

# *Rural water supply costs and service levels in Andhra Pradesh*

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**WASHCost**  
INDIA

## Summary of key points

1. Data on the real costs of drinking water collected by WASHCost research reveal that per capita cost of provision is about US\$ 12 per annum with wide variations across agro climatic zones and habitations of rural and peri-urban Andhra Pradesh.
2. Allocations are biased in favour of infrastructure (capital expenditure hardware) to the neglect of other important components especially the soft costs.
3. In India, every year, about 30 per cent of the annual investments i.e., US\$ 0.79 billion becomes ineffective or lost due to improper maintenance and management of WASH systems.
4. Many households invest in booster pumps, storage tanks, etc. These costs are as much as 12% of the total expenditure at state level and with wide inter- and intra- zonal variations. Such coping mechanisms can ensure water security at household level but impact negatively on other households.
5. Key groups within villages are excluded from decision making. Involving Panchayati Raj Institutions and Village Water and Sanitation Committees in the management of drinking water is emphasised at policy level but progress is slow.
6. Disaggregated unit costs would be very useful to the Rural Water Supply and Sanitation department (RWSS) in allocating funding, especially costs per litre provided under different conditions and systems, and costs per type of infrastructure. Such cost composition needs to be incorporated into the standard schedule of rates.



*Briefing Note on  
Rural Water Supply*

*The WASHCost Project (2008-2012) is engaged with stakeholders in the water, sanitation and hygiene (WASH) sector in four countries to research and understand life-cycle costs and to relate them to the service levels that communities receive. The aim of WASHCost is to enable decision makers and stakeholders to use life-cycle costing to improve planning, financing and decision making to deliver sustainable, efficient and equitable WASH services.*

# The nation's long search for safe and sustainable rural water supply



*“NRDWP guidelines have been widely appreciated ... but there is resistance to change and the sector still focuses finance on engineering and infrastructure”*

For more than a generation India has been striving to deliver “safe drinking water and improved sanitation for all, at all times, in rural India”. Greater decentralisation has shifted responsibilities to state and local level through the Panchayati Raj Institutions, and guidelines that promote sustainable solutions. Despite these efforts and the largest budget for water provision in the world, comprehensive coverage and reliable water services remain elusive. Villages that are declared “fully covered” slip back, pumps and borewells break down and are not repaired, groundwater sources become depleted and some are contaminated with fluoride and other pollutants. Water services received by poorer households continue to be lower and less secure than relatively better-off households.

In the six years to 2008/09, the central WASH sector budget rose by 67% in nominal terms, while the 11th plan (2007–2012) budgets for US\$ 2.62 billion (Rs. 126.8 billion) per year. Official data show that more than 90% of the rural population of India has access to handpumps or taps or other infrastructure that is capable of providing safe drinking water. However, it is estimated that these systems fail to deliver sustainable services resulting in slippage of 30% of the habitations from full coverage to partial or not safe sources (Reddy, et. al., 2011). To put it crudely, in India, about 30 % of the annual investments i.e., US\$ 0.79 billion becomes ineffective or is lost.

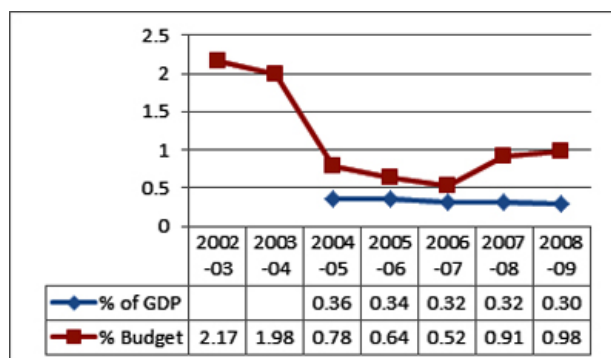
The National Rural Drinking Water Programme guidelines focus on access, source protection and water quality, and the key budget areas include replacement costs and sustainable service delivery. The guidelines are widely appreciated for their focus on improving services that people receive. But there is resistance to change in the system and the sector still focuses finance on engineering and infrastructure implementation rather than on factors to sustain service delivery in the long run, including source protection, long term maintenance and water quality. If implemented in full, the guidelines would make a significant step in this direction.

