Conservation Research Demonstration and Training Centre set up. International technical cooperation with USA, UNESCO, FAO etc let do the setting up institutions like the Central Arid Zone Research Institute (CAZRI), International Crop Research Institute for Semi Arid Tropics (ICRISAT), etc., mandated to conduct research on soil, water and agricultural potential in different eco-zones of the country.
- 1967 Central Ravine Reclamation Board (CRRB) set up, and a national policy on ravenous watersheds declared and ravine reclamation projects started in Uttar Pradesh, Madhya Pradesh, Rajasthan and Gujarat.

- 1974 Soil Conservation Division of the Ministry of Agriculture, GOI started model watershed s all over the country (e.g., Sukhomajiri in Harayana, Chinnatekur in Karnataka)
- 1985 National Wasteland Development Board (NWDB) set up under the Ministry of Environment & Forests
- 1992 Department of Wasteland Development (DoWD) set up in the Ministry of Rural Development NWDB transferred to the DoWD for non-forest wastelands. DoWD renamed the Department of Land Resources (DoLR)
- 1995 New Guidelines framed for watershed development in the country. Ministry of Rural Development
- 2000 New Guidelines for National Watershed Development Project for Rainfed Areas (NWDpra) Ministry of Agriculture and Cooperation.

	Drought Prone Area Programmes (DPAP)	Desert Development Programmes (DDP)	Integrated Wastelands Development Projects <sup>10</sup>	National Watershed Development Projects for Rainfed Areas (NWDpra)
Year of starting	1971	1978	1992 <sup>11</sup>	1990
Ministry	Rural Development	Rural Development	Rural Development	Agriculture
Cost sharing	75% Central govt. 25% State govt.	75% Central govt. 25% State govt.	100% central govt.	100% central govt.
Objectives	To mitigate the adverse effects of droughts and create additional employment opportunities	To mitigate the adverse effects of drought and create additional employment opportunities.  To check further desertification, restore ecological balance and promote economic development	To take up integrated wasteland development based on village/micro-watershed plans	To conserve and develop natural resources and manage them sustainably. To enhance agricultural productivity & production in a sustainable manner To restore ecological balance in a degraded and fragile rainfed ecosystems To reduce disparity between irrigated and rainfed areas To create sustained employment opportunities for rural communities
Activities	Land development and soil-moisture conservation through measures like terracing, bunding, vegetative barriers etc.	Land development and soil-moisture conservation through measures like terracing, bunding, vegetative barriers	Land development and soil-moisture conservation through measures like terracing, bunding, vegetative barriers etc.	
	Drainage line treatment through	Stabilisation of shifting sand dunes,	Drainage line treatment through	

<sup>10</sup> Watershed projects were taken up under the Employment Assurance Scheme (EAS) till April 1999 (around 63.5 million hectares), but this scheme has now been stopped and only funding to complete projects in hand are being sanctioned. (Kanda (ed.), p. 114).

<sup>11</sup> This scheme was originally with the National Afforestation and Eco Development Board of the Ministry of Environment & Forests, and was transferred to the Ministry of Rural Development when the Department for Wasteland Development was created in 1992. It is now the main scheme of the DoWD (now Department of Land Resources). (Kanda (ed), p.114)

	Drought Prone Area Programmes (DPAP)	Desert Development Programmes (DDP)	Integrated Wastelands Development Projects <sup>10</sup>	National Watershed Development Projects for Rainfed Areas (NWDPRA)
	vegetative and engineering structures	shelterbelt plantations, wind breaks	vegetative and engineering structures	
	Water resource development through water harvesting structures	Water resource development through suitable water harvesting structures ( <i>khadins</i> , tanks, etc.)	Water resource development through water harvesting structures	
	Afforestation and pasture development	Afforestation and pasture development	Afforestation and pasture development	
	Agro-forestry, horticulture and silvipasture	Agro-forestry, horticulture, silvipasture	Agro-forestry, horticulture and silvipasture	
Cost	Rs. 4,000 – 5,000 per hectare for 500 hectare watersheds = Rs. 20 – 25 lakhs	Rs. 4,500 – 5,000 per hectare for 500 hectare watersheds = Rs. 22.50 – 25 lakhs	Rs. 4,000 – 5,000 per hectare for 500 hectare watersheds = Rs. 20 – 25 lakhs	Rs. 4,500 – Rs.6,000 per hectare for 500 hectare watersheds = Rs. 22.50 – 30 lakhs
Time Period	4 - 5 years	4-5 years	4 –5 years	
PIA	GOs or NGOs, given 10 – 12 contiguous watershed projects	GOs or NGOs, given 10 – 12 contiguous watershed projects	GOs or NGOs, given 10 – 12 contiguous watershed projects	

### 3.4.3 Recent Change in Focus

The various schemes of watershed based development (see Table below) have a slightly different focus: the National Watershed Development for Rainfed Areas (NWDPRA) focuses mainly on the rehabilitation of agricultural land, the Integrated Wasteland Development Programme (IWDP) on wastelands; the Employment Assurance Scheme on employment-creation opportunities; and Drought Prone Areas Programme (DPAP) and the Desert Development Programme (DDP) are determined by agro-climatic conditions.

After 20 years of efforts in poverty alleviation and drought mitigation, the government constituted several committees, culminating in a technical committee headed by Dr. C.H. Hanumantha Rao in 1993 to make specific recommendations on the implementation of the Drought Prone Areas and the Desert Development Programmes with a watershed approach. The committee submitted its recommendations in 1994. Based on these recommendations, a new set of Guidelines for Watershed Development (GOI 1994) were formulated by the Ministry of Rural Development. These came into effect on 1 April 1995 and now apply to all the Ministry's watershed projects. Now generally known as the 'Common Guidelines', they mark the beginning of a new era in public-sector rural development programmes. They envisage a 'bottom-up planning' approach, working where possible through NGOs and with community participation as a central principle. The guidelines set up a cost norm of Rs.4000 per hectare for each watershed of about 500 hectares.

The latest step is the definition of the Common Approach to Watershed Development, by the four Central Government Ministries implementing watershed-based programmes in the country – the Ministry of Agriculture and Cooperation (MoAC), the Ministry of Rural Development (MoRD), the Ministry of Environment and Forests (MoEF) and the Ministry of Water Resources (MoWR). But the grand culmination of this 'single window' approach – discussed and initiated at the 1998 Workshop on Wasteland Development in India<sup>12</sup> – the new Guidelines are yet to come into force.

<sup>12</sup> The proceedings have been published as Farrington et al., (1999).

### **3.5 IMPACTS OF GOVERNMENT PROGRAMMES**

While it is true that watershed-based rural development projects have been formulated with the honourable aims of improving the natural resource base, agricultural production and alleviating rural poverty, these have not always been achieved.

#### **3.5.1 Adverse effects on rural poverty?**

Watershed-based rural development programmes have been criticised for not reducing rural poverty. Not only are they biased towards benefiting the landed (who can take advantage of the additional water and productivity enhancements that are the main thrusts of the programme), but have also been accused of actually working against the livelihoods of the poor. In the name of afforestation, panchayat lands have been handed over to government forest department staff – displacing the landless poor who leased the land to grow low-yielding rainfed crops. Goats of the poor have been banned from entering newly-planted private and public plantations. Increased agricultural productivity because of successful project interventions has led to cultivation expansion at the cost of small tenant farmers. It has also led to increased encroachments onto public land, again at the cost of the goats who are denied access to previously public grazing land.

*Sources:* Kanda (ed.), (2000) and Government of India “WARASA – Jan Sahbhagita: Guidelines for National Watershed Development Project for Rainfed Areas (NWDPR), Ministry of Agriculture, Department of Agriculture and Cooperation, Rainfed Farming Systems Division.

#### **3.5.2 Adverse effects on the natural resource base?**

But these projects have also adversely affected the natural resource base in some cases. Increased recharge of aquifers, following soil and water conservation measures, and the increased profits from improving agriculture (due to project interventions) have led farmers to use more water. They sink new bore wells, deepen existing ones, install more powerful pumps, and switch to more profitable water intensive crops. Measures to manage these newly developed water resources have been overlooked.

Short-term gains are translated into long-term losses.

### **3.6 POST-SCRIPT**

Linking poverty alleviation to resource base development efforts in watershed-based development programmes has caused confusion at different levels. Natural resource scientists, government functionaries at the centre, state and local levels, NGOs and academics have been grappling with trying to fit together what may well be a maddening jig-saw puzzle comprising hastily construed schemes, reluctant officials, a motley crew of NGOs and other PIAs, bemused villagers and an ancient landscape. However, on closer examination, it may well be the anxiety to ‘fit’ the pieces into government schemes that may be the problem, not the resources or the people. The next section, accordingly, looks at a resource that seems to be at the heart of the problem, water in AP.

## Section 4

### Water

#### 4.1 THE SITUATION

##### 4.1.1 Rainfall

Rainfall varies considerably across the state. For example, although average annual is 1000mm, the southwestern area of Rayalaseema district typically receives less than 700mm.

One third of the population of AP lives in a drought-prone area. Droughts tend to hit the Rayalseema and Telangana districts most. On average one in five years the average state rainfall is below 750mm. However, drought years are often consecutive.

##### 4.1.2 Surface water schemes

Organised large-scale irrigation began during the last century (Sir Arthur Cotton's Godavari Delta Irrigation scheme) and continued after Indian independence in 1947 (the Krishna delta scheme and the Nagarjuna Sagar project). But in recent times the area irrigated by surface sources has decreased (down from 3.1 mha in 1980-81 to 2.85 mha in 1997-98), because of poor maintenance or management problems of surface irrigation systems, and a shift towards groundwater-based irrigation or conjunctive use of surface and groundwater.<sup>13</sup>

#### **The 1999-2000 drought**

AP experienced a severe drought in 1999-2000, characterised by drinking water shortages, falling groundwater levels, and increased risk of contamination of surface water. The drought, following low rainfall (534mm annual rainfall) in the south-west and north-east 1999 monsoons was exacerbated by groundwater extraction. The worst affected districts were Anantapur, Cuddapah, Chittoor, Nellore, and Prakasam. In summer 2000, there were drinking water shortages in 50% of the municipal areas, resulting in the use of tankers to supply the required water. Agricultural production was seriously reduced in Karif 1999.

**Source: Inputs to UNICEF strategy for drought mitigation in Andhra Pradesh, Prepared for UNICEF Hyderabad by TARU Leading Edge, January 2001.**

##### 4.1.3 Tanks

Andhra Pradesh has a large number of water collection, storage and percolation tanks of various sizes and types. Tanks were an important source of irrigation, especially in the interior semi arid parts, where they provided irrigation to areas not amenable to irrigation by large irrigation projects, and play an important role in groundwater recharge. But since the 1960s there has been a continuous decline in the area irrigated by tanks, with a sharp decline since 1980. Poor maintenance have reduced storage capacity and made tanks vulnerable to breaches during heavy rains. This decrease in tank irrigation (sharply since 1980) has also led to increased dependence on groundwater for irrigation.

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<sup>13</sup> Andhra Pradesh has enacted the Farmers' Management of Irrigation Systems Act and Rules in the 1997 and has transferred some of the maintenance functions to the Water User Associations. It is expected that these will improve the performance of canal irrigation significantly but results from the ground are awaited.

#### 4.1.4 Lift Irrigation

Lift irrigation (LI) systems installed in parts of the state supply a minor (less than 4 percent) proportion of the net irrigated area in the state. These systems rely on seasonal streams and, in turn, on the rainfall pattern, size of catchment area, extent of upstream withdrawal, etc.. The Andhra Pradesh State Irrigation Development Corporation provides financial and technical assistance to farmers from amongst the backward groups to set up group-owned LI systems. These tap groundwater through borewells and supply a group of farmers. However, inadequate preparation of user groups has resulted in poor upkeep of these irrigation systems.

#### 4.1.5 Water use for agriculture

Andhra Pradesh has seen a gradual change in the importance of different water supplies for villagers. Prior to 1970 tanks and ponds (common pool resources) were the main sources of irrigation water. Village institutions were responsible for managing these resources and in particular maintaining them through desiltation, channel clearing, and other repair works. Watermen (*neerugatti*) had responsibility and authority for distributing and scheduling irrigation water for those farmers with land within the “command area” of the tank.<sup>14</sup> Typically larger farmers controlled most of the land in the command area of the tanks and so gained most of the irrigation benefits from tanks (CWS, 2000).

More recently, irrigation is becoming dominated by groundwater sources – privately owned dug wells and bore wells (the share of groundwater in irrigation has increased from 26% in 1981 to 51% in 1998). The area irrigated by tanks has continuously declined since the early 1960s: from 1.23 mha (1960s) to 0.9 mha (1980) to 0.56 mha (1997). In part this decline is due to poor management of the tanks. Some tanks have been converted into percolation tanks which provide groundwater recharge but do not provide direct irrigation. Although small and marginal farmers now own a larger share of land in tank command areas than earlier, the neglect of these common bodies of water has particularly affected negatively the livelihoods of poorer communities (CWS, 2000).

Groundwater for irrigation has been part of the government strategy to increase agricultural production.<sup>15</sup> The sharp increase in groundwater extraction in recent years using borewells has been aided tremendously by a government-scheme (the Million Wells Scheme) which provided subsidies to investing farmers.

Ground water is practically in the direct control of owners and users (that is, rights to groundwater are recognised through land rights and extraction is unrestricted), except where the Rural Water Supply has commissioned public water supply (PWS) projects and handed operational control over to the gram panchayats.

#### Extent of water exploitation

Of the 1,104 mandals in the state:

- 6 are classified as over-exploited (>100% use of renewable groundwater resources)
- 24 are “dark” (85 to 100% utilisation)
- Localised over-exploitation is occurring within individual mandals

29 of these 30 highly exploited Mandals are in hard rock systems. The most negatively affected regions are Telangana and Southern Rayalaseema

*Source:* TARU, 2000

<sup>14</sup> The tank command area is the area of land that can be irrigated by the tank.

<sup>15</sup> 84% of the state is underlain by crystalline and consolidated formations (TARU, 2000). The aquifers in the hard rocks are restricted to secondary porosity, are sparse and disseminated. In the semi-arid areas groundwater availability is expected to be low. Groundwater in such semi-arid zones can be characterised as a high stock low flow resource.

#### 4.1.6 Impacts on drinking water

In semi-arid Andhra Pradesh, today, most village wells run dry by around the beginning of March. Although these are mostly irrigation wells, some drinking water wells also run dry, forcing villagers to seek alternative sources. These sources tend either to be of poor quality (e.g. fluoride affected), far away, or on private land (often leading to disputes between the community and the owner). By May and June, this is the usual situation in most villages in the drought-prone districts.

Like in most parts of semi-arid India, when faced with a water shortage, households adjust by using less water: they bathe and wash clothes less frequently, and use fewer vessels to cook and eat. All of which add discomfort to the drudgery.

The very real danger of over-exploiting groundwater, where the groundwater aquifer is filled only by the annual rain, is that when there is a drought, there is no groundwater buffer to tide people over. And then there will be no alternative sources of water for people to drink.

This is already manifest in the suffering caused by the recent droughts of kharif 1999 and summer 2000.

## 4.2 TACKLING THE PROBLEM

The Government of Andhra Pradesh has implemented a number of efforts to conserve water in Andhra Pradesh. Early watershed programmes of 1975 were characterised by top-down planning, a lack of coordination among government departments, and little participation by the affected communities. In 1995-96 the watershed guidelines were revised with an emphasis on active mobilisation and participation by stakeholders. In 1997 a 10-year programme for watersheds was launched to treat waste and degraded lands. In 2000 the AP Water, Land, and Trees ordinance was introduced to provide legislation support for water conservation activities (See Appendix F for a list of relevant legislation).

