

Level 1 Service

Water source development or improvement with a distribution point at or near the source is normally provided when resources are not available to pipe or haul the water nearer to the point of use and/or it is beyond the capability of the village to operate and maintain a more complicated system. It should also be considered when water sources are scarce and have very low yields. The location of the distribution point should be slightly away from the source to reduce the chance of contamination. Storage at or near the source will often be required if the source has a low yield. Storage for dug wells can be incorporated into the well design. The system should provide at least 15 liters per day for each person using it.

Typical Level 1 service developments include a windmill pumping to an adjacent storage tank with a public distribution point, shown in Figure 1, a hand pump used to pump water away from the source to a distribution point, shown in Figure 2a, a hand pump at the source with the distribution point at the pump, shown in Figure 2b, and a spring development with water piped to a nearby distribution point, shown in Figure 3.

Level 2 Service

At this service level, the water source is developed or improved with distribution of water to population centers. If the source is near the population center, Level 1 service can be the same as Level 2. See Figures 1, 2 and 3. If the source is remote from the users, a tank, truck or trailer may be used to haul water as shown in Figure 4c or a transmission line can be installed to the distribution point(s). A source of pressure will be required to move the water from the source to the point of use. This can be accomplished by gravity if the source is at a higher elevation than the point of use or by pumping. See Figure 4a.

Level 2 service is more costly and complicated than Level 1 because valves are required so that repairs can be made, so that air trapped in the main line can be released, and so that the main transmission line can be flushed clean. A transmission line may be required and a more sophisticated distribution point may be needed. More

