Chapter-12
Irrigation

12.1. World Irrigation Scenario : As per International Commission on Irrigation and Drainage, Annual Report 2014-15 , world-wide, the area equipped for irrigation is about 318 million hectare(ha), while the actual irrigated area is about 300 million ha. The highest share of irrigated area is by emerging/ developing countries (78%), followed by developed countries (16%), and in the least developed countries (6%). On regional basis, the highest irrigated area is in Asia (72%) followed by Americas (15%), Europe (8%), and Africa (5%).

Sl. No.	Region	Irrigated Area Million ha	% of Irrigated Area
1.	Developed Countries	47.31	15.8
2.	Emerging/Developing Countries	233.33	78
3.	Least Developed Countries	18.40	6.2
	TOTAL	**299.04**	**100.0**

Sl. No.	Region	Irrigated Area Million ha	% of Irrigated Area
1.	Africa	14.74	4.9
2.	Americas	46.51	15.6
3.	Asia and Oceania	214.41	71.7
4.	Europe	23.38	7.8
	TOTAL	**299.04**	**100.0**

12.2 Due to increasing water scarcity, growing shortage of and expensive farm labour, sprinkler and micro irrigation is expanding rapidly in many countries. As a result, worldwide, the micro irrigation coverage has increased from 3.0 million ha in 2000 to about 11 million ha in 2013. Presently, the sprinkler irrigation is used on 43 million ha. The micro irrigation is likely to grow faster in coming years, especially in arid and semi-arid countries.

REGIONWISE									
S.No.	Region	Total irrigated area	Sprinkler irrigation	Micro Irrigation	Total sprinkler and micro irrigation	Percentage of total irrigated area	% Sprinkler irrigation	% Micro Irrigation	% Total sprinkler and micro irrigation
		(Mha)	Hectares						
1	Africa	8.73	16,49,502	4,83,322	21,32,824	24.4	4.0	4.3	4.1
2	Americas	38.88	173,04,311	24,90,056	197,94,367	50.9	42.4	22.4	38.1
3	Asia and Oceania	157.77	116,85,875	56,44,235	173,35,269	11.0	28.7	50.8	33.4
4	Europe	20.26	101,30,159	24,93,855	126,24,014	62.3	24.8	22.4	24.3
	Total	**225.63**	**407,69,847**	**111,11,468**	**518,86,474**	23.0	100.0	100.0	100.0
COUNTRY CLASSIFICATION									
1	Developed Countries	44.4	191,81,566	42,98,765	234,80,331	52.9	47.0	38.7	45.3
2	Emerging/ Developing Countries	178.1	214,98,588	68,06,973	283,05,720	15.9	52.7	61.3	54.6
3	Least Developed Countries	3.165	89,693	5,730	1,00,423	23.0	0.2	0.1	0.2
	Total	**225.63**	**407,69,847**	**111,11,468**	**518,86,474**	**23.0**	100.0	100.0	100.0

12.3 **Irrigation in India :** Irrigation Projects in India are classified into three categories viz. **Major, Medium and Minor Irrigation**. Projects which have a Cultivable Command Area (CCA) of more than 10,000 hectare are termed as Major Projects, those which have a CCA of less than 10,000 hectare but more than 2,000 hectare are termed as Medium projects and those Irrigation Projects which have a CCA of 2,000 hectare or less are known as Minor projects. A broad assessment of the area that can be ultimately brought under irrigation, both by surface and ground water, made by the various States in sixties has indicated that ultimate irrigation potential of the country would be of the order of 113m.ha (million hectare). However, the ultimate potential is 139 m.ha, the increase being primarily due to upward revision in assessed potential of minor ground water schemes and minor surface water schemes to 64 m.ha. and 17m.ha. respectively. Minor irrigation projects have both surface and ground water as their source, while Major and Medium projects mostly exploit surface water resources.

12.4. Types of Irrigation Technique: Various types of irrigation techniques differ in how the water obtained from the source is distributed within the field. In general, the goal is to supply the entire field uniformly with water, so that each plant has the amount of water it needs, neither too much nor too little. The various irrigation techniques are as under:

- **Surface Irrigation:** In surface irrigation systems, water moves over and across the land by simple gravity flow in order to wet it and to infiltrate into the soil. Surface irrigation can be subdivided into furrow, border strip or basin irrigation. It is often called flood irrigation when the irrigation results in flooding or near flooding of the cultivated land.