### 4.2.1 Government Programmes

The Government of Andhra Pradesh initiated a 10-year programme called *Neeru Meeru* (literally translated, 'water and you') through the Water Conservation Mission set up in 1999 under the Department of Rural Development.

The *Neeru Meeru* strategy is to try and increase the recharge of water into groundwater aquifers. There is a long list of activities and

In 1998, a scoping study of Water Resources in AP noted that that "Significant gaps exist in the assessment of groundwater, water quality, demand, existing source capacity and levels of use and urgent attention should be given to rectifying this situation" (Scott Wilson, 1998, p. 8).

This report also identified the following priority problems in a report to the Water and Environmental Sanitation Group of DFIDI:

- Integrated approach to water resource management is missing
- There is insufficient awareness of the need for better sanitation and hygiene
- Maintenance is not done, only repair
- Irrigation abstraction causes drinking water source failure
- Legislation does not work to protect drinking water." (p. 8)

The AP delivery model for water supply and sanitation has been characterised in TARU/DFID (2000; p. 14) as:

A supply-side approach based on planning norms, source reliability, and population projections for the next 20 years;

Having low or no community contribution to the capital cost of provision of services in rural areas

With inadequate user charges to cover operations and maintenance; and

ad-hoc and inadequate emphasis on environmental sanitation.

coordination between about 7 government departments. While impressive in scope, this does not tackle the source of the problem – the demand for water.

For, increasing the supply of groundwater – through whatever means (including soil and water conservation measures undertaken under the watershed programmes) – when there is a high demand for groundwater for irrigation and for drinking is like dropping water onto a sizzling pan: the more you pour, the more it evaporates!

#### **4.2.2 Community Water Demand Management**

With demand for drinking water set to rise with population growth, the bare minimum water requirements of water for health and hygiene purposes are set to rise. Since most of the groundwater (80-90% of average annual recharge) is extracted for irrigation, there is some hope that reduction in irrigation water use will release water to meet the minimum water requirements of future generations.

But how is irrigation water demand to reduce?

In theory, there are a number of options that can be tried ranging from pricing water to legislating bans on water extraction beyond certain limits. In practice, however, economic and legal means of restricting water demand seem limited in the Indian context. Water pricing is not a popular option politically and it will take an exceptionally strong political leaders to push through legislation that begins charging users at rates that will ‘bite’ sufficiently to reduce water use. And without effective pricing, it will be difficult to promote more efficient irrigation methods. But even once legislated, there is no guarantee that well-to-do farmers – who stand to lose the most from such pricing – will not bribe junior officials sent out by the government to enforce the legislation. This is a widespread practice even in environmental pollution issues, where Indian legislation is exceptionally strong.

An alternative and perhaps more feasible option is community management. After a long history of strong village management, and the deterioration of social rules for regulating the use of common property resources (CPRs) like surface water, forests and pastureland, there seems to be some revival of community regulation of forests and pastureland.

One problem with ground water, however, is that it is not ‘visible’. Developing and enforcing rules is therefore going to be a little more difficult.

But assuming that a community was fully committed to reducing irrigation water use, how could they do so?

There are at least three possibilities.

##### **Possibility 1: Stop summer irrigated cropping**

Since this could be unfair to villages where there IS sufficient water to support irrigated summer cropping, an indicator could be used to determine the groundwater situation. For instance, a village could decide that the water level in a certain ‘marker’ well by end February will be the indicator. A ‘safe minimum standard’ could be decided with some outside assistance, and a red line could be painted inside the well. Now, the management rule that the community could adopt could be that If the water level by end February is less than the red line, then there would be no summer cultivation. If it were above, summer cultivation would be allowed. This could also serve as an incentive for farmers to conserve water during the kharif and rabi periods – so as to have more water by end February in the marker well.

##### **Possibility 2: Limit borewell depths**



In some parts of Mehsana district in Gujarat, SEWA (an NGO called Self-Employed Women's Association) reports that women have got the panchayats to pass a resolution to limit the depth of new borewells. But WOTR in Ahmednagar reports that even after getting its villages to sign a Memorandum of Understanding (MoU) limiting borewell depth, there are violations in the field.

### **Possibility 3: Limiting irrigated cultivation**

Another possibility that a panchayat could consider would be to impose restrictions on irrigated cultivation, based on information on crop water requirements. This would be similar to providing a village with a 'safe minimum standard' total of water availability and asking them to ensure that demand is within the limit. Presumably, drinking and domestic uses of water would get a priority, and the remaining could be apportioned among the area held by irrigating farmers. Given the crop water requirements (which would have to be provided from 'outside'), the panchayat could decide the pattern of groundwater allocation to irrigating farmers at the start of the season – and then monitor to see if farmers were actually cultivating according to the pattern they resolved in the panchayat.

All of these options would be compatible with measures to increase the efficiency of irrigated agriculture, for example, through potentially more efficient methods such as drip irrigation and improved farmer knowledge and practice. More reliable electricity supplies could also increase irrigation efficiency.

The principles of the approach to tackle the problem are therefore the following:

- **Focus on demand for water:** While trying all possible means to increase supply, the focus should be on managing demand for groundwater.
- **Aim to reduce irrigation demand:** Reducing irrigation demand on groundwater is necessary to meet the minimum needs of a growing population.
- **Let communities decide how to manage water:** Ultimately village communities will have to decide, with some outside assistance to provide technical information (e.g., crop water requirements, safe minimum standards), how exactly they wish to restrict irrigation demands on groundwater.

## **4.3 WATER, FOOD AND MONEY**

There may be a few factors beyond the scope of the village community. These are to do with the reasons behind irrigation.

Basically farmers invest in water to irrigate crops for two basic reasons: (1) for the extra money (or profit) that irrigated crops bring in and (2) for food – especially paddy, which is grown at relatively low rates of return because farmers cannot buy paddy of equivalent quality at reasonable prices.

Thus, asking farmers to reduce irrigation would involve tradeoffs involving either food or money or both. This tradeoff could be made more bearable by (1) providing alternate means of earning a livelihood and (2) arranging for a good, cheap supply of food into the village. (There is already a Targeted Public Distribution Scheme (TPDS) operating in the state, but this is not seen as being part of the rural livelihoods agenda and has been subject to misuse (i.e., benefits going to the non-poor)).

This is not to say that these measures will stop irrigated agriculture, but these could help the village communities restrict its use of groundwater for irrigation.

While neither option is easy, both could be explored further in the context of sustainable rural livelihoods projects.

## Section 5

### Livelihoods

#### 5.6 INTRODUCTION

There is nothing intrinsically desirable about diversification of livelihoods: it is best known as a means of insurance against risk, such as the risk of crop failure. Whether one speaks of diversification of crops, or of livelihood strategies, the term diversification is used typically to denote a strategy adopted to minimise or mitigate risk and to cope with vulnerability. Diversification of livelihood strategies by the rural poor specifically refers to the addition of new activities to complement existing ones, to safeguard or augment household income. The idea is that the more activities on which a low-income rural household depends on, the better it is able to sustain itself in the face of adverse shocks from nature or the market.

#### 5.2 DIVERSE LIVELIHOODS OF THE POOR

Diversification of livelihood strategies, thus, reduces the risk of livelihood failure (Gill, 1991; Alderman & Paxson, 1992), and of seasonality in labour demand and consumption (Morduch, 1994), offsets the impacts of natural risk factors on staple food availability (Reardon et al., 1992), adds activities with higher returns to the household livelihood portfolio (von Braun & Pandya-Lorch, 1991), provides cash resources that enable household assets to be built up, and helps people hold on to assets they already possess (Netting, 1993).

That poor people pursue diverse rather than specialised livelihoods, there is no doubt (Reardon, 1997; Ellis 1998, 2000). Six main ways in which the poor earn their livelihoods are the following:

- i. **Small-scale agriculture:** Unable to afford irrigation in many cases, the poor are generally small and marginal farmers, who cultivate rainfed crops in poor soils. Both yields and nutritional value are low, but the output supplements their diet and is often slightly cheaper than buying the same food on the open market.
- ii. **Local labour markets:** Both the landless poor as well as small and marginal farmers take recourse to local labour opportunities, whether on farms or on government-sponsored employment generation programmes, to supplement incomes. For many, however, agricultural or non-agricultural labour provides the bulk of their livelihoods.
- iii. **Long-distance labour migration:** In the off-season, when there is no cultivation in the village, and hence few labour opportunities, low-income households migrate to other rural areas or towns, in search of work. Most such migrations are forced, while some are out of choice (Mosse, 1998; Breman 1996; DFID, 1998).
- iv. **Forest product collection:** Wherever available, more of the rural poor rely on forest products for fuel, fibre, food and a wide range of tradeable products. Apart from fodder for livestock, forests also provide the poor with minor forest products like gum, leaves and bark, which are collected and sold locally at low prices because little value is added to these primary products

- v. **Livestock production:** Most of the poor in semi-arid areas rear goats as insurance against adversity. These goats graze on common lands, and are reared for both milk and meat. Typically, goats are sold to meet emergency cash requirements and often sustain low-income families through stretches of unemployment or bad harvests. Few low-income households also own cattle, but these are mainly for milk to meet household needs rather than for market sale.
- vi. **Self employment in micro-enterprise:** A lot of this has been in traditional low-skill activities that simply add value to primary products. Basket weaving, sal leaf pressing, pot-making, and brick-making are typical examples. These are not the usual rural enterprises, like tailoring, blacksmithing, shoe-making and weaving, which are usually caste-determined occupations and constrained by demand in the village.

These diverse activities, however, are basically livelihood strategies that the poor are forced to adopt to cope with their poverty. Clearly, these are insufficient to lift them above the poverty line and keep them above it, and serve mainly to keep them at subsistence. This is, hence, distinct from diversification of livelihood activities done by choice to exit from poverty via asset accumulation (Hussein and Nelson, 1998; Bernstein et al., 1992).

### 5.3 IMPROVING RURAL LIVELIHOODS: SOME PRINCIPLES

Given the context of rural livelihoods and the rural development projects that have preceded the current generation of sustainable rural livelihoods project, it is necessary to think carefully through the notion of sustaining rural livelihoods. Else, these will be another statistic in the compilation of projects that have failed to help the poor.

The rural poor pursue diverse livelihoods in order to put together enough to survive. Thus the small farmer cultivates his own land, works as agricultural labour and migrates to work as casual labour in order to support his family. The landless labourer works in his or her own village, in the local towns and in other more distant places, in response to the availability of work. The artisans and craftsmen try and support themselves as best as they can and try and ensure that their children have more livelihoods options.

The poor are not just the ones who can work – like small and marginal farmers, landless labourers, widows, and artisans and craftsmen; but the old, the sick and the disabled form significant proportions of the rural poor.

But how does one help these people who are desperately trying to earn their livelihoods and survive?

Compared to the efforts of many past rural development projects, distributing money in the villages may have had more of an impact on the rural poor. Clearly, however, the fundamentals need to be re-examined. The following four principles of improving rural livelihoods through project-based intervention are offered to initiate discussion:

Livelihoods can only be supported through project action; enhancement depends on individual responses to the support provided

It may not be possible to improve everyone's livelihoods; welfare trade-offs may be involved

People don't want their livelihoods decided for them; they will always want to exercise their own choice

Sustaining livelihoods involves more and separate issues from improving livelihoods

## 5.4 IMPROVING LIVELIHOODS : FROM THEORY TO PRACTICE

What this means in practice is that the rural poor have to be identified and shown the possibilities that they have – and which may be currently unknown. Awareness of possibilities – which can include government programmes they are eligible for, the success of others in similar situations elsewhere in the country, or enterprise or employment options that they can try – will lead to a demand for certain options.

This demand has then to be channelled to the right quarters. If it is a government scheme, then they have to be given information on eligibility criteria, application procedures, where to deposit forms, when to expect the next steps, what to be done in the interim, what is expected of them, etc. If it is a project-related activity (e.g., forming a self-help group or a common-interest group), then their willingness to participate has to be taken to the next stage by a similar provision of information.

But alongside, attention is necessary on issues affecting quality of life – health, education, child-welfare, sanitation, hygiene, water supply, etc. Again, information has to be provided to these rural communities – so that it becomes a matter of choice. With the new focus on providing demand-led services, information provision becomes a crucial first step. Once the information is provided, choice has to be facilitated and the link provided with the appropriate providing agency (government or private).

*Improving livelihoods is thus about providing information and facilitating choices*

## 5.5 SUSTAINING LIVELIHOODS

Threats to existing livelihoods or livelihoods that have been newly created through project support comes from two main directions – the marketplace, and natural resource depletion. Protecting households from market fluctuations involves ensuring they get the right information to make their production decisions and to market their output. Protecting households from natural resource depletion requires providing them with the information necessary to make informed choices – which may be community-level decisions to restrict the depth of borewells drilled, the capacity of pumps or summer irrigated cultivation in the village.

But there are other dimensions too: there is a social dimension, which needs to ensure that women have the space and freedom to earn and to exercise some control over their earning.

All this requires institutional measures - social and community rules – that ensure that livelihoods are enhanced

- Despite poor natural resource endowments
- Despite market fluctuations, and
- with social equity (i.e., the poor are not exploited and conflicts are resolved)

This then is the challenge of sustaining rural livelihoods: to make sure that the poor have the information to make choices, and that they are facilitated in making these choices.

*Sustaining livelihoods is about providing information and facilitating choices*

## Section 6

# Convergence

### 6.1 THE IDEA OF CONVERGENCE

A problem commonly faced by project staff who went into villages to initiate watershed development projects in India was the mismatch between villagers' perceived needs and the project's remit. Where villagers wanted street lights, repairs to handpumps, an extension of the school building, a small bridge, or re-building of the temple wall, the project offered check dams, nala plugs, gully plugs, contour trenching, levelling, bunding, plantations and percolation tanks.

To some extent this mismatch was sought to be addressed by 'entry point activities', for which about 5 percent of the Rs. 4,000 per hectare cost norm for watershed projects was set aside. But in many projects there was general puzzlement about this amount, and later this amount was amalgamated into the main corpus of physical works funding.

With the coming of the livelihoods approach to rural development, and the new generation of sustainable rural livelihoods (SRL) projects of DFID with their demand-led approach, interest was revived in all the things that villagers had persistently stated. In one of the first of the new SRL projects (the Western Orissa Rural Livelihoods Project), a separate (and almost equivalent) amount per hectare was budgeted for 'watershed plus' activities or 'livelihood' activities, in addition to the normal cost norm for watershed activities.

In the Andhra Pradesh Rural Livelihoods Project (APRLP), only 20 percent was set aside for livelihood activities on the argument that there was sufficient money in the government system which could be tapped by needy villagers. The APRLP was only to put villagers in touch with different schemes that would serve their particular (non-watershed) needs. Government schemes and programmes for poverty alleviation, employment generation and providing social services would be converged to support the rural poor.

### 6.2 DIMENSIONS OF CONVERGENCE

During discussions at the design stage of APRLP, however, different dimensions of convergence emerged:

- *Convergence from below* : This was the notion of villagers being provided information on various government schemes and programmes, and the eligible ones applying to the government. In the event that they were thwarted by corrupt or apathetic government officials, they were to form a pressure group to lobby the concerned official, not relenting till their demands were met
- *Convergence from above*: Nevertheless, recognising that getting people together to knock on the government's door was not sufficient unless there was something concrete to offer behind that door. Government departments had respond to demands for their own schemes and programmes. This required examining and removing the constraints that prevented departments from operating efficiently and delivering promised services.
- *Convergence from within*: There is also a need for convergence within and among institutions:
  - o within donor institutions (e.g., DFID, World Bank) to make sure one section/department or project (e.g., health, micro-finance) knows what the other (e.g., livelihoods, poverty alleviation, literacy) is doing in the same project area.