## As India gets richer, the share of GDP for water shrinks

At first sight it seems as if water, sanitation and hygiene (WASH) has done well out of India's economic progress. However, the share that WASH gets of national wealth has actually fallen. While the budget allocation for the WASH sector rose 42% between 2004/05 and 2008/09, its share of the overall budget is half of the 2002 share (Fig 1). With a population of 1.2 billion people the US\$ 2.62 billion annual budget for WASH is little over \$ 2 a head (Rs. 100) and represents only 0.3% of GDP.

In Andhra Pradesh the budget allocation for rural drinking water was more than doubled between 2004/05 and 2008/09, but its share of the AP budget allocation was still below 1%. If the NRDWP and Total Sanitation Campaign guidelines were to be implemented in full, the annual budget to meet the costs of provision and sustainability would rise substantially in terms of its share of GDP and its share of the overall annual budget.

Figure 1: Trends in the Share of WASH Sector in GDP and Annual Budgets of India



# WASHCost data from more than 5000 households in 9 zones

WASHCost research analysed data from more than 5200 households in Andhra Pradesh, revealing low levels of performance of water service delivery systems with a third to a half of households accessing less than the standard 40 litres per capita per day from safe sources. In summer, a majority of rural households spend more than an hour each day collecting water. One in five households says that services are unreliable due to breakdowns.

Districts and mandals are under-resourced while institutions and user groups at community level are hardly functioning due to an excessive focus on infrastructure to the neglect of institutional strengthening. There is a need to increase skills, training, resources and support so that local bodies can shoulder their responsibilities. Effective supporting structures are required at district and mandal level, especially for repairs. The present decentralised system of water service management pushes responsibilities to Gram Panchayati (village governance bodies) without the required funds and people. In large villages it is doubtful that a volunteer community body can carry out the management role alone.