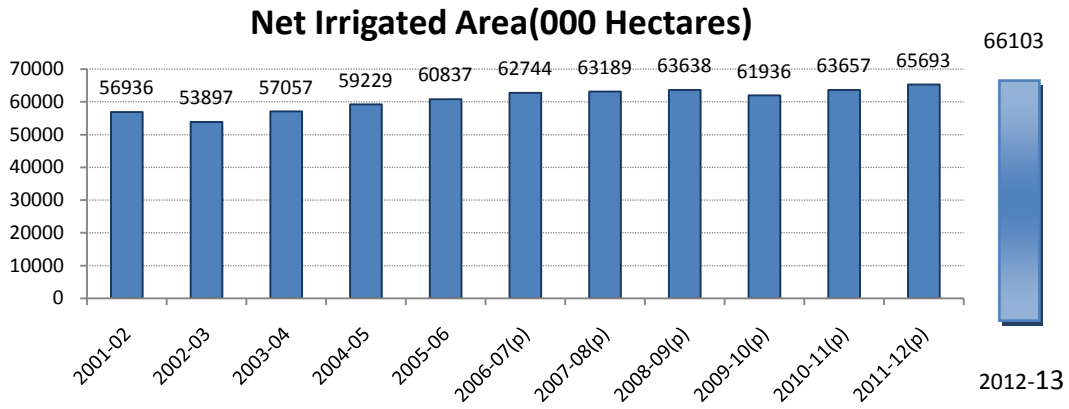
- **Localized Irrigation:** Localized irrigation is a system where water is distributed under low pressure through a piped network, in a pre-determined pattern, and applied as a small discharge to each plant or adjacent to it. Drip irrigation, spray or micro-sprinkler irrigation and bubbler irrigation belong to this category of irrigation methods.

- **Drip Irrigation:** Drip irrigation, also known as **trickle irrigation**, functions as its name suggests. Water is delivered at or near the root zone of plants, drop by drop. This method can be the most water-efficient method of irrigation, if managed properly, since evaporation and runoff are minimized. In modern agriculture, drip irrigation is often combined with plastic mulch, further reducing evaporation, and is also the means of delivery of fertilizer.

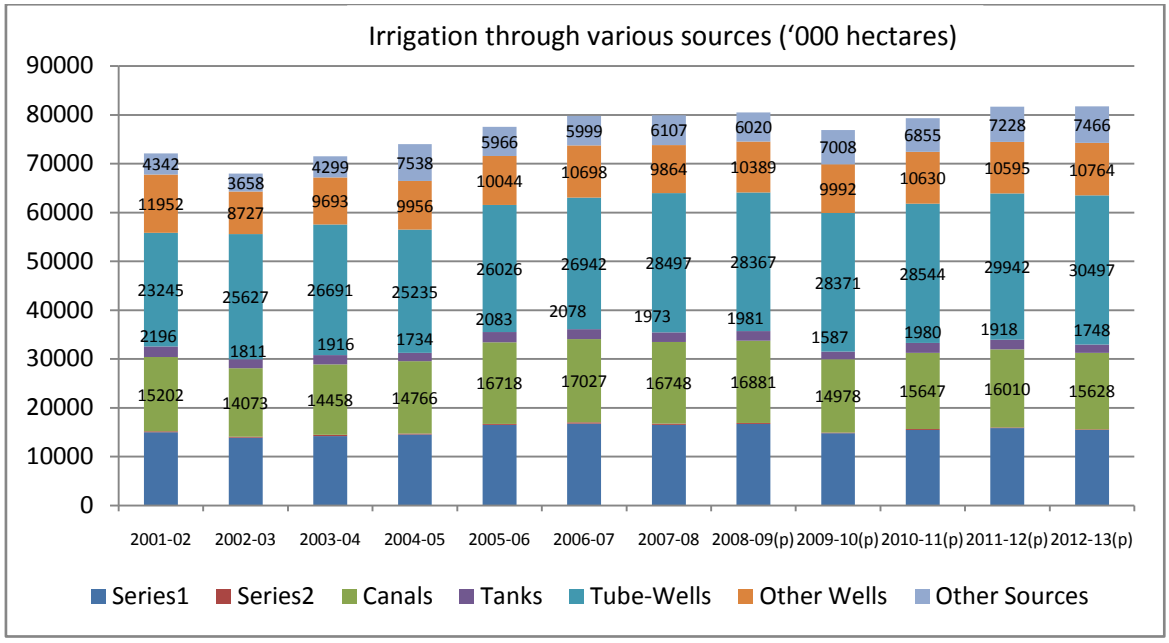
- **Sprinkler Irrigation**: In sprinkler or overhead irrigation, water is piped to one or more central locations within the field and distributed by overhead high-pressure sprinklers or guns. A system utilizing sprinklers, sprays, or guns mounted overhead on permanently installed risers is often referred to as a solid-set irrigation system. Higher pressure sprinklers that rotate are called rotors and are driven by a ball drive, gear drive, or impact mechanism. Guns are used not only for irrigation, but also for industrial applications such as dust suppression and logging. Sprinklers can also be mounted on moving platforms connected to the water source by a hose. Automatically moving wheeled systems known as traveling sprinklers may irrigate areas such as small farms, sports fields, parks, pastures, and cemeteries unattended.