- o Within the donor community to bring about some synergy between the working of donor assisted projects working in the same district, on similar issues, interacting with the same district and state-level government staff, and yet not sharing information and agendas for action.
- o Within the government : Although there has been much talk of a single-window approach and coordination at the central government level (and the publication of the Common Approach to Watershed Development), there is still considerable division of purpose, responsibility and authority within central and state government departments. All of which adds to the divisiveness at the district level, which is the main operational level of all development initiatives.

### 6.3 CONVERGENCE IN THE FIELD

In operational terms, the district is the focus of attention. The main actors here are the District Collector, the Project Directors and the Superintending Engineers (see Appendix X!). And true convergence must be effective at this level to have any wide-ranging impact.

The Collector is the administrative head of the district, but political precedence is given to the Members of the Legislative Assembly (MLAs) of the region. Watershed programmes and development programmes in general are to be administered by the Project Directors (PDs). The Line Department schemes are under the control of Superintending Engineers (e.g., Rural Water Supply, Electrification, Panchayati Raj Engineering, Roads and Bridges, Minor Irrigation, Ground Water, etc.) and Directors (Agriculture, Animal Husbandry, Horticulture, Soil Conservation, etc.). The latter report both to the District Collector and to their Department Heads in the state capital.

Thus the PD-DPAP is answerable both to the Collector as well as to the Commissioner of Rural Development, Department of Panchayati Raj and Rural Development in Hyderabad.

Although there have been several calls for convergence in donor assisted programmes (e.g., APRLP, DPIP), and government programmes (e.g., Neeru Meeru), there has been little effective coordination on the field. This is largely because active coordination means re-working terms and conditions, reporting hierarchies, transport and staff deployment and all those practical aspects of convergence which can be convenient excuses for a lower-level bureaucracy which does not want to converge!

This convergence cannot merely be a call, it has to be actively facilitated. And one of the best ways of facilitation is to make sure that all concerned parties stand to gain through convergence!

And this is probably best achieved by involving those directly affected by convergence – the District Collectors, the Project Directors, the Line Department representatives and the lower level staff – in participatory workshops facilitated to elicit positive responses.

### 6.4 POST SCRIPT

There is a possible hierarchy of action here.

- *Convergence from within*: Donors, national and state governments need to improve communication and synergy within their organisations.
- *Convergence from above*: District governments need to achieve cohesion in implementing development programmes.

- *Convergence from below*: Finally, villagers can be given information on the various ways in which they can apply for and benefit from government schemes and programmes.

Thus, convergence from above *requires* convergence from within. And without all these, convergence from below will be a case of ‘knocking, knocking, no reply’ (to coin an Indian phrase).

## **Part 3**

### **The Way Ahead**

- 7. Sustainable Rural Livelihoods Projects**
- 8. Integrated Water Management for Sustainable Rural Livelihoods**



## Section 7

# Sustainable Rural Livelihoods Projects

### 7.1 Introduction

There is today a wealth of theoretical knowledge on sustaining rural livelihoods. Frameworks have been drawn up, papers have been written, but little has happened on the ground that is different from what has happened in the past. This section aims to explore this issue a little further. The perspective is that of a project implementing agency (PIA) visiting a village which is part of an SRL project. But first the theory.

### 7.2 Sustainable Rural Livelihoods

DFID defines livelihoods and sustainable rural livelihoods in the following manner.

“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 natural resource base.”

The Oxford English Dictionary defines livelihoods as a “means of support or subsistence” “Quality or state of being lively”. The Thesaurus finds the following synonyms: “employment”, “income”, “job”, “living”, “maintenance”, “support”, “means of occupation”.

The common perception of the word livelihood is similar: “livelihoods have to be earned”, using all available assets.

DFID’s sustainable livelihoods approach identifies five assets - physical, natural, social, financial and human capital - that people draw upon in order to construct livelihood strategies. An underlying principle of the livelihoods approaches is that they begin from a position of assessing people’s strengths rather than needs. Thus, in order to earn sustainable livelihoods, the poor have access to five different types of capital:

- o *Natural Capital* – refers to the availability of water, forests, land, climate and other natural resources.
- o *Physical capital*: which is the basic infrastructure, goods and services needed to support livelihoods (e.g., water supply and sanitation systems, affordable transport, shelter, energy, etc.)
- o *Social capital*: refers to relationships of trust and reciprocity that support cooperative action, membership of formal and informal groups and networks that increase people’s ability to work together and access institutions and services. Formal law (statutory and religious) and informal law (customary) can also be seen as forms of social capital.
- o *Human capital*: refers to the skills, knowledge, beliefs, attitudes, ability to labour and good health that enable people to pursue different livelihood strategies.

- o *Financial capital* – refers to the financial resources including savings, credit provision and regular inflows of money (e.g., wages, remittances, subsidies, etc.).

But to a project team aiming to provide sustainable rural livelihoods to the project communities, this can be more than a semantic problem of interpretation: the seemingly dry and academic discussion on what it means to sustain livelihoods has to come alive and guide action on the field.

### 7.3 Sustaining Rural Livelihoods

A useful first step is to distinguish between *sustainable rural livelihoods* – which is an end-state - and *sustaining rural livelihoods* – which is the activities of sustaining livelihoods or enabling livelihoods to become sustainable.

Rural poor pursue diverse strategies to earn their livelihoods. But even after pursuing diverse strategies – which are usually the ones open to them and not ones they choose – they are usually still below the poverty line. There are thus two steps to sustainable rural livelihoods – improving them, and then sustaining them.

Improving livelihoods for the rural poor is usually understood as a basket of options to :<sup>16</sup>

#### *Increase earnings by*

- o Improved access and control over common property resources like forests and pastureland – so that they can gather grass and non-timber forest produce (NTFP) to feed their animals or sell
- o Improved short term and long term wage labour opportunities
- o Increased economic security and access to services
- o Improved access to government schemes through better information
- o Appropriate support for marginal farming operations on high or sloped land, access to new technology and resources
- o Creation of productive assets
- o Improved access to government schemes (including social welfare schemes)

#### *Reduce costs by*

- o Improved food security, off-farm employment and reducing seasonal vulnerability
- o Improved access to savings and credit facilities
- o Better ability to withstand disasters (sickness and death in the family, vulnerability to drought, flood, cyclones, etc.)
- o Increased local control over water resources and facilities

#### *Improve quality of living by*

- o Improved access to water for drinking and domestic uses – so as to improve the quality of life.
- o Reduced drudgery (e.g., time taken on fuel, fodder and water collection)
- o Improved health status, particularly for those involved in hazardous occupations (e.g., slate quarries)

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<sup>16</sup> From Annex 4, Social Appraisal (pp 18-25), in the Project Memorandum of the APRLP, produced by the Ministry of Rural Development, Government of India, the Department of Rural Development, Government of Andhra Pradesh and the Department for International Development, Government of UK, 23 July 1999.

***Empower rural poor by***

- o Active involvement of the poor in decision making and planning processes
- o Improved access to public life
- o Improved access to training and skills up-gradation opportunities
- o Improved dignity and reduction of oppression and elimination of discrimination
- o Improved access to government schemes through better information and support
- o Enhanced ability to implement project activities through groups
- o Increased opportunities to learn and acquire additional exposure.

All these, still, are end-products of *activities* that are initiated by a sustainable rural livelihoods project. The problem is that these activities are not well defined.

And that is probably something this workshop can contribute towards - with integrated water management at the heart of the issue of sustaining rural livelihoods.

## Appendix A

### Overview of Rural Poverty Alleviation Schemes of the Government of India<sup>17</sup>

Both the central government (Government of India) and the state government operate poverty alleviation schemes, although all of these may not be directly under the state Department of Rural Development.

The list given here is only of central government schemes. In addition, there are state government schemes run through the Line Departments (e.g., Agriculture, Horticulture, Forestry, Rural Roads, Rural Water Supply, etc.). Although a full review is yet to be done in the specific case of Andhra Pradesh, there are more than 250 schemes listed In the case of Rajasthan.

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<sup>17</sup> *Source:* Rakesh Kaushik and A. J. James (2000), Review Of Government Anti-Poverty Programmes In Rajasthan, for the District Poverty Initiatives Project (DPIP), Rajasthan of The World Bank, Appendix 3.

### 3. POVERTY ALLEVIATION: SUPPORTING PROGRAMMES AND INITIATIVES

#### 3.1 Area Development

YEAR/ PERIOD	ACRONYM	NAME OF PROGRAMME/ INITIATIVE	MAJOR OBJECTIVES
1960-71	IADP	Intensive Area Development Programme	Increasing agricultural production and productivity through the introduction of HYVs and an increase in irrigation
1960-71	IAADP	Intensive Agricultural Area Development Programme	
1960-71	HYP	High Yielding Varieties Programme	
1974	CADA	Command Area Development Programme	Faster and optimum utilisation of irrigation potential created; farm development with emphasis on weaker sections
1972	HADS	Hill Area Development Scheme	Socio-economic development of hill areas in harmony with ecological development. Promotion of basic life support systems with sustainable use of resources
1973-74	DPAP	Drought-Prone Area Programme	Creation of durable assets that would contribute towards reducing severity of drought, and increasing wage employment, etc.
1978	DDP	Desert Development Programme	Arresting environmental degradation & improving environment & productivity in deserts.
1990	NWDPR	National Watershed Development Programme for Rainfed Areas	Generation of successful models in all CD blocks where less than 30% arable area is under irrigation, to bring the benefits of the Green Revolution to dry regions.
1989-90	IWDP	Integrated Wasteland Development Programme	Development of non-forest wastelands, through a micro-watershed approach

#### 3.2 Target Group Development

YEAR/ PERIOD	ACRONYM	NAME OF PROGRAMME/ INITIATIVE	MAJOR OBJECTIVES
1970-71	SFDA	Small Farmers Development Agency	To attack poverty directly by improving productivity and access to productive resources and services to poorer sections of rural community in selected backward areas. (merged into the SFDA in 1979, and later into the DRDA)
1970-71	MFAL	Marginal Farmers and Agricultural Labourers Development Agencies	

### 3.3 Special Groups (SC/ST)

YEAR/ PERIOD	ACRONYM	NAME OF PROGRAMME/ INITIATIVE	MAJOR OBJECTIVES
1979-80	SCP	Special Components Plan	Development of the welfare of SCs by ensuring enhanced flow of funds through individual or family assistance, and also improvement in social sector basic amenities.
	SCA	Special Components Assistance	
1980	SCDS	Scheduled Caste Development Corporation	To provide a link between poor SC/ST households and financial institutions
1989	NSFDC	National SC/ST Finance & Development Corporation	To provide concessional finance for on- and off-farm income-generating activities
1992	NCS	National Commission for SCs and STs	To study safeguards, rights and socio-economic development for SCs and STs
1991	TSP	Tribal Sub Plan	To accelerate the pace of socio-economic development of STs and to protect them from exploitation
	SCA	Special Component Assistance	
	ITDP	Integrated Tribal Development Programme	(a strategy of the Tribal Sub Plan, implemented in blocks with 50% or more tribals)
	MADA	Modified Area Development Approach	(part of the TSP, to be implemented in groups of villages of 10,000 or more, where 50% are tribals)
	PTGs	Primitive Tribal Groups	Development of pre-agricultural level technology groups of tribals through micro-projects

### 3.4 Social Welfare Measures

YEAR/ PERIOD	ACRONYM	NAME OF PROGRAMME/ INITIATIVE	MAJOR OBJECTIVES
1950	PDS	Public Distribution System	To regulate the movement of foodgrains from surplus states to deficit areas, to stabilize the price of foodgrains, and to provide food security to vulnerable groups.
1992	RPDS	Revamped Public Distribution System	To focus PDS in backward and remote areas, which are predominantly tribal.
1997	TPDS	Targeted Public Distribution System	To ensure that poor and needy get the maximum benefit of the PDS
1995	NSAP	National Social Assistance Programme	To fulfil the directive principles in Articles 41 and 42 & provide social assistance to the poor
	NOAPS	National Old Age Pension Scheme	(part of the NSAP)
	NFBS	National Family Benefit Scheme	(part of the NSAP)
	NMBS	National Maternity Benefit Scheme	(part of the NSAP)

### 3.5 Rural Water Supply and Sanitation

YEAR/ PERIOD	ACRONYM	NAME OF PROGRAMME/ INITIATIVE	MAJOR OBJECTIVES
1954	RWS	Rural Water Supply Scheme	To initiate planned supply of water by creating an institutional mechanism to tackle the problem of sanitation and drinking water
	PHED	Public Health Engineering Department	
1992	ASRWSP	Accelerated Rural Water Supply Programme	To provide adequate drinking water to all habitations; provide financial support to the state to cover problem villages
1981-90	DWD	Drinking Water Decade	Provide realistic standard of quality and quantity of water to rural and urban areas
1985	(Drinking Water Department shifted from Urban Development to Rural Development Ministry)		
1986	RGNWDM	Rajiv Gandhi National Drinking Water Mission	To accelerate the process of providing drinking water to the rural population
1991-94		Habitation Survey on Status of Drinking Water	To identify problem villages and uncovered villages
1984		Sanitation Programme in the Health Sector	To ensure that SC/ST populations and other poor, weaker sections are covered fully with proper sanitation facilities
1986	CRSP	Central Rural Sanitation Programme	To convert dry latrines into cost effective sanitary latrines; propagate hygienic and safe health practices, and privacy to women; to provide sanitary marts.

### 3.6 Rural Health

YEAR	ACRONYM	NAME OF PROGRAMME/ INITIATIVE	MAJOR OBJECTIVES
1952	RHS	Rural Health Services	To form Primary Health Centres (PHCs) in Community Development (CD) blocks
1952	PHC	Primary Health Centres	To provide access to medical care in rural and urban areas
1974	MPHW	Multi-purpose Health Worker	To provide a package of health services at the doorstep
	HFA	Health for All	To provide affordable, accessible, appropriate health services for all by 2000 AD
1983	NHP	National Health Policy	To provide affordable, accessible, appropriate health services for all by 2000 AD
	CHC	Community Health Centres	To provide specialised medicare for every 1 lakh population
	SC	Sub-centres	To provide clinic-based services to villages in its vicinity for a population of 5,000 - 8,000

### 3.7 Rural Housing

YEAR/ PERIOD	ACRONYM	NAME OF PROGRAMME/ INITIATIVE	MAJOR OBJECTIVES
1953	NHP	National Housing Policy	To provide an institutional base for housing, with long-term interest free loans; to provide information on low-cost housing
1957	VHS	Village Housing Scheme	To provide housing loans with subsidies; to conduct research on low-cost housing, to provide rural sites distribution
1985	IAY	Indira Awas Yojana	To supply houses free of cost to SC/ST and other poor
1988	NHB	National Housing Bank	To provide housing loans
1996	(Rural Housing and IAY merged)		To provide housing finance through public sector institutions



## Appendix B

# Watershed Development Programmes in India<sup>18</sup>

### WATERSHED DEVELOPMENT IN INDIA

Watershed development projects have been operating in various guises since before Independence. Currently, microwatershed management (i.e., generally comprising areas of up to 1,500 hectares) absorbs over USD 500 million per year in India. This is mainly from central government sources, the National Watersheds Development Project for Rainfed Areas of the Ministry of Agriculture and Cooperation, and a number of projects, programmes and schemes also under the Ministry of Rural Development, being the most substantial. Watershed-based efforts of the Ministry of Environment and Forests are comparatively small. Donors have shown considerable interest in watershed development, both because of its environmental and livelihoods potentials, but the funds they provide amount to little over 10% of those provided by the Government of India.