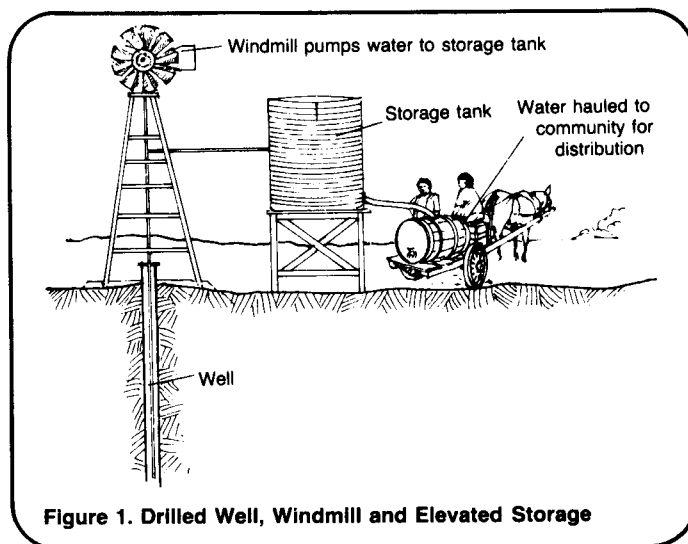


Figure 1. Drilled Well, Windmill and Elevated Storage

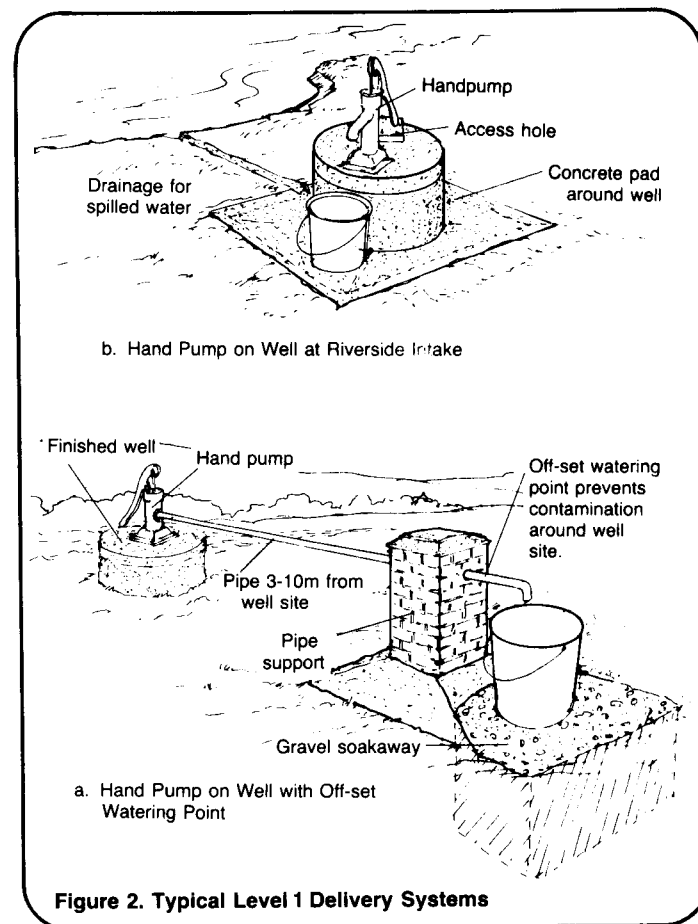


Figure 2. Typical Level 1 Delivery Systems

storage is also needed since water use will increase when the distribution point is nearer the household. Pump controls may also be required. Storage may be provided at or near the source, the distribution point, or both. Level 2 systems should be designed to provide at least 40 liters of water per day to each person being served. Figure 4b shows a system with several distribution points in a rural community with one storage tank.

Level 3 Service