- **Sub-Irrigation:** Sub-irrigation also sometimes called seepage irrigation has been used for many years in field crops in areas with high water tables. It is a method of artificially raising the water table to allow the soil to be moistened from below the plants' root zone. Often those systems are located on permanent grasslands in lowlands or river valleys and combined with drainage infrastructure. A system of pumping stations, canals, weirs and gates allows it to increase or decrease the water level in a network of ditches and thereby control the water table. Sub-irrigation is also used in commercial greenhouse production, usually for potted plants. Water is delivered from below, absorbed upwards, and the excess collected for recycling.

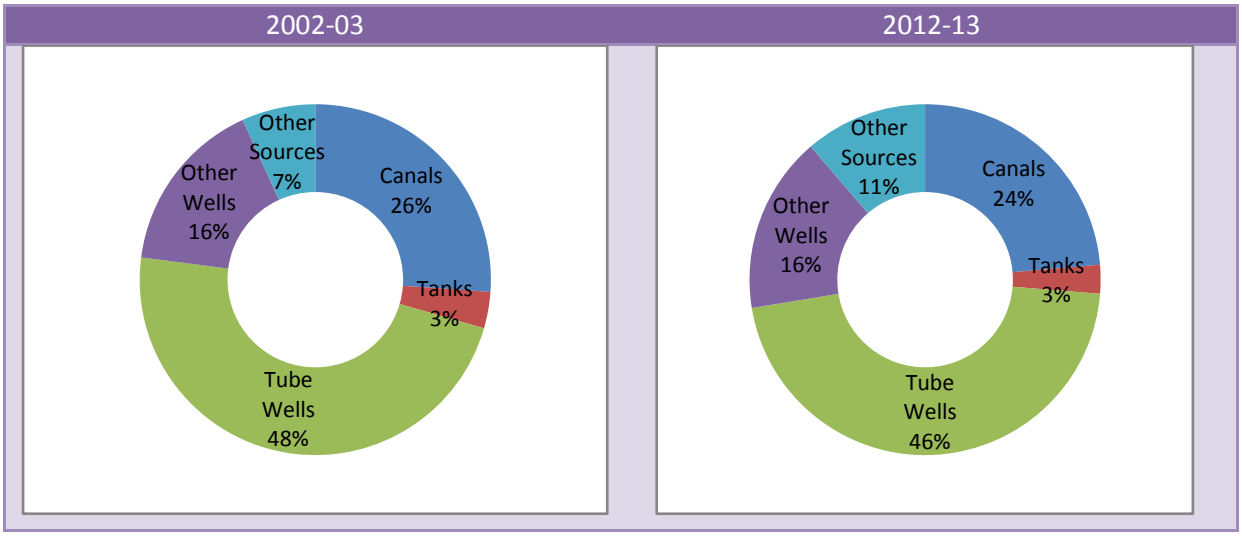
12.5 Net Irrigated Area : The net area under irrigation by all sources of irrigation increased from 56.9 million hectares in 2001-02 to 66.1 million hectares in 2012-13, an increase of over 16% . During the last decade i.e. 2002-03 to 2012-13, net area under irrigation has shown an increasing trend except for 2009-10 when it dropped by about 3 % compared to the previous year .



12.6 Sources of Irrigation: Various sources of irrigation in India are canals, tanks , tube wells and other wells, with tube wells and canals together accounting for about 70 % of total irrigation. Compared to 2001-02, irrigation during 2012-13, through tube wells has increased by about 31% whereas that through tanks has declined by about 20%.There has been 16 % increase in net irrigated area during the period. Irrigation through canals hah increased by meager 3 % . Private canals accounted for only 1 % share as most of the canals are government owned.

