

# Water scarcities in Sri Lanka: differences at regional level

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Water scarcities can take one of two forms: the absolute water scarcity or the economic water scarcity. The absolute water scarcity can surface in the form of low fresh water supply per person, or high demand with respect to supply, or as a combination of both. Countries with severe absolute water scarcity do not have sufficient water resources to meet the future demands in agriculture, domestic, industrial and environmental sectors. These countries will have to reduce the water use of the sectors with high demand and transfer the water savings to other sectors. Countries with severe economic water scarcity may have sufficient water resources to meet their future demand, but may not have the financial and institutional capacity to develop additional needs.

Several country level studies have identified that Sri Lanka has no severe water scarcity of any form at present or into the first quarter of next century. However, none of these studies has considered the spatial and seasonal variations of water supply and demand within Sri Lanka. In the presence of such variations, the national level statistics are misleading indicators of water scarcity. Due to bi-monsoon weather patterns, Sri Lanka experiences high spatial and seasonal variations of rainfall. The wet-zone, comprising about one-fourth of the land area receives an average of 2,400 mm of annual rainfall, which is distributed more or less evenly between the wet (maha) and the dry (yala) season. The rest of the area, called the dry-zone, receives less than 1,500 mm of average annual rainfall. Almost two-thirds of this quantity are received during the maha season. To compound the fact more, about 70 per cent of the maha season rainfall is received during the three months period from October to December.

Table distribution of national statistics between wet-zone and dry-zone.

Variable	Sri Lanka	Wet-zone	Dry-zone/a
Area	65600 km <sup>2</sup>	23%	76%
1991 population	17.26 million	56%	44%
Average Rainfall:			
Annual	1670 million	2350 mm	1460 mm
Maha season	980 mm	1080 mm	945 mm
Yala	690 mm	1270 mm	515 mm
Total utilizable water resources			
Maha Season	25.2 km <sup>3</sup>	51%	49%
Yala Season	23.2 km <sup>3</sup>	64%	36%
Total water withdrawal (1991)			
Maha season	4.31 km <sup>3</sup>	14%	86%
Yala season	5.46 km <sup>3</sup>	6%	94%

a- Unless the units are stated, the wet-and the dry-zone figures are the percent of the Sri Lankan total. (Source: International Irrigation Management Institute).

water resource per unit area in the dry-zone is only 30 percent of the water resources per unit area in the wet-zone. In the yala season even the total water resources are different. Only 36 per cent of the total water resources in the yala season are available for the dry-zone. The water resource per unit area in the dry-zone is only 17 per cent of that in the wet-zone. The differences of water resources between the districts are even higher. Water resource per unit area in some districts is less than 5 percent of the district with the maximum resource per unit area. On the demand side, 90 percent of the total water withdrawals are for the zone, whereas only 44 percent of the population lived there. This vast difference is

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due to two reasons. The majority of current water withdrawals (96 percent) are for the irrigation sector. Secondly, more than 75 percent of the total irrigation area in 1991 was in the dry-zone.

The five districts: Hambantota, Amparai, Kurunegala, Anuradhapura and Polonnaruwa contribute to 55 percent in the maha season, and 69 percent in the yala season total withdrawals. These districts contain the major portion of irrigated paddy areas in the country. Any present or future water scarcities in these districts, and for that matter in any other rice producing districts, will have a major impact in meeting the future food requirement.

According to the famous Swedish hydrologist Malin Falkmark, different forms of water scarcity at

Thus the country is not facing any form of severe water scarcity. However, 11 districts with 53 percent of the population will have their 2025 per capita water supply below 1700 cubic meters. Among them, the Colombo, Gampaha, Kandy, Jaffna, Kurunegala, and Puttalam districts will have less than 1,000 per capita water supply. If the food requirement for the population of these districts is to be produced in their districts, they will face either severe seasonal or year-round water scarcities. The three districts: Colombo, Gampaha and Kandy, in the wet-zone, comprise more than a quarter the total population, but have only about 5 percent of the total irrigated paddy area. Thus there may be a serious

threat to the food security of these districts, if the irrigation demand of the major paddy producing districts is high with respect to their available utilizable water supply. The demand with respect to the supply at regional level is discussed next.

A recent study by the International Irrigation Management Institute has defined that a country is severely affected by absolute water scarcity if the total withdrawals are more than 50 percent of the available water resources. A country will be severely affected by economic water scarcity if the future demand is more than twice the level of current withdrawals. Following this definition, if the current rate of irrigation efficiency, i.e. the ratio of irrigation requirement to irrigation withdrawal, continues into the future Sri Lanka will face a severe water scarcity.

However, a different picture emerges at regional level.

## Absolute water scarcity

According to the above definition almost all the districts in the dry-zone are already in either seasonal or year-round severely absolute water scarce conditions. If the current irrigation efficiency continues into the future the 6 districts: Hambantota, Killinochi, Amparai, Kurunegala, Puttalam and Anuradhapura (with more than 50 percent of the irrigation area) will have severe year-round absolute water scarcities. Most of the other districts in the dry-zone will face severe seasonal absolute water scarcities. In fact, as a unit, the whole of dry-zone in the yala season belongs to the severely absolute water scarce category. The regional scarcity picture of Sri Lanka will change with an increased irrigation efficiency scenario. This scenario assumes that the irrigation efficiency in 2025 will be double the current level. Under this scenario only the Anuradhapura district is in severe year-round water scarcity. The Amparai,

Batticaloa, Trincomalee, Polonnaruwa, Puttalam, Killinochi, Vavuniya, and Jaffna, districts will have severe seasonal water scarcities. Good news is that in these districts some water savings can be achieved through irrigation efficiency increase. These savings are more than enough to meet the additional water demand in the year 2025.

## Economic water scarcity

Under the same irrigation efficiency scenario Kalutara, Galle and Kegalle districts in the wet-zone will be in severe economic water scarce conditions. These districts, though have ample water resources, will at least have to double their withdrawals to meet 2025 demand. Under the increased irrigation efficiency scenario only the Galle district is in severe economic water scarce conditions.

Whether the physical conditions of an area will permit an increase in irrigation efficiency to a level discuss above is not clear. Even if it is possible, whether the country has the financial and institutional capacity to attain such high irrigation efficiency levels are also not clear.

However, at the current level of irrigation efficiency, the majority of districts in the dry-zone will face either seasonal or year-round severe absolute water scarce conditions.

Importance of regional water scarcities, especially of the districts in the dry-zone, in the context of country's food security is enormous. At present, the irrigated agriculture sector contributes more than 75 percent for the total rice production.

The 8 districts: Anuradhapura, Polonnaruwa, Amparai, Puttalam, Batticaloa, Trincomalee, Killinochi, are severely absolute water scarce - either seasonally or year-round even under the high irrigation efficiency scenario. These districts, comprising only 17 percent of the population, contribute more than 50 percent of the paddy production. Any significant reduction in irrigation withdrawals, in terms of either cropping pattern shifts, or from transfers to other sectors, may have a severe impact on future food security.

The national statistics indicates no water scarcity in the future. Yet severe regional water scarcities are already present. If proper attention is not paid more regions will enter into this category by the early next century. Therefore, more research is required at this stage to evaluate the exact extent and the magnitude of the negative impact on future food security due to regional water scarcities.

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