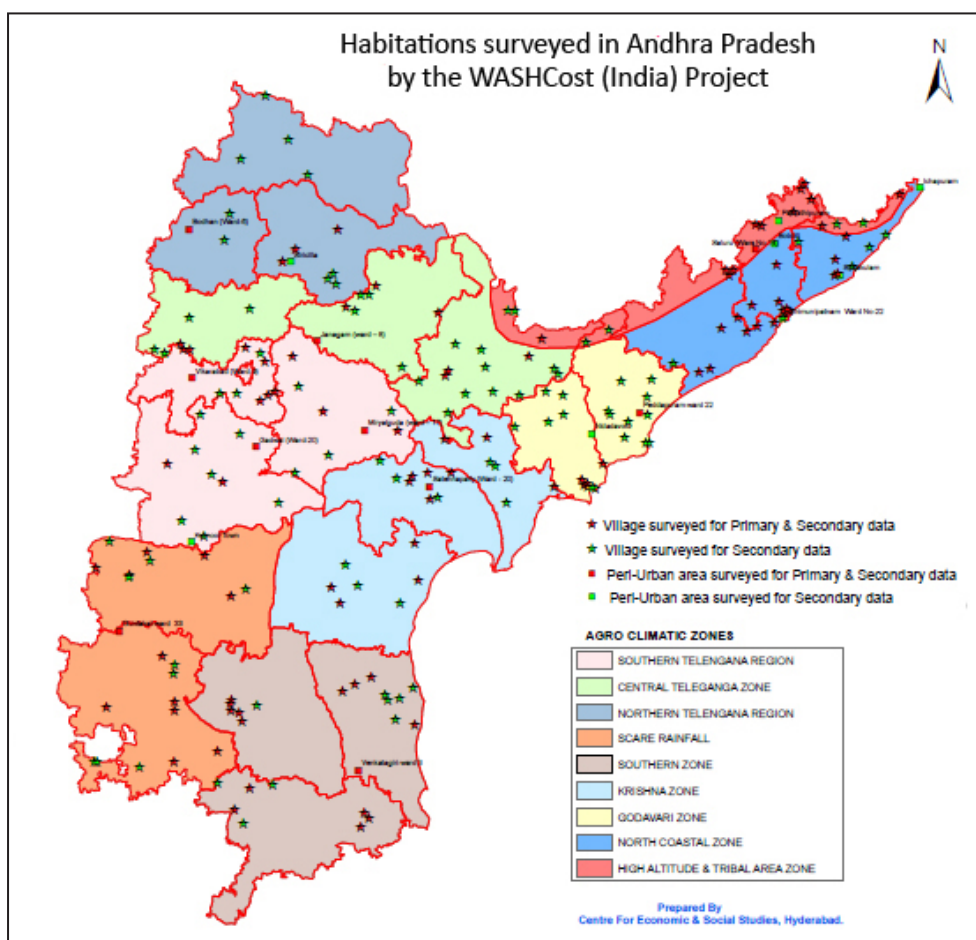


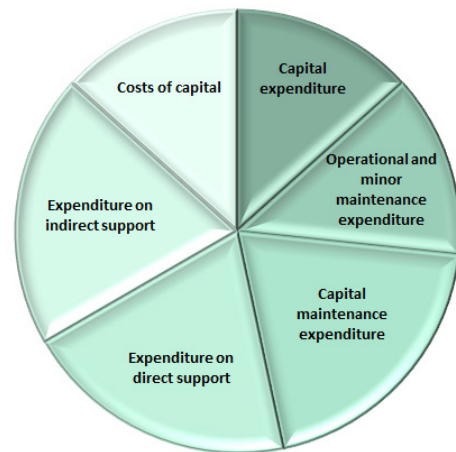
Figure 2: In Andhra Pradesh WASHCost (India) surveyed 187 villages and 18 peri-urban areas across nine climatic zones. The research team investigated costs, services levels, and the state of village communities and institutions in terms of transparency, accountability and participation.

## The methodology of the life-cycle costs approach

The WASHCost Project focuses on unit costs, taking into account the lifespan of equipment, and capital maintenance (CapManEx) costs. WASH-Cost has analysed all cost elements that must be captured to achieve sustainable services – known as the life-cycle costs approach (LCCA).

This factors in capital costs (CapEx) operation and minor maintenance (OpEx), the cost of major repairs and replacements (CapManEx), support to the community, such as training, capacity building and awareness raising (ExDS), and the indirect support costs of planning, budgeting and monitoring at department level (ExIDS). It looks also at the cost of borrowing capital (CoC), based on the rate of interest on loans taken out.

Figure 3: The pie of life-cycle costs needed to ensure sustainability



## Cost of water services in Andhra Pradesh

WASHCost research in Andhra Pradesh disaggregated the actual costs spent on WASH services in 187 villages and 18 peri-urban areas. The average cost of provision of water ranges between US\$ 9 and US\$ 23 per capita per year across nine agro climatic zones (averaging US\$12 at the state level) .

Per capita costs show inter- and intra- zone variations. The High Altitude (tribal) zone has the lowest costs while the South Telangana zone has the highest. This does not necessarily mean it is cheaper to supply water in the High Altitude zone. Costs need to be compared with the service levels and other factors like water systems or type of technology, local factors, etc.

While identifying the factors that explain these variations is critical, and this needs further exploration. the policy of uniform or blanket per capita allocations across habitations and zones does not seem to be the right approach.

Actual costs estimated in WASHCost research indicate that allocations are biased in favour of capital expenditure hardware (84%), while operational expenditure accounts for 6 % of total costs, and the remaining components, notably capital expenditure software receive marginal allocations (Fig. 4)

Current methods of disbursement tend to allocate equal or blanket amounts that fail to take into account local differences such as hydro-geological, agro-climatic conditions, etc..

