

* FMIS Inventories around the World

In past issues of the FMIS Newsletter, we have asked for members to forward data on FMIS around the world. This was also a subject that arose at the most recent Advisory Committee meeting in Kathmandu in March 1990. The information below was provided by network members as noted. We would appreciate it if you can forward to the FMIS Network coordinator any additional information or corrections or sources that can provide this information so that new or updated data can be added to a database on FMIS, worldwide. As we are now in the initial stage of developing this program, your cooperation will be most welcome.

INDONESIA

According to "Recapitulation of Village Irrigation and Rain-fed Rice Lands in Indonesia" (Rekapitulasi Daerah irigasi Desa dan Sawah Tadah Hujan Seluruth, Indonesia, 1982), a paper published by the Directorate General of Water Resources Development, Department of Public Works, the latest conservative estimate is that there are 1,036,613

ha of FMIS in Indonesia. Further data show that irrigated land falling under agency management totals 3,818,657 ha, according to another paper from the Directorate, entitled, Recapitulation of Public Works Irrigation Systems (Rekapitulasi Buku Pintar Daerah Irigasi PU, 1988). Thus, FMIS account for approximately 21 percent of the total irrigated area. Over the next 15 years, the government plans to turn over to farmer water users' associations over 1 million ha, in effect, turning them into farmer-managed irrigation systems, which will eventually increase the area of irrigated land of these systems to 30-40 percent of the total irrigated area in Indonesia. [*Information contributed by John Ambler, the Ford Foundation.*]

INDIA

The total irrigated area on the subcontinent of India in 1984-85 (the latest year for which figures are available) stood at 42 million ha, with a conservative estimate of the FMIS encompassing 50 percent of this area. This is probably a conservative figure, due to the

exclusion of larger tanks on the grounds that they are "government-owned," though day-to-day management is done by farmers. The estimate of 3 million ha under state tube wells is almost certainly inflated and private tube wells have expanded very significantly in the past five years. According to Indian Agriculture in Brief (Government of India, 22nd Edition 1988), of a total of 21,030 million ha the extent (ha) of irrigated land under FMIS is: private canals, 0.495; tanks, 0.945; tube wells 8.265; other wells, 8.725; other sources (surface lift irrigation, etc.), 2.600. [Information contributed by Anthony Bottrall, the Ford Foundation.]

PAKISTAN

Conservative estimates of Pakistan's FMIS coverage area -- including private tube wells -- is of the order of 2.5 to 3 million ha, although there is no official data with any degree of reliability of the entire scale or scope of FMIS. The latest official data for private tube wells in Pakistan is from the Water and Power Development Authority, which estimates that in 1986 there were 250,000 wells; but it is a certainty that the total numbers have risen since then. Other researchers estimate that private tube wells in Pakistan number between 280,000 and 300,000. It seems probable that the actual average private tube-well (farmer-managed) service area is around 7-8 ha, perhaps even less, which would mean that probably no more than 2.5 million ha of tube-well irrigated land is farmer-managed at this time. [Information contributed by Ed Vander Velde, IIMI Pakistan.]

SUDAN

Out of 80 million ha of cultivable land in the Sudan, only 1.7 million ha are under irrigation. The northern third of the Sudan is almost

desert, with an average annual rainfall of about 20 mm. The largest irrigation schemes are located in central Sudan where the land is vast and flat and the cost of land reclamation is cheap and the schemes are mostly owned and operated by the government.

In northern Sudan, the fertile land is mainly the flood plains of the Nile River, which form a narrow strip along the river. Generally, the areas are limited and reclamation costs are high and most irrigation systems are owned and operated by local inhabitants.

Historically, local inhabitants used a very primitive means of irrigation, one of which is a method used both in north Sudan and Egypt called the *Shadouf* (counterpoise lift). The shadouf is composed of a lever, a fulcrum, and counterweight in conjunction with a rope and containers. Another method is natural flooding of adjacent lands to the river banks and this is called "Basin Irrigation." In the first method, one farmer managed the irrigation while in the second, management was the responsibility of a group of farmers.

Average irrigated areas in the northern region (in ha) :

*Governmental Pumping Schemes	38,769
*Private Pumping Schemes	104,418
*Groundwater Pumping Schemes	25,788
*Basin Irrigation Schemes	6,384
* <i>Sagia</i> Irrigation Schemes	357

Total	175,716

Governmental Pumping Schemes are comparatively large schemes, ranging from 1,000 ha to 12,000 ha. The irrigation water is supplied by the government from a permanent pumping station. The involvement of the government is to supply water and maintain the main canal. Water

management, maintenance of small irrigation canals, choice of crops, etc., are the responsibilities of the farmers themselves. Some of these schemes were constructed as early as 1904. The government is supporting the farmers in the form of credit, fertilizers, pesticides, seeds at reasonable cost and free extension.

Private Pumping Schemes are mainly small farms ranging from 0.5 ha up to 1,000 ha in the case of cooperative schemes. They are designed, operated and maintained by the farmers themselves. As in governmental pumping schemes, the government supports the farmers in the form of credit, extension, supply of improved seeds, etc. The irrigation water is supplied by mobile pumps from the Nile River. The diameter of the irrigation pumps ranges from 3" to 16".

Groundwater Pumping Schemes are located at a distance from the river banks. Most locations were originally areas inundated during the flood period. To cultivate, farmers dig wells of various sizes to obtain irrigation water. This practice was found feasible and it is expanding rapidly. Farmers receive the same governmental support as in other schemes.

Basin Irrigation Schemes, in the past, covered a greater portion of the cultivated areas. However, after the construction of dams upstream, the areas being inundated have been reduced drastically. The input costs are minimal because irrigation water is free and the land is fertilized naturally. The only limitation is the duration of the cropping season.

Sagia Irrigation Schemes are seen in areas of relatively poor farmers who cannot afford to purchase a pump or whose land is too small. They use

oxen and other methods to lift the water either directly from the river or from a well.

Land utilization in the Northern Region is considered the best, which can be attributed to many factors. These include such factors as farmers owning their own lands, and the simplicity of production relationship which depend upon land, means of irrigation, farmer output, and water rates.

The Northern Region depends mainly on the Nile waters for agriculture. Rainfall is very sparse, but on some occasions torrential rains on the nearby hills bring devastating floods, which, while destroying untold amounts of property and lives also result in the recharge of aquifers. The Nile Water Agreement between Sudan and Egypt, secures enough water for agriculture in the Northern Region. Flow frequency problems abound, however, as do distribution and water-level problems throughout the year. Also affecting the area are major riverbank failures which erode valuable land along the banks. The widening of the river and its implications on the water levels and operation of irrigation pumps located close to the banks also affect the area.

Although the irrigation schemes in the Northern Region are classified as governmental, private, etc., the majority of these schemes can be classified as Farmer-Managed Irrigation Systems (FMIS). The farmers' involvement includes all activities from design, operation, and maintenance of the systems to the choice of crops, marketing, and storing. Only the design and operation of major structures in governmental schemes are the responsibilities of governmental agencies. The role of the government is manifested in the support given to the farmers in the form of credit, improved seeds, extension, etc. The individual farmholding is small and

easy to control and the yields are higher when compared to other parts of the country. The total cultivated area is approximately 140,000 ha.

[Information contributed by Ahmed M. Adam, First Under-Secretary Sudan Ministry of Irrigation & Water Resources.]