Level 3 systems have a water source, usually have mechanical pumps, a transmission pipeline, water storage reservoirs and a water distribution system. They are similar to Level 2 systems except that water is delivered to each house rather than to one or more communal distribution points. Water may be supplied to a tap outside the house or to a sink inside the house. In some systems, a water meter may be installed at each home to measure the amount of water used so that each household can be charged for the water it uses. Figure 5a and b

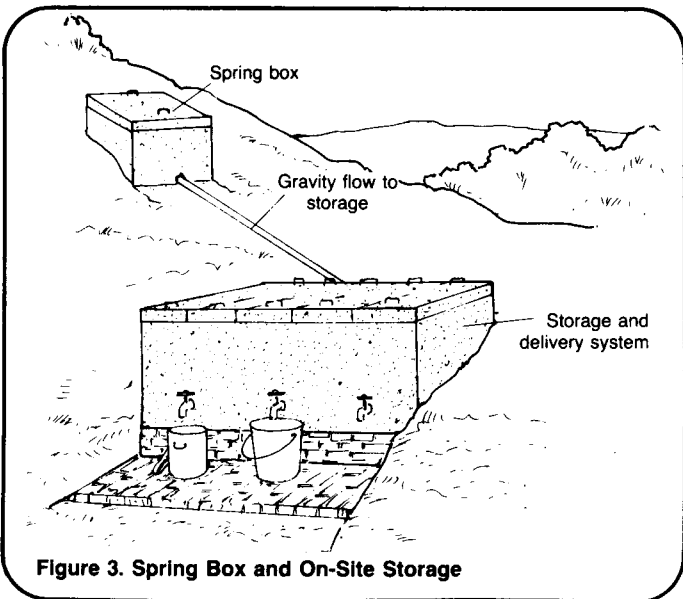
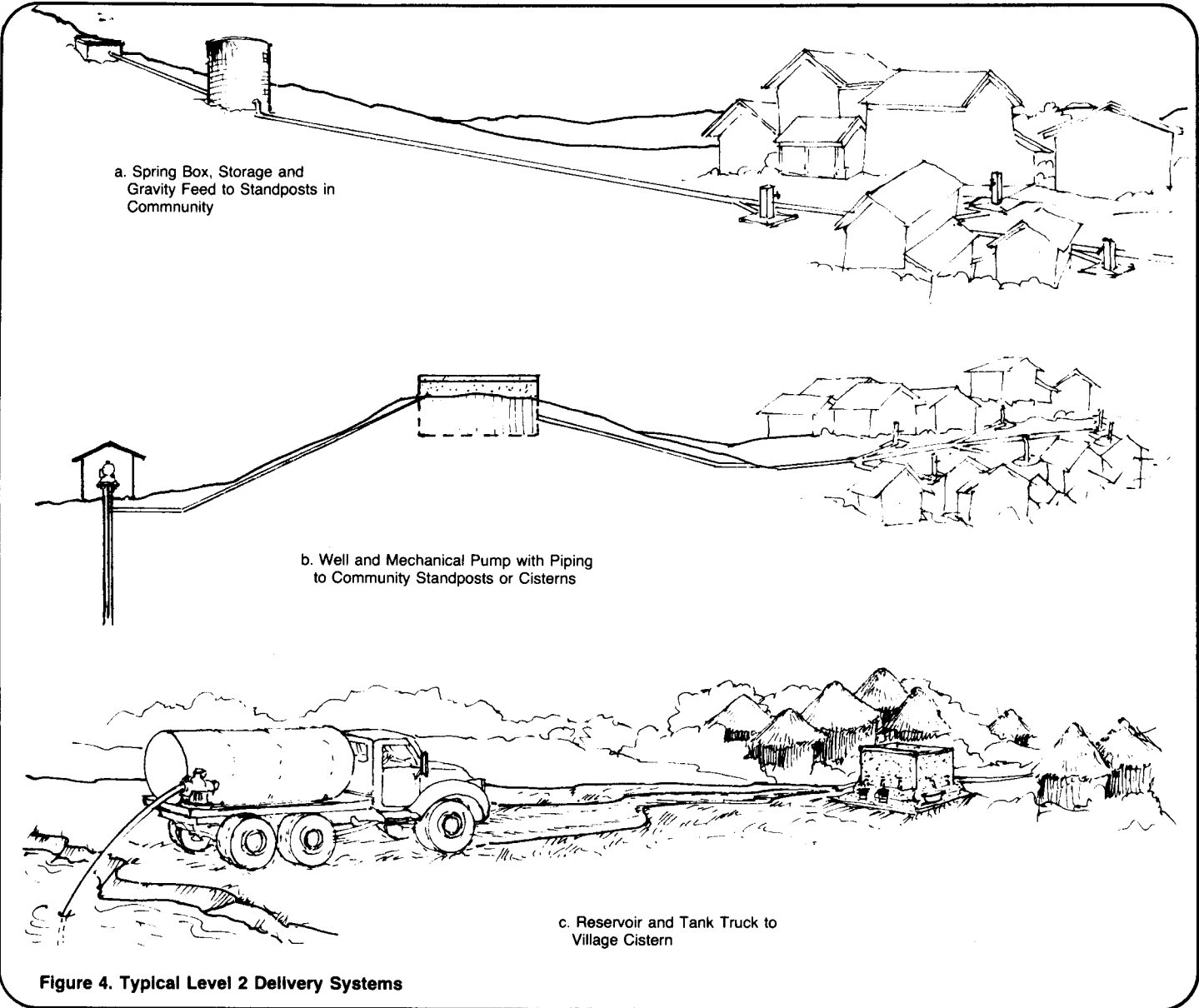