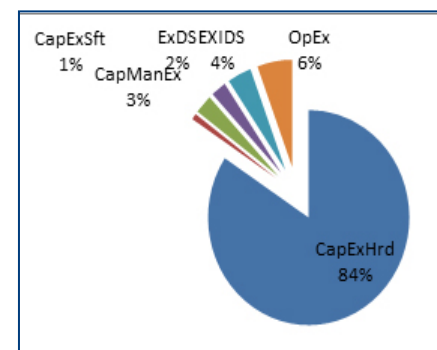


Figure 4: Share of cost components in Andhra Pradesh

## Resources fail to raise skills or protect water sources

The Standard Schedule of Rates that guides budget making in India includes infrastructure and equipment. But resources for source protection, maintenance and repairs are not properly allocated or spent. Source protection can rarely be achieved through engineering solutions alone, since it requires discussions and agreements among communities to manage agricultural demand and restrict private borehole construction that may damage drinking water supplies. Nor is there an adequate budget for raising the skills and capacities of those charged with repairs at village level or to provide sufficient support in managing the systems. In Andhra Pradesh there are up to 25% vacancies (mostly at the district and sub-district level) in the Rural Water Supply and Sanitation Department. Since Panchayati Raj Institutions do not have the capacity to fulfil their relatively new role of supporting the preparation of water security plans at the village and above higher levels, or their responsibilities for operational & minor maintenance responsibility, they need increased training, capacity building and support in terms of funds and functionaries

## Gram Panchayatis lack capacity to manage water services for their communities

There is a crisis in institutional function and capacity in the Panchayati Raj Institutional system which needs to be addressed at a much higher level in the context of overall decentralisation.

WASHCost initiated a survey on transparency, accountability and participation in Andhra Pradesh. 92% of the groups surveyed saw no visible signs of a functioning water and sanitation committee in their village. Often services are not distributed equitably across socioeconomic groups or locations. This is a major issue for achieving pro-poor service delivery.

Water quality management has been left to the Gram Panchayati and most do not have the capacity to fulfil this role. In some villages no analysis takes place at the water points. In others, someone comes to test the water but results are never fed back to the Gram Panchayati. In one extreme case, the Gram Panchayati was told that the water was affected by fluoride, but told the residents that the water was safe to drink.

In general there is a lack of coordination between the RWSS which is responsible for installing water systems and the Gram Panchayati, which is responsible for managing them and for repairs. That lack of coordination starts high in the system where there are separate funding streams via the Rural Water Supply and Sanitation Department and through the Panchayati Raj Institutions at state level. Either the Gram Panchayati in the village does not receive funding to fulfil their role or they choose to spend the money on something else.



# What services do you get for your money?

Costs on their own are not very useful. The question is what service do you get for different levels of expenditure? WASHCost asked households where they got their water, and about reliability and quality. How much did they pay and how much did they collect? Group discussions in villages revealed people’s perceptions on critical issues of the water supply.

WASHCost is mapping the costs of water against service levels provided, where the service is judged on quantity, quality, accessibility, and reliability (Table 1). These standards – based on Government norms – have been converted into a water service ladder, which show what has to be achieved to reach basic, intermediate or high level services. Many families in rural Andhra Pradesh are stuck at sub-standard or even “no service” level (Table 2).

*“In terms of accessibility more than half had ‘no service’ meaning it took more than an hour a day to collect water.”*

- In summer, a third of households accessed less than 40 litres per capita per day from their formal supplies – the minimum required for a basic service in India norms (GoI, 2010).
- For accessibility, a third of households had a substandard service meaning they spend more than half an hour each day collecting water, while more than half had “no service” meaning that it took more than an hour a day to collect water. Nine out of ten families were below the basic level of service.
- In terms of reliability, one in five households said they had sub-standard or “no service” meaning that they could not depend on the service because of the number of breakdowns. Individual actions to improve water security. (e.g. illegal connections or use of booster pumps) may have a perverse impact on the water users accessing water further down a piped water supply network. Households may find that a previously satisfactory service

Table 1: Water service ladder for assessing service levels.