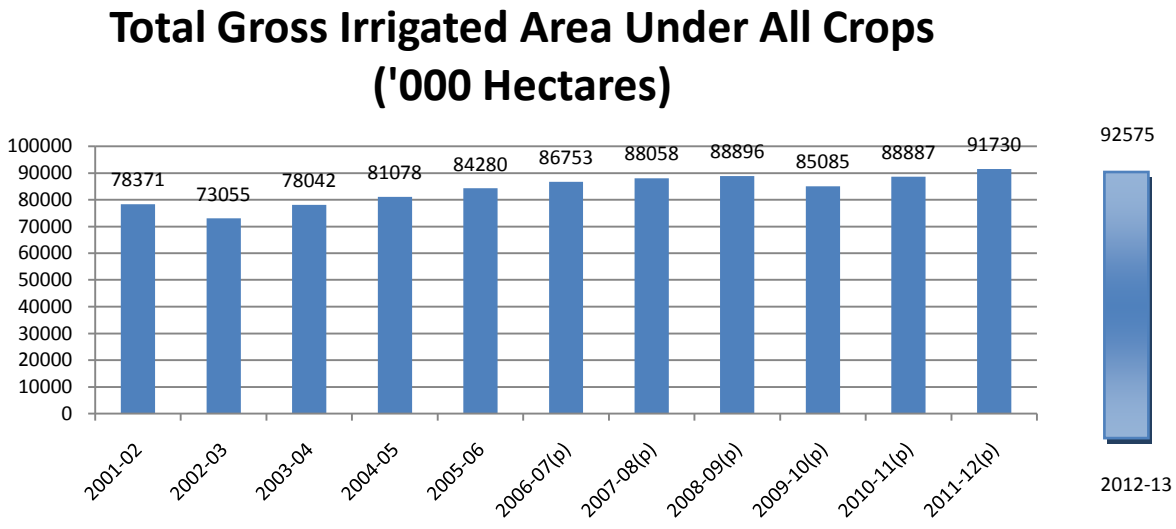


Irrigation Through Various Sources – Decadal Comparison



12.7 Southern States of Tamil Nadu, Andhra & Karnataka accounted for about 65-70 percent of total irrigation through tanks during 2008-09 to 2011-12 .However their share dropped to about 61% during 2012-13. Among major states, canal irrigation is more popular in Tamil Nadu, Kerala , J& K and Chhattisgarh over irrigation through Tube Wells. Whereas in Northern states of Punjab, Rajasthan, Bihar , UP etc share of tube wells in irrigation is significantly higher. In fact, out of the area irrigated through tube wells throughout India, Uttar Pradesh alone accounts for about one third of the total irrigated area.

12.8 Irrigated Area Under Crops (2011-12) : There has been about 18% increase in total gross area under irrigation since 2001-02 with about 92.6 million hectares being irrigated in 2012-13 compared to about 78.4 million hectares in 2001-02. During the period**,** Food crops have accounted for about 82-84 % of gross irrigated area under all crops. Amongst about 18% gross irrigated area under non food crops, oilseeds, cotton and fodder crops accounted for 8-9 % , 3-4 % and 3 % respectively. During the period, out of the food crops, wheat and rice taken together accounted for about 71-72 % of gross irrigated area and about 58-60 % share of irrigation amongst total irrigated area under all crops (both food and non food). Wheat had marginally more area under irrigation compared to rice and the gap has been slightly increasing since 2009-10.



12.9 Recent Initiatives: '**Pradhan Mantri Krishi Sinchayee Yojana'** was launched with the motto of '**Har Khet Ko Paani'**. Micro irrigation would be popularised to ensure '**Per drop-More crop' .**

12.10 The overreaching vision of Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) is to ensure access to some means of protective irrigation to all agricultural farms in the country, to produce 'per drop more crop', thus bringing much desired rural prosperity.

12.11 Amongst various objectives in the Scheme are convergence of investments in irrigation at the field level, physical access of water on the farm,and expansion of cultivable area under assured irrigation (Har Khet ko pani), enhancement of the adoption of precision-irrigation , reduction of wastage of water etc.

12.12 PMKSY will have following programme components:

A. Accelerated Irrigation Benefit Programme(AIBP)
B. PMKSY (Har Khet ko Pani)
C. PMKSY (Per Drop More Crop)
D. PMKSY (Watershed Development)

12.13 District Irrigation Plans (DIPs) shall be the cornerstone for planning and implementation of PMKSY. The DIPs are to be vetted by the Governing body of Zila Panchayat and subsequently be incorporated in the State Irrigation Plan (SIP).

12.14 PMKSY funds will be provided to the State Governments as per the pattern of assistance of Centrally Sponsored Schemes decided by Ministry of Finance and NITI Aayog. State Agriculture Department will be the Nodal Department for implementation of PMKSY. All communication between Ministry of Agriculture (MOA) and State Government would be with and through the nodal department.

References :

- International Commission on Irrigation and Drainage, Annual Report 2014-15
- Website of Department of Agriculture and Cooperation, Ministry of Agriculture & Farmer Welfare.