Figure 3. Spring Box and On-Site Storage



a. Spring Box, Storage and Gravity Feed to Standposts in Community

b. Well and Mechanical Pump with Piping to Community Standposts or Cisterns

c. Reservoir and Tank Truck to Village Cistern

Figure 4. Typical Level 2 Delivery Systems

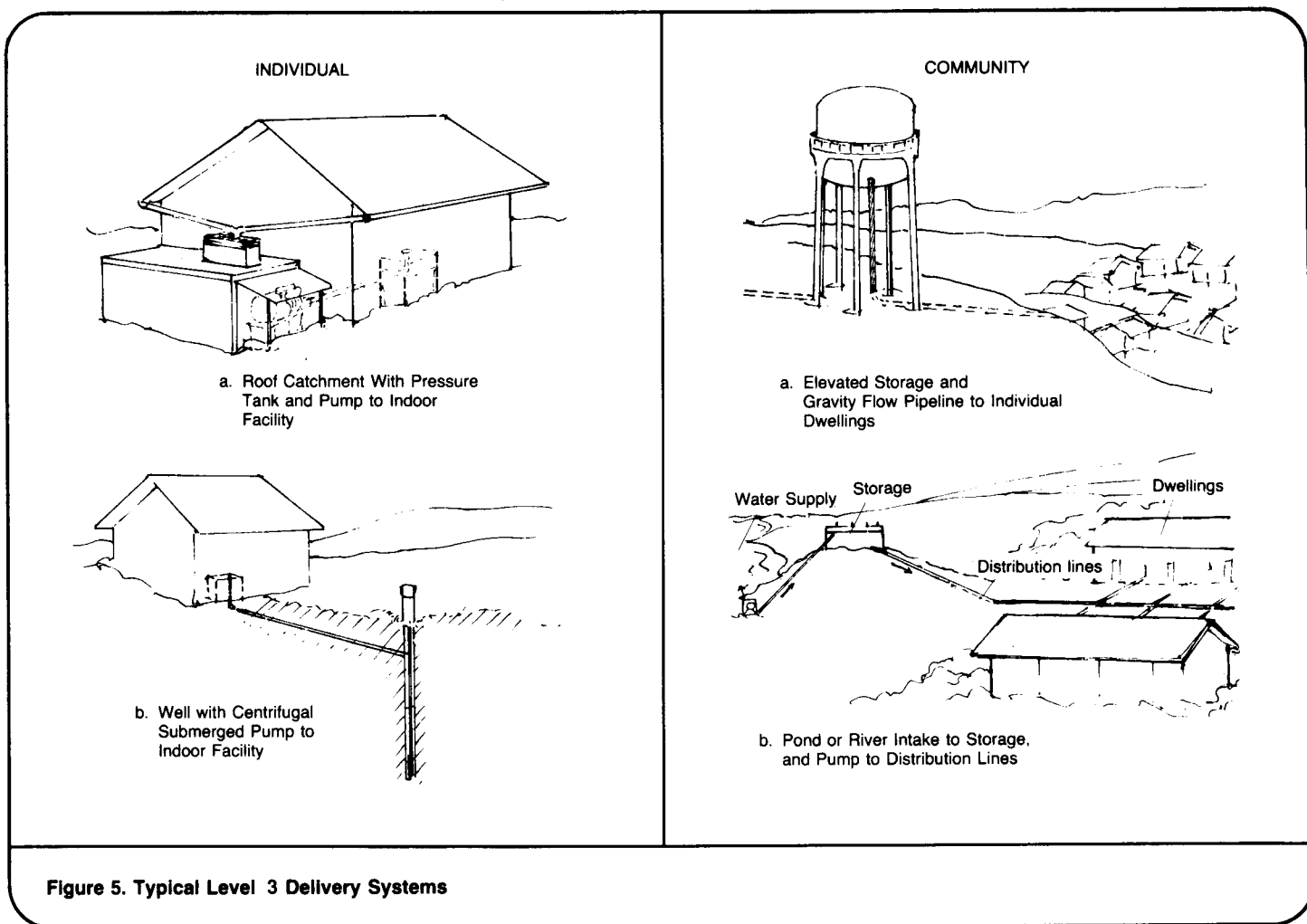


Figure 5. Typical Level 3 Delivery Systems

show Level 3 systems using a water source near the house. This would be most likely to occur where water is easy to obtain. Figures 5c and d show water supplied by gravity or by mechanical means to each home through a water distribution system.

Table 1 summarizes the most important considerations in choosing a method of water delivery.

Table 1. Delivery Method Selection Considerations

Level of Service	Suitability For Population Size			Construction Costs			Relative Costs of O&M		
	Small (to 100)	Medium (100-500)	Large (500+)	Low	Moderate	High	Low	Moderate	High
Level 1									
Gravity	x	x	x	x	to	x	x	to	x
Handpump	x	x		x			x		
Windmill	x	x			x		x	to	x
Level 2									
Gravity	x	x	x	x	to	x	x		
Handpump	x	x		x			x		
Windmill	x	x			x	to	x	x	to
Electric	x	x	x		x	to	x	x	to
Fuel		x	x				x		x
Level 3									
Gravity	x	x	x	x	to	x	x		
Handpump	x	x	x	x			x		
Windmills	x	x			x	to	x	x	to
Electric	x	x	x	x	to	x	x	to	x
Fuel		x	x				x		x

Technical Notes are part of a set of "Water for the World" materials produced under contract to the U.S. Agency for International Development by National Demonstration Water Project, Institute for Rural Water, and National Environmental Health Association. Artwork was done by Redwing Art Service. Technical Notes are intended to provide assistance to a broad range of people with field responsibility for village water supply and sanitation projects in the developing nations. For more detail on the purpose, organization and suggestions for use of Technical Notes, see the introductory Note in the series, titled "Using 'Water for the World' Technical Notes." Other parts of the "Water for the World" series include a comprehensive Program Manual and several Policy Perspectives. Further information on these materials may be obtained from the Development Information Center, Agency for International Development, Washington, D.C., 20523, U.S.A.