The significance of a watershed is that it represents the most rational unit at which to plan for the integrated conservation and management of natural resources for optimum production. Watersheds vary in size; large ones the size of river valley basins can contain within them thousands of micro-watersheds. Despite this variation, early programs took ecological objectives as their starting point in selecting the scale and deciding the scope of watershed management projects. Projects were managed as public works, with complex tendering processes, detailed work orders, target-orientation and a general lack of local participation.

A major review of early watershed development projects (Kerr, 2000) indicates their limited success in achieving environmental and livelihood objectives: only the small minority of projects managed by NGOs and specialised agencies demonstrated potentially sustainable success.

### New Directions for Watershed Development Projects

The mid-1990s witnessed a transformation of the early concept of watershed development as targeting a geo-hydrological unit comprising land and water within the confines of a drainage divide, to the rehabilitation and development of environmental resources in an integrated manner to develop economic resources within the watershed. The move away from physical target focus to incorporate associated non-land based activities in an integrated approach, reflects a recognition that many land-based activities do not help the landless or the poor, and that the management of natural resources has to be linked to the development of secure livelihoods in order to be sustainable. In terms of strategy, emphasis was placed on a participatory approach that involved people in both the planning and management of interventions. Many of the changes were facilitated by a highly progressive set of guidelines for watershed development issued in 1994 by the (then) Ministry of Rural Areas and Employment, covering its various themes, projects and programmes. In brief, the Guidelines were innovative in three respects:

- In encouraging collaboration between governmental and non-governmental organisations as project implementing agencies (PIAs)
- In facilitating the participation by local people in the design and implementation of rehabilitation

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<sup>18</sup> This section is reproduced from Farrington and James (2000).

- In allowing local-level control over the disbursement of funds for rehabilitation.

Early experience with implementing these guidelines suggests that they have helped to clarify and guide policy (Turton, 1999, Farrington et. al (eds.), 1999). Implementation on the ground, however, still poses several challenges, not the least being posed by the uneven pace of introducing reform among *Panchayati Raj* institutions (PRIs) in States in response to the 73<sup>rd</sup> constitutional amendment of 1993 (Baumann, 1998).<sup>19</sup> The Guidelines specify that, in states where PRIs have been introduced, *Zilla Parishads* may have overall responsibility for programme planning and implementation (para 29), that PRIs could be part of the Watershed Association (para 31), and that members of the *Gram Panchayat* should be part of the Watershed Association (para 38). Similar involvement is ascribed to PRIs in the financial provisions, the planning process and the technical aspects of the projects. However, the nature of reform of PRIs in the States is crucial to ensuring that PRIs are both willing and capable of taking on the responsibility of watershed management.

## 4. IMPACTS OF WATERSHED PROGRAMMES

### 4.1 Impacts on the resource base

Watershed projects have generally focused on land-based activities, ranging from soil and water conservation, varietal improvements, and provision of water harvesting structures to afforestation, livestock improvements and pastureland management. Specialised activities include sand dune fixation, ravine reclamation, treating degraded land, etc. While these often have the desired results, there are several undesirable impacts that also take place over time even when the activities are implemented properly. These are often not seen since they tend to take place after the project is completed. This process is described below.

The results of such project activities can be divided into two stages. In the first stage, assuming proper implementation, there is an increase in the availability of water and hence an increase in irrigated area and biomass production, on forest land and crop land. Increased productivity leads to greater profits from land-based activities. In the second stage, however, increased prosperity leads to further investments in irrigation, either through sinking new wells, or deepening existing wells. It also leads to greater investment in water-using crops which also are more remunerative. This can lead to a perverse impact on the resource base: an increase in the use of groundwater. Thus, several watershed projects which showed first stage impacts of increased availability of water and biomass production, lead over time to a worsening of the groundwater situation. Note that this is not an irrational decision by farmers. In the absence of communal or state property rights over groundwater, farmers treat them as private property or open access, preferring to pump out as much as possible before other tubewell or well owners draw on the same aquifer.

Similarly, rehabilitation of forested areas often show good results as long as the protection is effective. In most watershed projects, afforestation and re-forestation activities are undertaken by the project (e.g., Forest Department staff) and these areas are also protected for the duration of the project. Once the project withdraws, these plantations are handed over to the village. More often than not, institutional mechanisms (e.g., forest protection committees) do not continue the protection effort, for a variety of reasons. Either these institutional mechanisms have not been sufficiently developed during the project period to organise and pay for effective protection. Or, the villagers are not

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<sup>19</sup> Apart from reserving seats for women, scheduled castes and scheduled tribes at all tiers of local government - village, block and district level - the Amendment also mentions that the State legislatures may by law 'endow the Panchayats with such powers and authority as may be necessary to enable them to function as institutions of self-government and such law may contain provisions for the devolution of powers and responsibilities upon Panchayats at the appropriate level. In this connection, the Eleventh Schedule lists 29 functions as a reference point, at least half of which involve natural resource management.

interested in protecting the entire afforested area, arguing that their needs are met by a smaller area and hence they find it not worth their while to protect the entire re-forested or newly afforested area. The net impact is a decline in forested area over time.

This suggests that while attention to technical issues in rehabilitating the resource base is necessary and vital to watershed development, people and institutions matter in ensuring that the effects are positive and sustainable.

## 4.2 Impact on the poor

The nature of the activities taken up in watershed projects has implications for social equity: since it is the non-poor who have access to the best lands in the village, it follows that the main benefits of such activities is to further improve the situation of the non-poor. Special mention must be made of common property resources – especially pastureland. Although these can benefit the poor enormously, they are not developed because benefits cannot be appropriated privately. Hence, even if a watershed project provides funds and establishes pastures or plantations, there is very little incentive – even among the poor – to maintain it, simply because they cannot prevent others from reaping the benefits.

In addition, projects impact the way in which the poor carry out their diverse livelihood strategies. Current experience suggests that these are not always positive. The main points are listed below, in terms of the six ways examined earlier in which the poor typically earn their livelihoods.

- i. **Small scale agriculture:** Since the poor rarely have secure access to agricultural land, and many more are dependent on common pool resources (fuelwood, non-timber forest products, fodder) than on crops. Those with land tend to be marginal and small farmers with less than 1 hectare of operational holdings (by definition). More often than not, these tend to be the least productive land, situated in elevations, with little or no provision for irrigation. Even if they are provided with adequate irrigation, high yielding varieties of crops and better cropping practices, it is difficult to ensure that they produce sufficient output to lift a household of 5 members above the poverty line and keep them above poverty.
- ii. **Local labour markets:** That the poor can best be reached initially by the provision of local, casual, unskilled employment opportunities is well known (Carroll, 1992). However, while projects do provide increased opportunities for such employment in the rehabilitation phase (Farrington, et al, (eds.), 1999), a prevalent practice in several parts of the country is to bring in contract labour usually from outside the village. Further, whether watershed projects provide an increase in secondary employment opportunities (e.g., in agriculture) is still being debated. Nevertheless, those dependent on wage-labour often are not full participants in project processes, not being able to afford the time (and the attendant loss of earnings) to attend project-related meetings held during working hours.
- iii. **Long distance labour migration:** Those engaged in stable contracts to work in distant places may be forced to do so because they are tied in by indebtedness. Others may want assurance that new employment opportunities in their home areas through watershed development are reliable and worthwhile, before breaking stable migration contracts. Both, however, imply that migrant workers are generally not present to defend their interests in, for instance, access to forests or pastures, at the time when major decisions are being taken on watershed development. In their absence, their dependents in the village feel unable to voice their own views on watershed plans, or to take decisions on even routine resource allocation issues, such as the choice of crop variety, management of flocks of small livestock, and so on.
- iv. **Forest product collection:** While protection and rehabilitation of forest areas by projects and programmes can increase the availability of food, fibre, fodder and tradeable products which are important livelihood supports for the poor, these do not always materialise. In many cases,

effective forest protection ends with the withdrawal of the project, and hence gains during the project period are lost, even to the poor. Or, when forest protection is effective, monopoly powers granted by the state to certain public or private agencies ensure that the poor do not gain from collecting or selling forest produce. In many states, for instance, priority is given to the Forest Department nurseries as suppliers of seedlings to rehabilitated areas, and it is difficult for local low-income groups to break into this monopoly (or, often, even to obtain preferred species from government nurseries). Also, in some states, contracts have been granted to commercial companies for collecting, transporting or marketing non-timber forest products (NTFPs), which generally results in unfavourable prices to collectors, but also prevents them from diversifying into downstream transport and marketing activities (DFID, 1998). Also, there are instances where panchayats have handed over panchayat land to the Forest Department for afforestation, ignoring the claims of landless poor who were leasing this land from the panchayat to cultivate rainfed crops to supplement their income and diet.

- v. **Livestock production:** Many of the rural poor are herders who have depended historically on unrestricted grazing for their animals. However, most watershed projects do not have an explicit focus on the type of livestock favoured by the poor in many semi-arid areas, i.e., small ruminants and in particular, goats. As a result, not only are there little provisions - like access to good stock or to cheaper sources of credit - to augment the stocks of these animals, but also scant attention is paid to grazing requirements. Indeed, often, the impact of project-related improvements in crop productivity or irrigation facilities is to expand the area under cultivation. These expansions (or encroachments), along with afforestation activities, typically reduce the area available for the poor to graze their animals, creating conflict situations and generally leaving the poor worse off than before the project. In projects where attention has been paid to improving locally-available grass varieties, these do not often continue beyond the project period because of a lack of local expertise, experience and interest in re-planting and maintaining pastureland. Also, given the lack of private property rights, there is little incentive to invest in grazing land, e.g., providing irrigation or introducing new species.
- vi. **Self employment in micro-enterprise:** While most projects talk of off-farm employment opportunities, little effective support is given to rural micro-enterprises by the poor. Most effort is devoted to providing training for skill development. However, mere skill development is inadequate to ensure that the poor can earn a livelihood from their (often new) skills. Equally important are questions regarding the economic viability of the enterprise. Often, poor infrastructure (e.g., electricity, roads, transportation), insufficient quantity or quality of finished products, inadequate demand for these products in local markets, and unfamiliarity with established market procedures and institutions (e.g., commission agents, local market requirements, etc), ensures that additional production is not translated into sustainable profit.

Hence, in general, the impact of watershed programmes on the condition of the poor has been uneven, and has not always led to sustainable improvements in the resource base. There is thus a crucial need to re-examine watershed programmes to orient them towards improving their impact on both the poor and the resource base. Yet to do both, it is necessary to focus not only on the resource base, but on the people and institutions that manage the resource base.

## Appendix C

# Water Resources and Geology of Andhra Pradesh<sup>20</sup>

## II. WATER RESOURCES

The major part of the state lies in the plateau zone lying about 600 m amsl toward the west. There are few isolated hills in this plateau and it is underlain by Archean granitoids. The majority of this plateau (parts in the state) is drained by Krishna river and its tributary, Tungabhadra. The northern part of the state lies in the right bank of Godavari river. Towards the northwestern part of the state, Deccan traps and associated black cotton soils are found.

The Eastern Ghats form a series of disjointed hill ranges parallel to the coast along the western border of the coastal plains. Towards their northeastern part bordering Orissa, the Eastern Ghats are continuous hill ranges and have elevation as high as or more than 1200 m amsl. River Godavari cuts across these ranges. These ranges have some of the best forests in the state and are inhabited mostly by tribes. The distribution of area and population under different physiographic regions in the state is presented in Table (2).

<b>Physiographic Regions</b>	<b>No. of Villages</b>	<b>No. of Towns</b>	<b>Percent to Total Area</b>	<b>Rural Population Density* (per sq km)</b>	<b>Percent of Rural Population</b>	<b>Percent of urban Population</b>
Coastal Plains	3,684	54	9%	382	18%	21%
Plains (Interior)	11,508	114	40%	201	45%	42%
Uplands	4,397	43	15%	184	16%	29%
Plateaus	1,559	13	7%	158	6%	3%
Riverine tracts	2,523	2	3%	150	3%	1%
Forests	4,615	16	15%	88	8%	3%
Hills	1,414	10	10%	57	3%	1%

*Source:* Regional Divisions of India – A Cartographic Analysis, Andhra Pradesh, GoI  
\* Projected from 1981 data

The average rural population density of the state was about 175 persons per sq km in 1991. Highest population densities are reported from the agriculturally well-developed coastal plains. This has 9 percent of the area but houses 18 percent of the rural and 21 percent of the urban population. With excellent aquifers in this region, water shortage is not a major issue but these areas have problems of saline aquifers which necessitates long distance conveyance of water to some of the coastal communities. This region is one of the most irrigated regions of the state.

The plains and uplands of the state lie in the hard rock region. The southern part of the state lies in semi-arid zone and rainfall variability is quite high in most parts of these plains and upland regions.

The population densities of plains and upland regions are more than the state average. Some parts of these land types have high fluoride bearing groundwater. There are pockets of groundwater over-

<sup>20</sup> This section is reproduced from TARU (2000), pages 8–14.

exploitation in these regions. Regular summer water shortages and occasional droughts are quite common in these regions.

The lowest population densities are reported from forest tracts and hilly regions located mostly in the North eastern part of the state. The tribal settlements are generally dispersed and often hamletted. Since most of these regions are less accessible due to terrain conditions, transportation of rigs is a major problem. Groundwater availability is restricted to very few aquifers due to terrain conditions in these regions. A large proportion of the numerous streams in these regions have water during most part of the year and they are one of the common sources of domestic water. Water from these streams is often polluted due to utilisation by settlements en route and free use by animals, especially during the lean seasons. Perennial springs are another important source of water, especially in laterite-capped hill regions. Spring sources are tapped directly and usage at the spring itself often pollutes the sources.

## **Geology**

The geology of the state is dominated by rocks ranging from the Archean to the Gondwana period. The coastal region with recent alluvium forms the youngest rocks. Most parts of the state lie in Archean and Pre-Cambrian terrain. Granites and high grade schistose rocks are the most common rocks in this state. Eastern ghats contain Khondalites and Charnockite suite of rocks. Khondalites are mostly high grade metamorphosed sedimentary rocks.

The central and western part of the state is covered by Archean rocks. These have been eroded and isolated hillocks of granitoid rocks are common features in these otherwise monotonous plains. These rocks have developed secondary porosity due to repeated structural disturbances and often form good aquifers especially in the vicinity of faults. In the rest of the areas, they are poor aquifers and the groundwater is mostly restricted to weathered zone.

Cuddapah group of rocks belong to Proterozoic period (0.5 to 1.6 BYBP). These formations form an arcuate belt, nearly parallel to the coast with the southern end in Chittoor district and the northern end at the tri-junction of Guntur, Khammam and Nalgonda districts. They form good aquifers at places.

The Gondwana sedimentary rocks are exposed along the Godavari valley bordering Madhya Pradesh on the northeastern part of the state. They are found in the eastern edges of Adilabad, Karimnagar, Warangal and Khammam districts. They comprise sandstones, shales and coal. Some of the sandstones are good aquifers. Deccan Traps, belonging to Cretaceous to Tertiary age, are found along the north-western border of the state with Maharashtra and these have a few good aquifers.