Service level	Quantity	Accessibility	Quality	Reliability/Dependability
High	80lpcd+	0-10 mins to collect water per day	Water quality has been tested independently using a water quality test kit.	Network supply with a system for handling breakdowns that functions well.
Intermediate	60-80 lpcd	10-20 mins	Users are aware that RWSS officials have certified that there are no water quality problems.	Network supply and a system for handling breakdowns exists, but does not function well.
Basic (Normative)	40-60 lpcd	20-30 mins	No complaints by users	Network supply according to an agreed schedule and duration. Handpumps are dependable, but no system for handling breakdowns exists.
Limited (Sub-standard)	20-40 lpcd	30-60 mins	Water is used for drinking but users complain of bad smell, bad taste or colour or appearance.	Network supply has scheduled times and duration and delivery, but supply is still haphazard. Handpumps are not dependable because recharge rates are low.
No service	Less than 20 lpcd.	60+ mins	Water is unfit for drinking by humans or animals.	Network supply is haphazard. Handpumps are unreliable because ground water is exhausted.

no longer reaches them because of increased abstraction. The huge investment in private borewells in villages is having a negative impact on the functionality of the borewells that are part of the public water supply.

- Quality of water is a major issue – the data reveals that 14% of families are buying water from private sources or buying bottled water. The quantity of water bought varies widely across households. 15% of households drink water from unsafe informal sources like streams or canals.

Water service level (% of Households)	Parameter			
	Quantity	Quality	Accessibility	Reliability
High	5	1	1	9
Intermediate	13	11	5	
Basic ( Normative)	54	48	9	6
Sub-standard	28	11	33	51
No Service	1	15	52	21

Table 2:  
Percentage of  
households in each  
water service level  
category



## Who should meet the cost of water?

The question of who should pay for what water services is not clear in terms of policy. India has gradually moved away from a policy of ‘free water’ through the introduction user fees to be collected by Gram Panchayati; but also because people opt to buy their way out of shortages and insecurity. This can be seen in the WASHCost research data, where 14% of households are buying water, a proportion that rises to 90% in villages where there are problems with fluoride in the supply. It can also be seen in the number of individual solutions people seek in villages – digging private wells, connecting an electric booster pump to pipe network or making illegal connections. We can think of these as the “coping costs” of inadequate services. All these coping costs are usually borne by individual families. At the state level these coping costs (excluding opportunity costs of time) are about US\$ 1.5 per capita per annum, which ranges from 0 to US\$ 9 per capita across the sample habitations. At the aggregate level these hidden and unacknowledged costs account for about 12% of the total expenditure on drinking water at the state level.

The diversity of these estimates across zones suggests three things:

1. There is no clear agreement about what constitutes a water service
2. There is no clear understanding about what it costs to provide a water service
3. There is little agreement about who should pay for what

Disaggregating the costs allows those who plan or deliver services to ensure that all aspects are covered and none get forgotten. It allows data to be collected and shared on each element in order to ensure sustainable service delivery.

## Services often fail to reach the poorest

This map (Figure 5) was compiled with the help of GIS in one of the WASHCost research villages. It shows clusters of water users according to the quantity of water they access each day (non-summer). Some have good access to water but others have basic levels. Those with sub-standard levels of quantity are not great in number but are clustered in the north of the village. WASHCost mapping often shows lack of equity in water point distribution with the better services clustered around areas where richer, more powerful families live. Scheduled castes and tribes often live in the parts of the village with the least resources.

