

## 1: Irrigation management - Wikipedia

*Irrigation water needs is the third in a series of training manuals on irrigation. Unlike Volumes 1 and 2, Volume 3 has been divided into two parts. Part I Principles of Irrigation Water Needs.*

Beat Stauffer seecon international gmbh Dorothee Spuhler seecon international gmbh Executive Summary Manual irrigation systems are very simple, but effective methods for making water available to crops. Manual irrigation systems are easy to handle and there is no need for technical equipment. But it is important that they are constructed correctly to avoid water loss and crop shortfall. The systems allow for high self-help compatibility and have low initial capital costs. They can be used in almost every area, but they are especially adapted for arid areas where evaporation rates are high. But they need high labour inputs. A common and very simple technique for manual irrigation is for instance the use of watering cans as it can be found in peri-urban agriculture around large cities in some African countries. A more sophisticated and very water-efficient type of manual irrigation system is small-scale drip irrigation with buckets see also drip irrigation. Beside these systems, there are many other methods for manual irrigation, which are easy to install and simple to use. In general, all of these methods have high self-help compatibility and a relatively high performance. IPTRID Simple drip irrigation in contrary to high tech drip irrigation systems uses low-cost plastic pipes cut to the appropriate lengths laid on the ground to irrigate vegetables, field crops and orchards. Small holes in the hose allow water to drip out and keep the base of the plant wet without wasting any water. Read more about it here. Watering Cans Farmers in Africa irrigate a field with watering cans. The rose on the top of the outlet creates a sprinkler effect. A carry-pole across the shoulders as done in many parts of Asia would simplify the irrigation work. FAO Editor Irrigation by watering cans is a very basic way but is still widely used. This creates a lot of work for the labours especially if this technique is used for large fields. A common way to make this work easier is a carry-pole across the shoulders. The field worker is able to carry two big watering cans in each side and the irrigation water can be distributed equally on the field. With watering cans, the field worker is able to irrigate very specific and only where it is necessary. Pitcher Irrigation Adapted from: Soil is then packed around the necks of the jars so that their rims protrude a few centimetres above the ground surface. Water is poured into the jars either by hand or by means of a flexible hose connected to a water source. Since the walls of the pots are porous make sure to use unglazed pots, the water can seep slowly out and reach the roots of the plants. The jars can be made of locally available clay: Instead of a clay or earthenware pot, also the sweet monkey orange fruit *Strychnos spinosa* can be used when it has been dried and the top cut off. The jar should be filled up regularly especially in arid areas and has to be changed if there are big cracks that the water percolates without reaching the roots. Clay pot irrigation method. Bottled irrigation method is also effective and simple. Bottles can be found everywhere in the world. The bottle is first filled and then placed with its neck into the soil next to a plant, so it stands upside down see picture above. The dense soil hinders the water from leaving the bottle immediately. Instead, it gets released slowly and directly besides the roots, so it is available to the plant for a longer time and the water cannot evaporate directly. Porous and Sectioned Pipes Adapted from FAO Another variation of pitcher irrigation uses porous pipes instead of pots to spread water along a continuous horizontal band in the soil, rather than at discrete locations. As such, the porous pipe method is more suitable for closely spaced row crops grown in beds, such as vegetable crops. One end of the porous pipe is made protrude above ground that the operator is able to refill it with water as soon as it is necessary. In contrast to subsurface drip irrigation, the porous pipe distributes the water over the whole length and not only where it is perforated. That means it is less effective and water loss is slightly higher. Schematic view of porous pipe irrigation. Source FAO An interesting variation of the pitcher method is the use of thin plastic sheeting to form a sleeve-like casing. To define its comparative usefulness better, the method should be tested side by side with alternative methods of irrigation. To date, this has not been done systematically. Many of them can be made out easily available material e. This reduces the costs significantly. However, high labour inputs are required for operation and maintenance. Moreover, it is important to check the systems regularly to prevent blockages and leakages. Furthermore, there are several techniques to improve the production and

avoid water loss on the fields. See conservation of soil and moisture and crop selection. If poorly treated wastewater is applied. Appropriate pre-treatment should precede any irrigation scheme to limit health risks to those who come in contact with the water. As well, depending on the degree of treatment that the effluent has undergone, it may be contaminated with the different chemicals that are discharged into the system. When effluent is used for irrigation, households and industries connected to the system should be made aware of the products that are and are not appropriate for discharging into the system. Drip irrigation and subsurface drip irrigation are the only types of irrigation that should be used with edible crops, and even then, care should be taken to prevent workers and harvested crops from coming in contact with the treated effluent. Despite safety concerns, irrigation with effluent is an effective way to recycle nutrients and water see also fertigation or waterborne diseases pathogens and contaminants. Applicability Manual irrigation methods are appropriate for small-scale farming or backyard gardening irrigation in dry and arid climates where water is scarce. All the different designs reduce water evaporation. It allows people to grow its own food with simple but effective techniques. Principles and Options This publication is an attempt to distil current information on irrigation methods that might be appropriate, and to offer some ideas on the possible adoption and adaptation of such methods by small-scale farmers in the semi-arid areas of sub-Saharan Africa. Small-scale Irrigation for Arid Zones.