The Rajahmundry sandstones belonging to Mio-Pliocene age, are found as a small pocket near Kakinada and are overlain by coastal sands and recent alluvium. The coastal sands and alluvium form a linear belt along the eastern coast and their width is maximum along the Krishna and Godavari delta region. The thickness of alluvium often attains the thickness of few hundred meters but the deeper aquifers in the area, are reported to contain highly saline water.

## **Rainfall**

The average rainfall over the state is about 1,000 mm but this is unevenly distributed across space and time. The northern hilly and coastal areas receive more than 1,000 mm while the southwestern Rayalaseema receives less than 700 mm of precipitation. Rainfall increases towards the North and the North eastern parts of the state. Coefficient of variability of rainfall is fairly high especially in the Rayalaseema region.

The southwest monsoon contributes nearly 80 percent of the annual rainfall in Telangana, 75 percent in Rayalaseema and 50 percent in Coastal Andhra Pradesh. Cyclonic disturbances in the Bay of

Bengal, especially during winter, cause heavy rains in the coastal regions. Most of the plateau experiences hot dry climate while the coastal region is hot-humid to sub-humid. Droughts and crop failures are quite common in the interior parts of the state owing to the regional and temporal rainfall pattern.

### **Ground Water Resources**

About 84 percent of the state is underlain by crystalline and consolidated formations. The rest of the area is either has alluvial formation or coastal sandy zones. The aquifers in hard rocks are restricted to secondary porosity caused by folding and faulting. The hard rock aquifers are sparse and disseminated. The hard rock regions of Andhra Pradesh can be broadly classified in to Granitic and Proterozoic regions. The Proterozoic sedimentary regions are situated in an arcuate belt running parallel to the coast comprising districts bordering coastal districts. The secondary porosity has developed in these rock formations by folding of these sedimentary rocks. The hydraulic properties of these formations improve only in areas where tectonic activities have taken place; otherwise these formations are fairly impervious. Since most part of the hard rock regions, especially the Rayalaseema districts, are located in semi-arid areas, groundwater availability is likely to be low and competing demands from agriculture can put a severe strain on drinking water availability during summers. Most of the groundwater extraction for agriculture is carried out during the rainy and winter months and wells can go dry before the onset of summer season.

The ratio of Gross irrigated area (GIA) to Gross sown area (GSA) in the state grew from 35 percent in 1980-81 to 43 percent in 1997-98. The ratio of ground water irrigated area to total irrigated area in the same period grew from 26 percent to 51 percent. Significant growth in ground water irrigation is reported from the interior hard rock zones which is a matter of concern.

Since more than 80 percent of the population is situated in the hard rock regions, ground water availability becomes a critical issue to ensure drinking water availability in this state. About 44 percent of the total population in the state, reside in the plains areas which are mostly the areas amenable to surface irrigation through large irrigation projects. A part of this region type is already covered under irrigation projects. The remaining 36 percent population is located in the uplands, plateaus, hills and forested regions. Groundwater availability becomes critical for these regions since they do not have surface water options. The rural population in all these regions is more than three fourths of the total population of these regions, except in case of uplands (64 percent, due to location of Hyderabad in this region type).

Out of the total 1,104 Mandals in the state, six mandals were classified as “over-exploited” (more than 100 percent of utilisation of renewable groundwater resources) and 24 mandals were categorised as “dark” (85 to 100 percent utilisation). Except for one mandal, all of them are situated in the hard rock regions. The worst impacted regions are located in northern Telangana and Southern Rayalaseema.

Since groundwater estimation is done at Mandal/block level, a correct picture of village wise groundwater utilisation does not emerge clearly. In many mandals, which are “grey” or even “white”, pockets of over exploitation may be present. The methodology itself has limitations which is unable to account for wide variations in aquifer conditions, especially in hard rock regions. The recent (Kharif, 1999 and Summer, 2000) droughts and drinking water shortages across the hard rock regions of the state indicate need for village/ micro-watershed level holistic assessment considering both surface and ground water resources and extent of development and usage patterns. The droughts of 1999-2000 of Andhra Pradesh are a grim reminder to the extent of deterioration in ground water availability.

### **Surface Water Resources**

Krishna and Godavari are the two major rivers flowing through the state. Pennar, Vamsadhara and Nagavalli are the three smaller rivers of a total of 34 rivers flowing through the state. All these rivers

carry an estimated total of 18 mham of water to the Bay of Bengal. Being a riparian state, Andhra Pradesh has the share of water from the Krishna and Godavari systems. The state has on-going river water disputes with other riparian states. A significant proportion of the waters from the Krishna has already been tapped while the full potential of the Godavari are yet to be tapped. The utilisable water resources of the state are estimated to be about 7.74 mham, at 75 percent availability. In 1991, Andhra Pradesh had a live storage capacity of 2.472 mham, 0.2433 mham projects were under construction and another 0.1984 mham storage capacity projects were under consideration.

This state has a large number of tanks of various sizes dating back at least five centuries. Large-scale irrigation development on an organised scale, was started during the Colonial period. The Godavari delta irrigation scheme was implemented by Sir Arthur Cotton towards the end of the last century. This was followed by the Krishna delta scheme. After Independence, several large projects were taken up in the interior areas, the Nagarjuna Sagar project, being the largest one.

The GIA from all surface sources was 3.1 mha in 1980-81 which declined to 2.85 mha in 1997-98. In 1980-81, the share of surface sources in irrigation was 74 percent in 1980-81 which reduced to 49 percent in 1997-98. There have been marginal fluctuations in the area irrigated by project canals which seem to respond the rainfall pattern. Decrease in area irrigated by surface sources is a matter of concern as this indicates that the surface irrigation systems are decaying due to poor maintenance or facing management problems. This can cause a decrease in ground water recharge on one side and increase in groundwater usage in the canal command areas, especially at the edge of the command areas. Andhra Pradesh has enacted Farmers' Management of Irrigation Systems Act and Rules in the 1997 and has transferred some of the maintenance functions to the Water User Associations. It is expected that these will improve the performance of canal irrigation significantly but results from the ground are awaited.

Tanks were an important source of irrigation, especially in the interior semi arid parts of the state. Tanks provided irrigation to areas not amenable to irrigation by large irrigation projects. The net area irrigated by tanks increased from 0.763 mha in 1950-51 to 1.23 mha in early 1960s. There has been a continuous decline since, in the area irrigated by tanks. This decline may partly be attributed to coverage of tank irrigated areas under the command areas of project canals, but the continued decline since the early 1980s (by which time, most canal projects were over), is a matter of concern. The net irrigated area from tanks decreased from 0.9 mha to 0.56 mha during the 1980-1997 period. There has also been no significant change in irrigation intensity of tanks.

Tanks are distributed over the semi arid parts of the state and they play an important role in groundwater recharge in these areas. Poor maintenance of these tank systems have resulted in reduced storage capacity and it makes them vulnerable to breaches during the heavy rainfall periods, which are quite common. Since there were many villages that prospered due to the irrigation by tanks, decrease in tank irrigation often has led to increased dependence on groundwater for irrigation which has in turn led to water shortages during summer.

Lift irrigation systems have been installed in parts of the state, which rely on seasonal streams and their quality depends considerably on the rainfall pattern and local factors like catchment area and upstream withdrawal. The Andhra Pradesh State Irrigation Development Corporation provides financial and technical assistance to farmers from amongst the backward groups to set up group-owned LI systems. The irrigation from LI sources account for less than four percent of the Net irrigated area in the state. These are groundwater dependent with borewells as source for a group of farmers. However, the transfer of borewells to the farmers in 1995, without adequate preparation of user groups, resulted in poor upkeep of these irrigation systems. The Netherlands-funded AP WELL undertook initiatives in Farmer managed Borewell Irrigation systems in seven districts of the state with the target of creating 3,300 drilled wells, rejuvenating 500 borewells and establishing a network of observation wells. This initiative, which is farmer-based, has attempted to make users aware and enforce community norms on crop choice for agriculture (suited for the area and water available) and inculcate active management strategies within the groups for sustainable use. It is to be noted that the



farmer in this project pays Rs. 0.50 per unit of electricity consumed, the norm set by the Ministry of Power.

### **Water Quality**

Andhra Pradesh has both coastal and semi-arid hardrock regions, therefore problems of coastal salinity and fluoride are the most common groundwater quality problems in the state. The coastal salinity problems are largely restricted to coastal villages, inhabited mostly by the fisherfolk. During the last one decade, groundwater over-exploitation is reported from one mandal of West Godavari district. Coastal aquifer over-exploitation may grow if the surface irrigation systems are insufficient to meet agricultural needs. In the delta area, another major concern is the saline water ingress along the river mouths. Since the coastal belt is nearly flat, over-exploitation of surface water inland may cause back-flow of sea water inland along river mouths.

Aquaculture has become quite common along the coastal zone, and this involves storage of saline water in tanks. It is known to affect sweet water aquifers in the coastal zones, since the tanks are located in the sandy zones and no measures are undertaken to prevent infiltration. Since aquaculture takes place over large areas, coastal aquifers are likely to be impacted in the future.

Groundwater extraction in the coastal zones is generally undertaken to irrigate lands which do not get surface water irrigation. These lands are mostly located at the junction of interior hardrock zones and coastal alluvial zones. The coastal aquifers most probably get some of the recharge from interior zone. Over-tapping this zone is likely to reverse the current position of fresh and seawater interface. This can result in seawater intrusion as already evidenced in Gujarat and other coastal zones in the country.

Fluoride is the major quality problem in the interior areas of the state. The fluoride affected districts are Nalgonda, Anantapur, Cuddapah, Guntur, Nellore, Chittoor and Krishna. In each of these districts, some villages do not have any groundwater source free of fluoride. The state government has commissioned many surface water based water supply schemes, to address this problem. In some of the affected areas, water treatment through the Nalgonda process has been attempted but these plants are reported to be mostly defunct now due to poor O&M. Activated alumina based household and village level treatment methods are being tried out now in the state. The Sathya Sai Trust has set up large surface water based piped water scheme for Anantapur district. The O&M of this system is large and the maintenance of the piped system running across the semiarid country side will not be sustainable. Inland salinity is also reported from the semi-arid regions, especially in the Rayalaseema region, but the problem is not very severe.

In respect of water supply, of the 69,732 rural habitations in the state, there are about 32,000 fully covered (FC) villages and 26,976 (39 percent) habitations are partially covered (PC). Fluoride problems are reported from 12,068 habitations and 8,519 habitations have problems of salinity or brackishness. Of the quality affected habitations, about 46 percent have been provided safe sources subsequently. This leaves more than fifty percent of the habitations needing to be provided with safe drinking water.

## Appendix D

### **The Panchayati Raj Engineering Department in Andhra Pradesh<sup>21</sup>**

The Panchayati Raj Engineering Department (PRED) is the engineering and works arm of Department of Panchayat Raj & Rural Development. There are two divisions within the organisation, one to handle works on roads and buildings and the other, dealing with water supply. In terms of mandate, the PRED is one of the larger and more influential institutions in the state, [and it caters] to about 70 percent of the population. The PRED continues to share the responsibility of both, the installation as well as O&M of water supply services. Even though devolution of powers following the 73<sup>rd</sup> CA may mean that the PRED engineers at the district level (responsible for water supply) are now officially under the administrative control of the Chief Executive Officer of Zilla Parishad, their linkages with the line organisation continue to remain stronger as career advancement, transfers and postings, and other cadre management is managed therein.

The organizational structure of the PRED has the Engineer-In-Chief at the head and the Chief Engineers for RWS, Roads & Buildings (R&B), Works and Employment schemes, Vigilance and HRD under the E-I-C. The span is organized into zones headed by a Superintending Engineer, with Executive Engineers in charge at the District level assisted by Deputy Engineers and Assistant Engineers at sub-district levels. While the Assistant Engineer and Deputy Engineer have to work with administrative coordination from the Mandal Parishad Development Officer, the Executive Engineers are required to report on development matters to the CEO, Zilla Parishad. The R&B division is responsible for Panchayat, Mandal and District roads and the construction of public buildings for the ZP, MPP and the GP. The Works and Employment schemes division takes up public works for the ZP, MPP and GPs, which are in the nature of asset creation activities as part of other development programmes being managed by the district administration. The RWS accounts for about 60 percent of the technical staff in the PRED. The administrative staff make up about 50 percent of the PRED staff.

The PRED -RWS is a specialist technical department created to facilitate asset creation by the rural local bodies. It however also carries out O&M and Quality Control functions, as most of the panchayats do not have the capacity to carry out these functions. Staffing in this department is heavily engineering dominated. The department has been receiving budget sanctions based on works to be taken up and estimated O&M activities. Hence, the physical targets of completion of schemes are emphasized rather than aspects like service delivery, quality and reliability of services. Thus, works and construction wield significant importance as compared to the other functions.

In rural areas, the accent in recent years (because of drying up of sources and emerging quality problems) has been on designing and implementing large comprehensive water supply schemes, with no consultation or contribution from local communities. The O&M costs for these schemes prove to be higher than what Gram Panchayats (GP) and Zilla Parishads (ZP) are willing or capable of bearing, despite the directives issued last year devolving more funds to the local bodies and directing local bodies to collect user charges. In practice, the handover of water supply schemes executed by the PRED to the local bodies has not happened, and the PRED maintains a mobile team for O&M. In recent history, a philanthropic initiative (Sathya Sai Trust) in providing drinking water supply to rural areas in Anantapur by means of a large, relatively sophisticated system, was not taken over by even the PRED because of lack of financial resources for maintenance.

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<sup>21</sup> From TARU/DFID (2000), pp 14-16. There is also a recent report of Phase I of a comprehensive review commissioned by the Government of Andhra Pradesh (GOAP) supported by the UK DFIDI. See Zeidlitz, et al (2001) Andhra Pradesh Impact and Expenditure Review, Panchayati Raj and Rural Development Phase I, Final Report submitted to the World Bank, 28 February.

## Appendix E

### Institutions involved in Water & Environmental Sanitation in Rural Andhra Pradesh<sup>22</sup>

#### LOCAL LEVEL INSTITUTIONS

##### Gram Panchayats (village level)

The 73<sup>rd</sup> constitutional Amendment and the consequent Andhra Pradesh Panchayati Raj Act 1994 assigns local bodies the responsibility of providing safe drinking water supply and sanitation. Local bodies comprise Gram Panchayats, Municipal Corporations and Municipalities. Under the AP Panchayati Raj Act, O&M of water supply installations is the responsibility of Gram Panchayats. The Act also empowers the Gram Panchayat to collect house tax (10% of which is intended for use in water supply) from its constituents. In reality, most of the Gram Panchayats have financial constraints in taking over the responsibility of Operations and Maintenance.

The 21,000 Gram Panchayats in the State are supported by the Panchayati Raj Engineering Department (PRED), which is supposed to design, develop and carry out operation and maintenance activities for all piped water supply schemes.

The O&M of standposts is the responsibility of the Gram Panchayat.

#### STATE LEVEL INSTITUTIONS

##### Rural Water Supply Department of the PRED (for details on the PRED, see Appendix E above)

The Rural Water Supply (RWS) Department within the PRED spends money given to it by the central government through the Accelerated Rural Water Supply Programme (ARWSP) and the Minimum Needs Programme (MNP) and the matching contribution from the state government *plus* additional plan and non-plan funds to:

- Design new community water supply (CWS) schemes
- Carry out O&M of all built CWS schemes
- Maintain handpumps (public standposts) in gram panchayats

The payment by gram panchayats to the PRED for the O&M of handpumps is done by redirecting one rupee from the annual state government grant of Rs. 4 per capita to all gram panchayats in the state.<sup>23</sup>

**Andhra Pradesh Industrial Infrastructure Development Corporation (APIIDC)** is responsible for construction and O&M of water supply and sanitation in notified industrial areas and industrial estates.