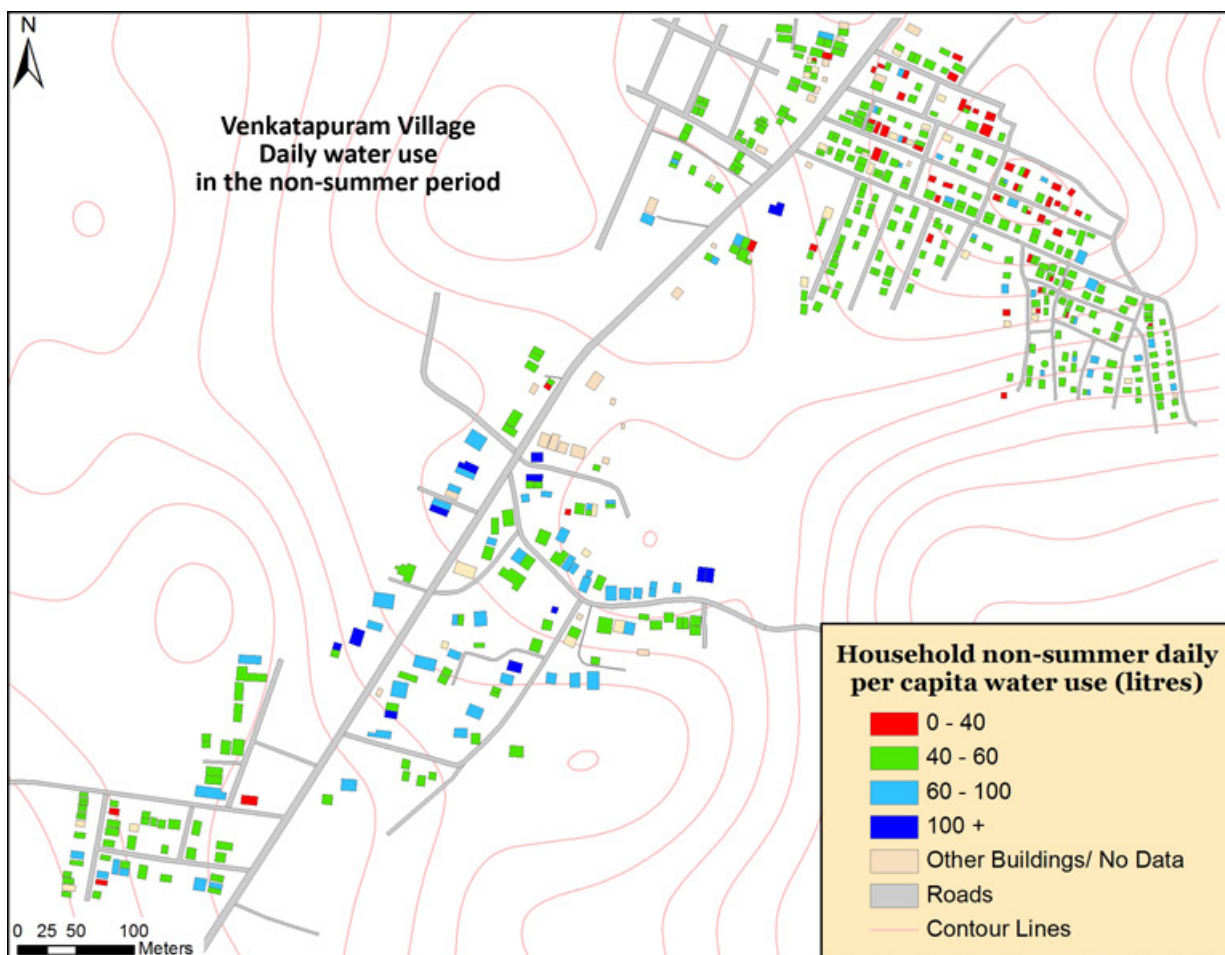


Figure 5: Daily water use in Venkatapuram Village in the non summer period.



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