## 2: Irrigation Water Management: Training Manual No. 3: Irrigation water needs

*Part , Chapter 8 - Irrigation Pumping Plants PDF Electronic Version Part , Chapter 9 - Water Measurement Manual (current version of the Bureau of Reclamation's Water measurement Manual).*

An effective development occurred in Mexico , [10] where in a program of WUAs was initiated with tradable water rights. Similar efforts were made in Peru, see Irrigation in Peru Legal and institutional framework , but the progress is not yet at the level of that in Mexico. Water delivery principles[ edit ] Rotational turns[ edit ] In large irrigation schemes, the distribution of irrigation water and the delivery at the farm gate is often arranged by rotational turns e. The quantity of water to be received is often proportional to the farm size. As the canals usually transport constant flows, the water is being received during a period of time proportional to the farm size e. The method of rotational turns is typical for the utility form of irrigation management. On demand[ edit ] In smaller irrigation schemes the water delivery may be arranged "on demand" with water charges are on a volumetric basis. This requires a precise bookkeeping system. As the demand may be fluctuating over time, the distribution system and infrastructure is relatively expensive because it must be able to cope with periods of peak demand. During periods of water scarcity , negotiations are due to regulate the supply or restriction agreements must have been made. From point of view of efficient irrigation water-use this is the most effective system. Preferential rights[ edit ] Cumulative frequency analysis of the variable annual discharge of a river. Data analyzed with the CumFreq program [11] In projects with an uncertain supply of water due to annual variations in river discharge, water users at the top the head users of the irrigation system i. Hence, the number of farmers that are able to grow an irrigated crop may vary from year to year according to the riparian water rights. The preferential method of irrigation can be found in spate irrigation systems. It is likely that the irrigators near the headworks, or their ancestors, did contribute more to the construction and maintenance of the works than the others, and therefore acquired the preferential rights. Thus, farmers can irrigate only part of their land or irrigate their crops with a limited amount of water, whereby they may choose between crops with a high consumptive use e. In India, such practice is called protective irrigation, [13] which aims at equal distribution of scarce means and prevention of acute famine. The method of protective irrigation is typical for the utility form of irrigation management. Owing to competition for water, the water delivery practices may deviate from the principles. Water delivery practices[ edit ] Competition[ edit ] In practice the distribution of irrigation water is subject to competition. Influential farmers may be able to acquire more water than they are entitled to. Water users at the upstream part of the irrigation system can more easily intercept extra water than the tail-ender. Tail-end problems[ edit ] R. Chambers [14] cites authors who have reported tail-end problems. The Sardar Sahayak Pariyojana irrigation project, an extension of the Sardar canal project with 1. The Ibrahimiya irrigation canal near Minya , Egypt Also in Egypt, in , considerable differences in the water distribution over the canal systems have been reported:

## 3: Irrigation Systems for Farm Management | Valley

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## 4: Pumping Solutions for Precision Irrigation | Valley

*MANUAL FOR THE IRRIGATION SYSTEM. This Manual for the Irrigation System Management Training of Irrigators. Delivery and Distribution of Irrigation Water.*

## 5: Manual Irrigation | SSWM - Find tools for sustainable sanitation and water management!

# IRRIGATION WATER MANAGEMENT MANUAL pdf

The Irrigation Water Management (IWM) Plan will contain, at a minimum:  $\neq$  An irrigation system layout map showing the main pipeline(s), irrigated area, soil.

## 6: Table of Contents

Figure 3. Weather Reach Water Management System Rain Bird® ET Manager Series - Installation and Operation Manual 1. Introduction 4 The Weather Reach Water Management System.

## 7: Irrigation Scheduling $\neq$ Irrigation

America's Water Infrastructure Act of  $\neq$  legislation that was supported by the the Irrigation Association (IA) $\neq$  was signed into law on Oct. 23 Included in America's Water Infrastructure Act of is the congressional authorization of the WaterSense program.

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