**The Minor Irrigation Department** includes the AP State Ground Water Department, the AP State Irrigation Development Corporation and AP State Rural Irrigation Corporation.<sup>24</sup>

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<sup>22</sup> From Jani (1999).

<sup>23</sup> From discussions with officials of the RWS.

<sup>24</sup> Scott Wilson (1998), p. 10.

**The Irrigation Department** owns almost all the surface water in the state. Whenever water supply schemes are based on surface water, the user department needs to coordinate with the irrigation department to negotiate water allocation.

**The Health and Family Welfare Department** is primarily responsible for providing health care facilities in the state. Operates through several large departments within it. The Directorate of Medical and Health Care Services has a huge staff of multipurpose health workers to implement several national and state level programs. The Directorate of Medical & Health Care Services undertakes hygiene promotion as one of the IEC activities. In times of epidemic outbreaks, the department also acts as an expert agency to local rural (and urban) bodies.

**The AP Housing Corporation** provides financial assistance and expert advice to create housing for low income families in the state, particularly in rural areas. Inclusion and construction of a latrine is a prerequisite for availing finance (grant plus loan) for construction of houses. The corporation offers standard two-pit latrine design for implementation. (The corporation, which is also funded by the central government, is presently running at a loss.)

**State Pollution Control Board** is responsible for controlling air and water pollution including hazardous waste through national level statute (the Environmental Protection Act of 1986). It is also undertaking a watershed-based mapping of background levels of water pollution in the entire state.<sup>25</sup>

**Department of Women Welfare and Child Development** is responsible for encouraging women's involvement in developmental initiatives in the state.

**Water and Land Management and Research Institute (WALMI)** is a state government training and research institution in the areas of water resources and irrigation.

## FINANCIAL INSTITUTIONS

**Lead Banks** have been decided for each district of the state to fund developmental initiatives including soft loans for construction of wells, pump set procurement, deepening of bore wells etc for centrally funded programs.

## CENTRAL GOVERNMENT INSTITUTIONS

**Rajiv Gandhi National Drinking Water Mission** has recently come out with modified guidelines for availing grants and incentives by the state.

**Central Ground Water Board** plays an advisory and expert role in ground water monitoring and exploitation. A model ground water bill has been proposed over which a decision has yet to be taken by the state.

**Ministry of Water Resources** at a national level is also a repository of advisory and expert resources.

**National River Action Plan** has the primary objective of prevention of pollution in rivers and ponds. Several states have availed grants from the Plan to treat industrial and domestic sewage.

**Andhra Pradesh Transmission Company (APTRANSCO)** is a recently formed organisation under the power sector reform project of World Bank and DFID. Although its debt continues to mount, the state government will have to implement power sector reforms fully, or face conditionalities. Any water policy/sector reform is likely to affect this department - and be affected by it.

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<sup>25</sup> Lecture delivered by Tishya Chatterjee, Member Secretary, AP Pollution Control Board (APSCB), organised by the Confederation of Indian Industries, New Delhi, November 2000.

**National Hydrology Project** is in the process of upgrading data collection networks and setting up hydrological databases.<sup>26</sup>

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<sup>26</sup> KAWAD Water Resources Audit (2000), p. 14, footnote 2.

## Appendix F

### Laws relating to Water Supply and Environmental Sanitation in Andhra Pradesh<sup>27</sup>

The legal framework for the water supply and environmental sanitation sector is provided by: (a) Acts that relate to state and district level organisations which have a role in providing water supply and sanitation services, (b) An Act that seeks to control groundwater extraction and (c) An Act that aims at advancing public health in the state. The key legislations include:

- a. The Andhra Pradesh Panchayat Raj Act 1994.
- b. The Andhra Pradesh Municipality Act, 1994
- c. The Hyderabad Metropolitan Water Supply and Sewerage Act, 1989.
- d. The Andhra Pradesh Groundwater (Regulation for Drinking Water Purposes) Act, 1996.
- e. The Andhra Pradesh (Andhra Area) Public Health Act, 1939.

These legislation are briefly described below:

#### **a. The Andhra Pradesh Panchayat Raj Act, 1994**

The Andhra Pradesh Panchayat Raj Act was enacted in 1994, to ratify the Constitutional (Seventy third Amendment) Act, repealing earlier laws on the subject, and providing for the constitution of Gram Panchayats, Mandal Parishads and Zilla Parishads; and related matters. According to the Act, there will be an elected member (Gram Panchayat Technical Committee member) for every 300 persons within the revenue village and the Sarpanch (Headman) will be elected directly by voters in the village.

The second tier, the Mandal Praja Parishad (MPP) consists of the directly elected members (Mandal Parishad Technical Committee member), the Member of the State Legislative Assembly (MLA) representing the concerned Mandal and the Member of the National Parliament (MP) from this area, who is an ex-officio member (they have to opt for one Mandal within their constituency) and sarpanchs (Headmen) of the GP in the Mandal, who are permanent invitees but with no voting rights. The Act also provides for one elected member belonging to minorities based on religion or language. The president of the MPP is directly elected by the registered voters in the area, while the vice-president is elected by the members of the MPP. The Mandal Parishad Development Officer, a government employee, is the Chief Executive Officer of the MPP. The MPP has the power to borrow funds and levy taxes, fees, etc. Its function range from the execution of all programmes under community development to the implementation of welfare schemes.

The Zilla Praja Parishad (ZPP) consists of the elected territorial constituency members (ZPTC), MLAs representing rural areas of the district, the MP of the district and one member belonging to the minorities. The Chairperson of the ZPP is directly elected by the voters in the district, while the vice-chairperson is elected by the ZPP members. The MPP Presidents are permanent invitees with no voting rights. The District Development Officer is the Chief Executive Officer of the MPP. The ZPP has the power to examine and approve budgets of MPPs, allocate funds to MPPs, co-ordinate and consolidate the Mandal level plans into district rural plans and supervise the activities of Mandals in the districts. The Act provides for reservation of 50 percent of elected political positions for SC (15 percent), ST (6 percent), Backward Classes (20 percent) and women (9 percent) in both the MPPs and

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<sup>27</sup> From TARU/DFID (2000), pp. 16-23

ZPPs. The Act also empowers the government to constitute Planning and Development Boards at district level, which are expected to formulate and execute annual district plans. An innovative feature of the Act is the disqualification of persons having more than two children from standing for elections.

The Andhra Pradesh Panchayat Act provides for a list of eleven functions which the local bodies are obliged to undertake - construction, repair and maintenance of buildings, roads, bridges, culverts etc., lighting of roads and public places, construction of drains, disposal of drainage, cleaning of streets and removal of rubbish, etc. The Act also listed 29 functions which the Panchayats may undertake depending on convenience and availability of funds. This include welfare and development functions like drinking water, housing, health and sanitation and water management. Even though the transfer of responsibility for O&M has been authorised by the state government, this has not been effected due to apprehensions of financial burden on the local bodies.

Though the Act came into force in 1994, the rules were not issued by the government, regarding the procedure to levy new taxes and to that extent, the Panchayats are deprived of income. The recommendations of the First State Finance Commission, which submitted its report in 1998, included several non-financial subjects relating to computerisation, administration, staffing pattern for GP, all for strengthening the PRI infrastructure and some legal recommendations. Some of the recommendations on increasing incomes of the local bodies and advocating more scientific methodology for assessment would have an indirect impact on the WES sector, the pertinent directives relating to water supply and sanitation sector were:

Gram Panchayats should compulsorily levy the water tax under Section 71 of the A.P.P.R. Act to augment the funds for maintenance of the existing bore-wells and other rural water supply schemes (para 9-5-3); and

Special taxes could be levied on structure with more than 500 Sq. Ft., plinth area if a proposal is received from the Gram Panchayats (Para 9.5.3.).

The State Finance Commission (SFC) had also recommended a higher proportion (39 per cent) of state tax and non-tax revenues to be devolved to the local bodies. However, the government has set-up a second SFC to work out the final formula for distribution of funds. The Second SFC is currently undertaking a detailed study of revenue generation by the PRIs and evolve evolving an appropriate formula for devolution of funds. Their report due in 2000 is reported to be delayed to 2001.

A committee headed by Dilip Singh Bhuria was appointed to examine the provisions of the 73<sup>rd</sup> CA and recommend a system of Panchayats Raj suitable to the scheduled areas in the country. The committee recommended an alternative system built on the foundation of traditional institutions. Since different ethnic groups live in exclusive and widely dispersed settlements in tribal areas, the constitution and composition of GP would have to be necessarily different to enable face to face and participatory planning.

The Provisions of the Panchayat (Extension to Scheduled Areas) Act, 1996 extended the provisions of Panchayats to the Schedule V Areas and enjoined the states to pass appropriate legislation for this extension, keeping consonance with the customary law, social and religious practices and traditional management practices of community resources. The state governments were also enjoined to entrust to Panchayats, the responsibilities of planning and managing minor water bodies<sup>28</sup>.

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<sup>28</sup> Andhra Pradesh entrusted the *planning and management* responsibilities to different tiers within the 3-tier PRI structure. However the powers and function (lease out minor water body for specified purpose, regulate use of water from rivers, streams and minor water bodies for irrigation purposes), were kept vague (in such manner as may be prescribed).

**b. The Andhra Pradesh Municipality Act, 1965** (Subsequently amended in 1994, 1997)

The Andhra Pradesh Municipalities Act was enacted to prescribe the constitution, powers and duties of Municipal bodies in the state. The Act details the responsibilities of the civic administrative body and also prescribes the powers to enforce, within the context of health and security of its citizens.

The Municipal council is empowered, with the sanction of the government, to direct the construction of such works for supplying it with water and may provide for structures of storage and distribution. The Council is empowered to control the use of all water connections provided by it and is liable to supply only as much water as funds permit. The council is empowered to give connections to households, on receipt of applications; provide for classification of water supply under different categories and levy and collect pipeline service charges from every house owner who has been provided a water connection. Most of the Municipalities except Municipal Corporations of Hyderabad and Vishakhapatnam and Guntur, do not have metered connections. Hence, water tax in urban areas of the state, is collected on flat rate and not based on use.

The Municipal Councils are empowered, with the permission of the government, to raise funds through bonds and other accepted market options. However, this option has not been exercised by any urban body in the state, so far. After the Constitutional (Seventy Fourth Amendment) Act, the state government issued the necessary rules, incorporating the following as enacted by the 74<sup>th</sup> amendment:

- a. Criteria for the gradation of Nagar Panchayats (for transitional areas and small urban areas) and Municipalities;
- b. Reservation of one third of the seats in the Municipality for women, and proportionate representation (in proportion to the share of section of population in the Municipality) for SC, ST and BC communities.
- c. Provision for co-option of members having special knowledge into the municipal administration as also members from amongst the minorities;
- d. Constitution, composition and reservation, powers of Ward Committees (WC).
- e. Fixation of strength of Nagar Panchayats and Municipalities;
- f. Transfer of responsibilities according to the Twelfth Schedule to urban local bodies.

The Twelfth Schedule includes water supply for domestic, commercial and industrial uses; public health, sanitation, conservancy and solid waste management; urban poverty alleviation; public amenities including public conveniences; and safeguarding the interest of the weaker sections of society.

While the 74<sup>th</sup> CA dictated the constitution of fora for planning at the district level and separate planning bodies for metropolitan areas, this has not been adopted by the state. The GoAP accepted and implemented 13 recommendations of the SFC pertaining to urban local bodies, which included enhanced allocation for water supply schemes in municipal areas and empowering local bodies to enhance user charges. Following this, there have been enhancements in the connection fee (referred to as donation amount) and revisions in water tariff (read as fixed monthly charges).

In 1997, vide Government Order No. 158, the Connection (Donation) amount was enhanced by 50 percent in Warangal, Kurnool, Guntur, Rajahmundry and Vijayawada Municipal Corporation/Municipalities, and the monthly water charges for household connections increased to Rs. 100 from the existing rate of Rs. 40. All the other Municipalities were ordered to increase existing tariffs by 50 percent.



**c. Hyderabad Water Supply and Sewerage Act, 1989**

The Hyderabad Water Supply and Sewerage Act (HWSS) was enacted in 1989 to make provision for water supply, sewerage and sewage treatment in the Hyderabad metropolitan area and establish the institutional framework for this. This Act details the constitution, composition and duties of the HMWSS Board. The Act legislates the necessary powers to manage water supply and sewerage within the metropolitan area defined by the government. It also empowers the board to carry out necessary action towards the management of water supply and sewerage in the area. It also empowers the Board to regulate drinking water with prior approval of the Government. The Board is provided with necessary powers to regulate and act on private parties in cases where their actions are seen as detrimental to the purposes of the Board.

The Board is empowered to levy rates, fees, tariffs, rentals, deposits, contributions and other charges in order to provide sufficient revenues to cover operating expenses, taxes, interest payments and to provide for adequate maintenance and depreciation. The Board is empowered to borrow any sum required, with the permission of the government, for purposes of fulfilling its functions under law.

**d. The Andhra Pradesh Groundwater (Regulation for Drinking Water Purposes) Act, 1996**

This legislation has been enacted to regulate the exploitation of ground water for the protection of public drinking water sources. This law explicitly denies permission to any person to sink any well within a distance of 200 meters of a manually driven public drinking water source or within 250 meters of a power driven public drinking water source. Any person seeking to sink a well within 500 meters of a public drinking water source has to obtain permission from the Technical Officer (a geologist of the State Ground Water Board not below rank of Asst. Hydrogeologist/Asst. Geophysicist) and pay a fee as may be prescribed.

The Act empowers the Revenue officer (not below rank of Mandal Revenue Officer), on advice from the geologist to declare an area as “water-scarce” for a certain period. The extraction of water from wells in the water-scarce area, within a kilometer of the drinking water source, for any purposes other than drinking, can be restricted or prohibited. However, the geologist has to support this decision with rainfall data analysis and regular observations of water-level fluctuations. The law also empowers revenue authorities to enter the land of the well-owner to carry out any investigations, effect closure or disconnection, if contravention of rules are observed. There is scope for payment of compensation in case of closure or disconnection.

There has been a proposal to amend the act as follows:

- a. The distance norm is changed to uniform 250 m for manual or power driven source.
- b. The Technical Officer may be of equivalent rank in the PRED, APIDB or the SGWB.
- c. Registration of existing wells and new wells is to be made mandatory.
- d. Database in format prescribed by the SGWB to be maintained by the PRI.

The proposed amendment is reported to be part of a more comprehensive Act, currently under discussion with the state cabinet. Punitive measures are recommended and the management and implementation is to be with the PRI, supported by department officials. However, reconciliation of immediate demands from agriculture, sustainability issues and drinking water priorities will be a problem area. While the resource management issues are being addressed through vigilance and law and the responsibility of management vested with the PRIs; there has been no reported plan to empower this institution with information about the resource situation which could enable discussion on options and empowered choices. Agriculture, a major consumer of ground water will continue to be driven by crop choice based on economic returns, labour situation and food consumption preferences and it might prove difficult to regulate inputs into this without addressing the above issues. The existing differentials between cost of irrigation in canal-irrigated areas and groundwater irrigated areas and regulation being sought for the latter will also bring back the question of regional

imbalances in development. There is also the issue of co-ordination between the agencies – Electricity Distribution Companies, Groundwater Department and local administration – who have powers of regulating groundwater use directly or indirectly. The campaign to regularise electricity connections in July 2000, saw some of the larger increments in irrigation pumpset connections happening in the drier districts of Mahbubnagar, Anantapur and Nalgonda.

