

Pattern of technology adoption



Technologies typically become more refined over time, as demand increases.

Most new technologies have a long, often winding path from development to widespread adoption. This path is shown in Figure 1 below. Consider the adoption of cell phones, and wireless networks as we discuss this topic. When cell phones were first introduced, even commercially, they had limited uses, and were much less advanced compared with the smart phones of today.

When a technology is first developed or discovered, it has very limited impact in terms of those who use it and in terms of its public or environmental benefits. As the technology is improved, it becomes more useful and accessible, and becomes more widely adopted. Sensor networks have gone through the research and

experimentation phases of development, and are currently entering the commercialization phase (see Figure 1 below). The development of sensor networks has reached the point where they are beginning to be adopted by growers. As this technology becomes more widely adopted, public benefits will continue to accrue at an increasing rate. Although it is difficult to predict the total impact of sensor networks, we will present a number of different scenarios, to provide you with an idea of the type of impacts that are possible with the adoption of sensor networks.

There are a number of factors that affect the public benefits that are realized with the adoption of sensor networks, including the speed and extent of adoption, and the effectiveness of the technology. How quickly sensor networks are adopted affects how long it takes for environmental benefits to increase. If we use our cell phone example above, it took less than 20 years for this technology to spread rapidly in the US and around the world.



As technologies mature, there are many benefits, including adding more features, and addressing problems that have arisen.

The cost of a technology, and how the cost relates to the benefits that are seen by growers impacts how fast the use of sensor networks will spread. The more benefits that growers accrue from the system, the more likely they are to see it as beneficial to them. Likewise, as the total number of growers that have adopted sensor networks increases, public benefits will increase as well. The effectiveness of sensor networks (both the system itself and how it is used) will impact pollution reduction. As sensor network technology and our ability to use it improves, environmental benefits will also increase. At the operation level, each grower has to integrate sensor networks into their growing decisions. The more information from sensor networks is applied, the higher the environmental benefits will be at that operation.

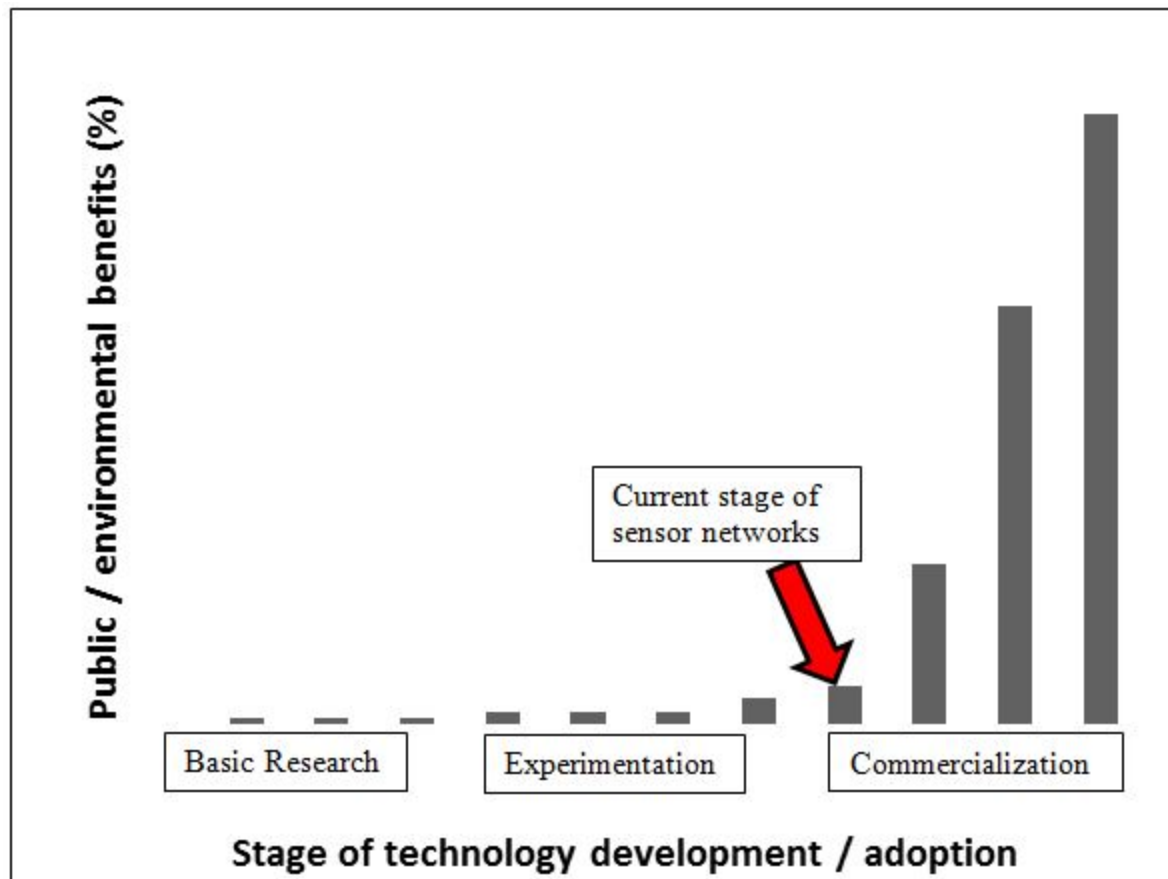


Figure. 1. Theoretical environmental benefits that can be gained from emerging wireless sensor irrigation network technologies (Modified from National Research Council, 1997).