**e. The Andhra Pradesh Public Health Act, 1939**

The Andhra Pradesh Public Health Act, 1939 provides for the advancement of the public health of the Andhra area of the state. It advises the local authority on the appointment of a health officer. The Act details the powers of the Public Health officer in directing the local authority with regard to improvements in water supply, maintenance of public drains, provision of sanitary conveniences and abatement of nuisance.

The Health Officer is also empowered to prohibit use of water from suspected sources in case of infectious diseases; take action on trade, which is felt to be affecting communicable diseases and advise necessary action in the case of insanitary buildings, unsound food, over crowding and arrangements for fairs and festivals.

**f. Other Related Legislation**

**Water Rights**

As in the rest of the country, individual rights over surface water are unclear resulting in riparian rights being exercised more by persons abutting the water course. The lack of any defined modality of water rights or licences for water have perpetuated characteristic head-end to tail-end differentials even in irrigation projects and benefits have been more to certain persons by virtue of the location of their land. Individual rights for ground water resources were recognised only through land rights and this bestows an undue advantage to those who have economic power, farm size and access to technology. The unrestricted access to groundwater, even at the cost of depriving earlier uses, does not have any mechanism to compensate the user who loses his original share of water due to heavier extraction by the new party. The rules and norms developed by groundwater boards, nationalised banks and state electricity boards, specifying overdraft zones and safe distance factors, have been found difficult to enforce and monitor. Also, the effectiveness and use of such norms in hard rock aquifers needs a critical examination.

**Irrigation**

In Andhra Pradesh, state legislation relating to the irrigation sector - The Andhra Pradesh Water Tax Act, 1988 and The Andhra Pradesh Water Tax Rules, 1990; and The Andhra Pradesh Farmers' Management of Irrigation Systems Act and Rules, 1997 - impact the water supply sector, when viewed from the vantage of comprehensive water resource management. The Andhra Pradesh Farmers' Management of Irrigation Systems Act and Rules, 1997 has enabled the mechanism of water distribution management, maintenance and rehabilitation of surface irrigation canals/drains to be carried out through local Water Users Associations (WUA), which were formed by law and elected. This initiative of the state government, backed with initiatives to train elected members on administration and financial management, is aimed at improving the management of irrigation in the command areas and irrigation efficiency by speedy rehabilitation of canal systems. During this period, the state government has also been able to increase irrigation charges and thus partially reduce state subsidies.

## **Power**

The power distribution in Andhra Pradesh is carried out by a Public sector entity, the Andhra Pradesh State Electricity Board (APSEB), which has been restructured into generation, transmission and distribution companies as a part of the World Bank assisted Power sector reforms project. The impetus provided for agriculture in the earlier plans influenced the power tariff policy. The tariff for power for agriculture pumpsets was based on a flat tariff from 1984. The tariff revision in 1996 and in 2000 retained the flat fee structure, but increased the annual payment depending on the power of the pump set. Also, a concession on this flat fee (between 33 to 12.5 percent) was offered for farmers in the Drought Prone Area Program (DPAP) districts. The reforms in the power sector initiated by the state government and aided by multilateral and bilateral agencies, legislated the Andhra Pradesh Electricity Reform Act, 1998 and Rules, 1999. The agenda for reforms propose a ten year phased plan to move towards real cost pricing, while improving access and quality of service. In the tariff ruling for 2000-2001, the Andhra Pradesh Electricity Regulatory Commission has asked the utility to carry out a full census of agricultural connections before the next tariff filing, and to prepare a plan of action towards achieving the metering of all agriculture connections over the next three years.

## **Protection of Special Interests**

Some of the important central acts which protect and safeguard the interest of the tribals are (a) Protection of Civil Rights Act, 1925 (b) Scheduled Caste and Scheduled Tribes (Prevention of Atrocities) Act, 1989 (c) Bonded Labour System (Abolition) Act, 1976 (d) Child labour (Prohibition and Regulation) Act, 1986 and (e) Forest Conservation Act, 1980. In Andhra Pradesh, several regulations have been made in tribal areas for protecting the tribal communities' interests over land, against exploitation by moneylenders and for debt relief. The state government is in the process of seeking appropriate amendments to the laws vesting rights over land with the tribals in the Scheduled Areas. This is to facilitate the opening up and development of the mineral industry, in line with the goals expounded in the Vision 2020.

## Appendix G

### Policies Relating to Water Supply and Environmental Sanitation in Andhra Pradesh<sup>29</sup>

#### State Development Policy and Focus on the Water and Sanitation Sectors

The policy of the state towards the development, management and use of water resources in the state can be placed in context from the sectoral allocation in plan expenditure over the years. Table (4) provides an overview of the sectoral allocations in the water sector in the Second and Eighth Five Year Plans, as against the total allocation (up to the end of the Eighth Plan).

SECTOR	SECOND PLAN (1956-1961)	EIGHTH PLAN (1992-1997)
Agriculture	16%	7%
Irrigation	35%	15%
Power	20%	57%
Industry & Mining	5%	2%
Transport & Communication	5%	7%
Social services	19%	12%
Urban Water Supply	1%	1%
Rural Water Supply	1%	2.1%
Miscellaneous	0%	0%
Total (Rs. Million)	1,886	232,722
Total allocation for water supply up to the Ninth Plan (Rs. Million)		13,961
Share of Water Supply in Total Plan Allocations up to the Ninth Plan		3.4%
<i>Source:</i> Plan Documents, GoAP, Hanumantha Rao et al, 1998		

Andhra Pradesh does not have a codified Policy for Drinking Water Supply and Sanitation, while the Government has recently released an Irrigation Sector policy (1995), as part of the reforms programme in public irrigation management. An examination of objectives, strategies and approaches followed by the state in the planning process over the decades and the key legislation examined assist in charting the contours of public policy thinking relating to water in the state.

Across the Five Year Plans, the two sectors that have received special attention are irrigation and power. While the irrigation sector has consistently received more than 25 percent of the outlay, the power sector has received at least 15 percent. Resource allocation for social services has always been above 10 percent and for industries and mining, it has been 5 percent (or less) of the total outlay.

#### Water Policy

The approach to water resources in Andhra Pradesh plans has evolved continuously in response to emerging needs and demands. In the early decades of planning in the state after independence, water was viewed as a resource that had to be harnessed for agricultural development. Intense focus on water as an agricultural input gradually gave way to a broader perspective during the International Drinking Water Decade (1981-90) which helped to highlight the importance of drinking water in

<sup>29</sup> From TARU/DFID (2000), pp.23 – 30.

development. Increased spending on water supply from the Sixth Plan onwards reflects this change in outlook. In a similar vein, the Seventh Plan of the state stressed the need for a harmonious balance between economic development and social development. The human development paradigm of the 1990s, incorporating concerns of environmental sustainability, has reinforced the idea that water resource development involves a holistic people centred approach to managing natural resources. This is reflected in the Eighth and Ninth Plans of the State that address water management, water conservation, less water-intensive cultivation, and replenishment of water sources. Thus, over the decades, attempts to exploit water have given way to managing water resources for sustainable growth with human development.

The Ninth Plan (1997-2002), while discussing agriculture, called for efficient water management. Modernisation of old irrigation projects to ensure water conservation reliability, and creation of Water Users' Associations to maintain the distribution system formed as a part of the proposed strategy. In respect of drinking water, the Plan aimed at full coverage of 14,677 partially covered, 7,874 fluoride affected, and 2,695 brackish habitations. A separate Rural Water Supply Board was envisaged to advise on rationalisation of user charges. Other elements relating to water supply were identification of the need for a policy of reservation of water in reservoirs for industries, commercial establishments and for domestic consumption, and the idea that urban bodies would have to plan for economic recovery of investment, by collecting user charges and through access to institutional finance.

The Irrigation sector policy prepared by the state government has enunciated the improvement of irrigation efficiency through participatory management of the distribution infrastructure. It also highlights the need to increase cost recovery and provide more user responsive irrigation. The sector strategy also enunciates the need for a Comprehensive Water Resource strategy accounting for domestic, agricultural and industrial uses based on river basin planning. However, steps towards this would be taken only after reforms on distribution management and public expenditure correction achieve a certain degree of stabilisation. Also, the data needs for the policy and plan envisaged are highly biased towards the surface water resources component.

The State Water Conservation Mission (SWCM) was constituted in May, 2000 with the objective of developing a vision and strategy for water conservation and sustainable utilization at the state level. The Mission seeks to achieve this through a time-bound action plan and convergence of departmental plans and programmes at the district and sub-district levels. The Mission has the Commissioner, Rural Development as the Chief Executive Officer, assisted by a team comprising of administrative and scientific personnel with the support of a secretariat. The Mission has been instrumental in preparing the draft legislation on Water and Trees, which seeks to enforce control over use and prescribe responsibilities to departments and other agencies. The Chief Minister's *Neeru-Meeru* programme which planned out a 90-day time bound programme for construction of Rain water harvesting structures in all districts of the state during June-September, 2000 was also co-ordinated by the SWCM. Water Conservation and Utilisation committees have been set up at the district, mandal, gram panchayat and Municipality levels, which will be responsible for coordination of activities designed by the Mission.

There is a State Watershed Programme Implementation and Review Committee to coordinate line department activities in agriculture and horticulture with nominated members from voluntary agencies, research institutions and training institutions, at the state level. All the Soil and Water Conservation activities being carried out under different development programmes like DPAP, DDP, EAS are to be coordinated by this committee.

The new guidelines of the Rajiv Gandhi National Drinking Water Mission (RGNDWM) envisage preferential financial allocation for the states which undertake sector reform projects which include 10 percent capital cost sharing and 100 per cent sharing of operation and maintenance costs by users, focus on village level capacity building, and water conservation measures. As an incentive, states implementing such projects will also be entitled to funds remaining unutilised from other states.

Work has been initiated for pilot projects in four districts of the state - Chittoor, Khammam, Nalgonda and Prakasam – according to the revised guidelines issued by the RGNDWM.

### **Sanitation Policy**

Over the years, sanitation at the household or habitation level has been managed as a latrine construction programme in an ad-hoc target driven manner, characteristically constrained by funds. Budget limitations of local bodies have resulted in piece-meal<sup>30</sup> drains in habitations taken up under annual budgets. This has meant that there have been no systematic improvements to environmental sanitation or hygiene and there is little ownership or incentive to upgrade and maintain these locally. The popular participatory initiatives of the state government like the Janma Bhoomi have been able to organise villagers around issues of cleanliness (Clean and Green Andhra Pradesh), organise community labour to provide drainage facilities in the settlement and also effectively utilise the IEC funds during these bi-annual events. However, there is an apprehension that the strategy of building up awareness on health and hygiene issues through continuous communication may have been overwhelmed by attention to the bi-annual campaigns.

The performance of the health care system in the state has been constrained by the lower financial priority accorded to it over the Plan periods. Public Expenditure on Health has always been less than 6 percent of plan expenditure and the fiscal pressures on the state economic management have aggravated this further. The Economic reform programme currently under way in the state has allocated funding for upgrading the health infrastructure.

The changing attitude towards water have however not resolved the competition between water as a resource for agriculture, and water as a resource for drinking purposes. Expansion and development of the agricultural sector incentives provided for irrigation development and subsidies on power, have increased the demand for groundwater based irrigation, leading to depletion of groundwater resources. Since by virtue of the natural resource regime, irrigation development has created and accentuated regional imbalances, the state has had to provide succour in the non-irrigated tracts by other subsidies (lower power tariff for agriculture in drought-prone areas to enable groundwater development).

The adverse impact on availability of water for drinking purposes notwithstanding, the state continues to accord priority to economic development by means of increased irrigation. With five percent for water supply and sanitation, and 23 per cent for irrigation, the Ninth Plan outlay for Andhra Pradesh does not indicate any major shift from the past. The broad picture of water resource management suggests that the push towards drinking water given by the 1987 National Water Policy, appears to have been offset by the pull of politico-economic factors in the State. A public expenditure strategy based on large allocations to numerous broad-based welfare programmes initiated in the latter part of the 1980s coupled with non-expansion of the revenue base affected the fiscal situation of the state. The reforms initiated in the irrigation sector during the mid-1990s for better management and cost-recovery of the supply system are likely to improve the agriculture production situation and lead to better water resource management. However, the corrections being planned at the input side in these sectors would need to be complemented with corrections at the market end too and the process will need to be carried out in phases with corresponding safety nets.

### **Policy with Focus on Vulnerable Groups**

About Six percent of the allocated funds for rural water supply, are utilised for providing water supply in tribal settlements. The Social Welfare Department provides funds for civic amenities to SC habitations. The Ninth Plan allocation for these community services was Rs.5 million. With a view to promoting general awareness among SCs, the state government finances opening of libraries in SC habitations. Under the Central Sector Plan, Government of India provides financial assistance to new

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<sup>30</sup> Incomplete (due to lack of funds) drains are constructed in settlements which succeed in shifting the accumulation to another part of sometimes the same street. Extension

SC assignees of surplus land, to improve irrigation facilities on a community or individual basis. The State government too has a scheme for undertaking land improvements including encouraging SCs to invest in bore wells, energise existing wells and other similar programmes.

There are a number of programmes being carried out in the state for economic empowerment of women, including formation of Self-Help Groups (SHG) and training programmes for income generation. The state government produced an Action Plan for Women's Development (1994), which aims to bring about a gender focus in state programmes through allocation of a third of the funds in each sector to women-oriented programmes. The directives have been formulated, but the modalities of targeting and effectiveness are not clear, since the action plan is more a broad-spectrum prescription rather than issue-based and focused action.

### **Initiatives in Participatory Governance**

The *Janma Bhoomi* programme is a people centered development process launched in the State of Andhra Pradesh in January 1997. This process has evolved out of the experience gained through the implementation of *Prajala Vaddaku Paalana* (taking administration to the door steps of the people) launched in November 1995 and *Sramadanam* (contribution of labour) launched in January, 1996. The *Janma Bhoomi* aims at establishing an ideal society, which embodies and cherishes the principles of people's participation, equality, transparency and accountability, leading to sustained economic development and excellence in all walks of life. The goal is, an enhanced quality of life for every man, woman and child in the state. Ten rounds of Janma Bhoomi have been held in the state up to now. The following are the five core themes of the Janma Bhoomi mobilisation:

Community Works  
Primary Education  
Primary Health and Family Welfare  
Environment Conservation  
Responsive Governance

The programme has claimed success in raising people's awareness of planning and implementation issues, and increasing role of the people in planning and implementation. The programme has been able to utilise funds in different sectors effectively and achieve a campaign mode of awareness building. For instance, both state and centrally sponsored programmes allocated funds for IEC at the district level for mobilisation and publicity. However, follow up action and corrections necessary to sustain the campaign and their outcomes, remain to be implemented and are likely to be constrained by availability of resources locally.

### **Vision 2020**

In early 1999, the Andhra Pradesh government unveiled 'Vision 2020' - a document articulating collective goals and aspirations, that the state hopes to realise by the year 2020. The state government has identified 19 growth engines on the basis of the resource availability in the state. In order to attract investments in the above categories, the GoAP, as the vision 2020 document outlines, would be focusing on three broad industry categories:

- |    |                  |   |  |
|----|------------------|---|--|
| a. | Knowledge based  | : | Pharmaceuticals, Information Technology (IT) |
| b. | Resource based   | : | Mining and Agro-industries                   |
|    | Mining           | : | Cement, Coal                                 |
|    | Agro Industry    | : | Oil Seeds, Tobacco and Sugar                 |
| c. | Labour intensive | : | Garments and Leather                         |

The effort also charted the route towards ensuring sustainable development in the region by the second decade of the 21<sup>st</sup> Century. Sectoral action plans, in line with the vision, are under preparation by sub-committees constituted for the purpose. Universal access to safe drinking water and sanitation is among the goals outlined in this blueprint for the state's development.

The approach envisioned is to make provision of services demand driven with substantial popular participation. While running of municipal services on a competitive basis, involvement of private sector in developing urban services and infrastructure, and local management and control of local services form part of the urban growth strategy; Harnessing of water resources, stakeholder management of irrigation systems, and integrated development of rainfed areas are expected to stimulate agri-business and contribute to self-reliant rural communities.

Vision 2020 commits the state to ensuring the provision basic services in urban areas and hopes to augment water supply by the tapping of current irrigation sources, judicious exploitation of ground water and utilisation of river water through piped water-supply schemes. With regard to water quality in urban areas, appropriate technologies are proposed. Technical assistance from non-governmental organisations and limited governmental subsidies to support the implementation of alternative technologies in the field of urban water supply and sanitation, are expected.

While the vision document envisages a decentralised empowered polity, judicious use of resources, demand-responsive services and economic growth, the emergent contradictions in the vision are showing themselves. The power sector reforms and current capacities of the utilities have forced the state to request the farmers to control paddy cultivation and opt for less water consuming crops, while increase in rice production was a growth engine in the vision.

Rice cultivation, dairying, poultry, horticulture, fisheries, and agro-industry are among the "growth engines" selected for promotion by the state to revitalise agriculture. All these activities are water demanding and the conflict between irrigation and other sectors need to be resolved in this predominantly semi arid state with ongoing interstate water disputes. A common thread running through the various "growth engines" identified in the agricultural sector is the presence of infrastructure bottlenecks, especially in processing. Agro-processing – whether in dairying, poultry, horticulture or fisheries – involves the use of large quantities of water on a regular basis. In all these sectors, the state is committed to rectifying the bottlenecks.

The industrial growth strategy also contains elements that raise the likelihood of increased use of water for non-drinking purposes. For instance, building a strong position in garment and leather products calls, for continuous power and water supply in the export-processing zones envisaged near Secunderabad and the state's southern border.

Viewed at a broad level, the state's plan for industrial development is likely to result in the rise of townships and industrial clusters. The experience of high investment in the urban centres in other parts of the country (e.g. Tamil Nadu), suggest that the demand for water and sanitation facilities would grow considerably with the spurt in urbanisation. While the mega city project is expected to take care of the growing needs of Hyderabad and Secunderabad, appropriate arrangements will need to be worked out in areas selected for the expanding urban townships in other parts of the State.

Given the state's resource endowment, promotion of agriculture and industry would invariably involve diversion of water resources towards non-drinking purposes. At the same time, it is felt that the direction in which the state is headed and the implications of the proposed strategy, have to be understood well in order to design appropriate projects in the water sector in Andhra Pradesh.



## **V. EXISTING PROGRAMMES**

### **Rural Water Supply and Sanitation**

The Rural Water Supply programme is managed by the PRED throughout the state, except for the TSP areas, where it is responsible only for O&M. Of the 69,732 habitations, Full coverage of 14,677 partially covered, 7,874 fluoride affected, and 2,695 brackish habitations is envisaged by 2002. While the partially covered habitations are to be provided from the MNP funds and the ARWSP funds released by RGNDWM, funds have been sought for the fluoride problem under the RGNDWM submission. A separate Rural Water Supply Board was envisaged in the Ninth Plan to advise on rationalisation of user charges and is yet to be set up.

The quality monitoring systems developed by the PRED, have not proved adequate in systematically monitoring water sources, and are currently being revamped. The initiative supported by the Netherlands Assisted Project in Vizianagaram district in this regard, aims at setting up comprehensive surveillance facilities. While the PRED has set up district laboratories for quality monitoring, the Institute of Preventive Medicine has pioneered steps for mobilisation and awareness building in the case of an outbreak.

The Rural Sanitation Programme is being carried out with CRSP and corresponding MNP funds. The mobilisation for this is being undertaken through the Janma Bhoomi Programme and this process is being managed by the PR&RD department. The IEC Cell in the PRED carries out IEC activities relating to sanitation in the rural areas of four coastal districts of Andhra Pradesh. This project, began in 1997 and is being implemented in the districts of East Godavari, West Godavari, Krishna and Guntur. Until April 1999, the costs of the project were being shared by the central and state governments on a 50:50 basis, after which, following fresh guidelines from the RGNDWM, the project is being fully funded by the Central government.

### **Urban Water Supply and Sanitation**

The Department of Municipal Engineering and Public Health is in charge of planning and implementing water supply and sewerage schemes in urban areas. The completed scheme is handed over to the Urban Local Body (ULB) for O&M. With decreased plan outlays, the UWS programme over the last two years has depended on borrowed funds from financing institutions like the LIC and HUDCO at commercial rates. The initiatives in urban water supply sector have ensured rapid completion of existing schemes in about 40 urban locations, with loans at commercial rates from financial institutions. However, the borrowing and non-commensurate cost recovery have resulted in financial liabilities for the urban bodies, of the order of about Rs. 70 crore. Also, some of the schemes have relied on distant sources and annual estimated operations and maintenance costs deter the local bodies from assuming charge. As discussed earlier, one major concern is that 10 percent of the ULBs have a service deficiency exceeding 50 percent, and another 41 percent have more than 25 percent deficiency in service provision.

There have been initiatives in rain water harvesting to augment local water resources in two urban centers - Bhonghir and Kama Palle - and these are being currently initiated in Hyderabad. Another interesting approach in urban administration has been the initiatives to out-source and privatise essential functions. The water supply scheme for Vishakhapatnam has been given on a BOO to a private party. The Private contractor provides the water to the Municipal Corporation at its Elevated Reservoirs and the responsibility of distribution and revenue collection etc are handled by the local body. Solid Waste Management including sweeping, garbage collection and removal have been handed over to selected CBOs in 60 of the 116 municipalities. These CBOs formed under the SJSRY programme (annual budget of Rs. 250 million plus Rs. 30 million from the NSDP) into SHGs have been linked with the financial institutions and financing arrangements made. The CBOs, with the municipalities have been able to arrive at user-based administration charges for the SWM, thus

devising differential tariffs for different entities like hospitals, markets, etc. The Individual Sanitary Latrine programme which is managed by the parent department (Municipal Administration & Urban development) is also being taken up through these CBOs, in some of the municipalities.

The HMWSSB manages the water supply and sewerage in the twin cities of Hyderabad and Secunderabad. The utility has finished the re-laying and augmentation of existing sewerage infrastructure with the assistance of the World Bank. The proposal for augmenting water supply to the city from Nagarjunasagar (about 140 km) is still pending technical clearance with the CWC and financial clearance from the funding agencies. The current initiative to build the Cyberabad Township adjacent to Hyderabad is likely to further strain the capacities of the organisation.

## Appendix H

### Brief Descriptions of On-going Projects in AP

	APRLP	DPIP	Sector Reform Project	AP WELL*	NAP
<b>Year of starting</b>	1999	2000	2000	1995	1986 (1998)***
<b>Project period</b>	7 years	7 years		6 years?	3 years***
<b>Size of investment</b>	GBP 45 million	USD 100 million		Rs. 70 crores**	
<b>Funding agency</b>	DFID	World Bank	Water & Sanitation Program	Royal Netherlands Embassy	Royal Netherlands Embassy (RNE)
<b>Nature of Assistance</b>	Grant to the Central Government and Loan to the State Government	Grant to the Central Government and Loan to the State Government	Grant to the State Government	Grant by the RNE	Grant to State Government
<b>Nodal Central Government Department</b>	Department of Land Resources (previously Department of Rural Development)	Government of India, Department of Economic Affairs	Government of India, Department of Economic Affairs		Government of India, Department of Economic Affairs
<b>Nodal Central Government Ministry</b>	Ministry of Rural Development	Ministry of External Affairs	Ministry of External Affairs		Ministry of External Affairs
<b>Nodal State Government Department</b>	Department of Panchayati Raj and Rural Employment			Irrigation Department	Panchayati Raj Engineering Department
<b>Agency Responsible</b>	Project Support Unit	State Project Management Unit		AP State Irrigation Development Corporation	Netherlands Assisted Project Office
<b>State Coordinator</b>	Shri. S. P. Tucker	Shri. K. Raju			Shri. Frank Hanrath
<b>Main objectives</b>	Poverty alleviation using a Sustainable Rural Livelihoods Approach	Poverty alleviation using Common Interest Groups and Common Investment Funds		To assist groups of small and marginal farmers to own, operate and maintain borewells; and share water equitably	Installation of piped water schemes and handpumps with effective community management
<b>Area of operation</b>	5 drought-prone districts of Anantapur, Kurnool, Nalgonda, Prakasam and Mebhoobnagar	6 poorest districts of the state: Anantapur, Nalgonda, Srikakulam....		7 districts: Mahboobnagar, Kurnool, Anantapur, Prakasam, Nalgonda, Chittoor and Cuddappah	Jami and Gantyada mandals of Vizianagaram district

\* The full title is Andhra Pradesh Ground Water Borewell Irrigation Schemes.

\*\* The total value of the project is Rs. 79.4 crores, which includes 5.7 crores from the AP State Government and Rs. 3.7 crores from the farmer contributions.

\*\*\* The technical assistance to the PRED was formalised in 1986 with the establishment of a small NAP office in Hyderabad, and has evolved through three generations of projects, referred to as NAP, API, AP II and AP III. The last started in 1998, for a duration of 3 years.

## Appendix I

### Recommendations for Future Water Supply from the Andhra Pradesh Water Resources Scoping Study in 1998<sup>31</sup>

#### Basic Principles

Water is the key resource in ecosystem management, followed by the complementary resources of land and people. The importance of water in India is all the more so because of the monsoon related pattern of the rainfall regime and the concentration of supply of the resources into a short period of about four months over the majority of the country. In conditions of scarcity it is evident that judicious use of the resource is essential. Disputes arise when the perceptions of one section of society regarding needs are in conflict with the water demands of other sections which have been satisfied in the past through traditional or 'riparian' rights.

There is therefore a requirement to reach a consensus on norms for determination of needs and for allocation to various uses. Fixing priorities amongst a variety of needs is essentially a matter of attitudes and values at village level. Conflicts are difficult to reconcile if there is no common understanding of the needs versus the availability. A participative approach is necessary to evolve an understanding based on a scientific appraisal of resource availability within a village area and any constraints that exist, and the ways and means of overcoming these constraints by optimising use of the resource in an agreed co-operative manner.

Prior to the development of irrigation, and in particular the use of pumping plant and availability of the necessary energy to drive the pump, water availability was the reason why villages developed in a particular location. In a majority of watersheds the needs of the population were satisfied without importing water over long distances. It can be said, therefore, that the naturally occurring water resources of a village would be sufficient to provide basic subsistence needs, apart from irrigation for other than supplementary needs during the kharif season for all sections of society in the village. Irrigation has upset this natural state of affairs in Andhra Pradesh, as the almost hundred-fold increase in numbers of irrigation pumpsets since 1960 shows.

#### Project Framework

A project should be developed with a Goal of **Poverty Alleviation through Improved Livelihoods and Health**, contributing to a Super Goal of **Poverty Elimination in the State of Andhra Pradesh**.

The Project Purpose would be that **Villagers gain access to equitable, appropriate and sustainable water and environmental sanitation services**.

Project Outputs would need to be focusing on:

*Minimum Needs Supplied*, particularly aimed at the poorer sections

*Resources Evaluated Fully*: in order that rational allocation and planning can be undertaken in a participatory way and conflicts identified and overcome.

*Village developed economically*: within the carrying capacity of the watershed and ensuring that the needs of the poor are given priority.

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<sup>31</sup> Final Report to DFID, India by Scott Wilson in September 1998, pp. 8-10.

*Equity guaranteed* in order that the project is socially sustainable

*Subsidies Re-oriented*: such that supported over-exploitation of the natural resources of the village by the richer sections is curbed and this support is re-oriented to the poorer sections.

*Water Resource Management Principles Established*: to ensure that the natural resources of the village are retained within the village and utilised to give appropriately targeted benefits.

*Priorities established for selection*

The location of a project will be made against criteria set down by secondary and tertiary stakeholders. It will therefore be necessary to establish which criteria should be used for the selection process. The following list is an indicative one of some of the most important criteria:

Villages with the highest percentage of Below the Poverty Line households

Villages with the lowest literacy levels

Villages with the highest incidence of poor water quality

Villages with the lowest level of existing water supply service

Villages willing to contribute to costs and accept environmental sanitation systems

## **Options**

Two basic options exist for PRED to provide water supply to rural villages in Andhra Pradesh, a PWS based on a local village source with standposts and a CPWS based on a remote source and covering a number of villages with both standposts and house connections.

### ***Option 1***

If it is possible to sustain a local source for village water supply by appropriate conservation, recharge and water harvesting methods within a watershed, and using an integrated, watershed-based approach to water resource management with the agreement of the village population, then **this is the preferred option**. The scheme should be based only on the specified needs of the village and should be designed for local operation and maintenance.

### ***Option 2***

Where a village or group of villages does not have a local source of water which can, by whatever means, be made sustainable in quality and quantity, a scheme based on a remote source may become necessary. This will be an **option of last resort** because the cost of water and the impositions regarding maintenance will be difficult for the village to manage. The scheme should be based only on the specific needs of the village and should be designed for local operation and maintenance.

In Nalgonda District, where Dutch Aid Agencies have been working for some years, and have now accepted that a solution to the massive fluoride problems there cannot be based sustainably on better developed groundwater sources, a CPWS is clearly the only realistic option. Proposals presented by PRED for a standard CPWS scheme, for these fluoride affected villages, are not prepared to a high enough design of specification standard and a key element of any support project will have to be capacity building in PRED. This capacity building should also extend to cover better standards of tendering and contract supervision.

## **Additional Project Outputs**

### *Essential Sub-Projects*

Sub-project studies are recommended in the following areas, to improve the quality of data used to design specific projects and support better water supply and resource management:

- The effects of annual recharge on groundwater quality determined
- Groundwater movement resulting from natural recharge assessed
- Regional and watershed based hydrographs of groundwater movement produced
- Summer storage tank pollution and water quality changes observed
- Minor irrigation tank recharge systems developed
- Water supply system material and equipment quality monitoring and control methods established
- Water treatment system design, operation and maintenance improved and rationalised.

### *Integrated Water Management*

PRED has responsibility for rural water and sanitation within the Panchayati Raj and Rural Development Ministry. Watershed development is the responsibility of the Commissioner for Rural Development in the Ministry. To guarantee an integrated approach to water resource management at watershed level, which is essential for sustainable water supply, means that there is the need for a **district level authority for water resource management on a watershed basis**, including representatives of the above departments and including additional representatives from the Ministry of Minor Irrigation which includes both the AP State Ground Water Department, the AP State Irrigation Development Corporation and AP State Rural Irrigation Corporation.

A new project should therefore set out to develop and create this organisation and apply water resource management techniques in the project area in an integrated way and define a successful methodology for future replication.

### *Model Approach*

An important output of a new project should be a **fully documented model approach** for each of the main options undertaken in order that PRED has a manual that will ensure replicability throughout the state. It is also vital that training needs are evaluated and met by appropriate training programmes as the project develops that support replicability.