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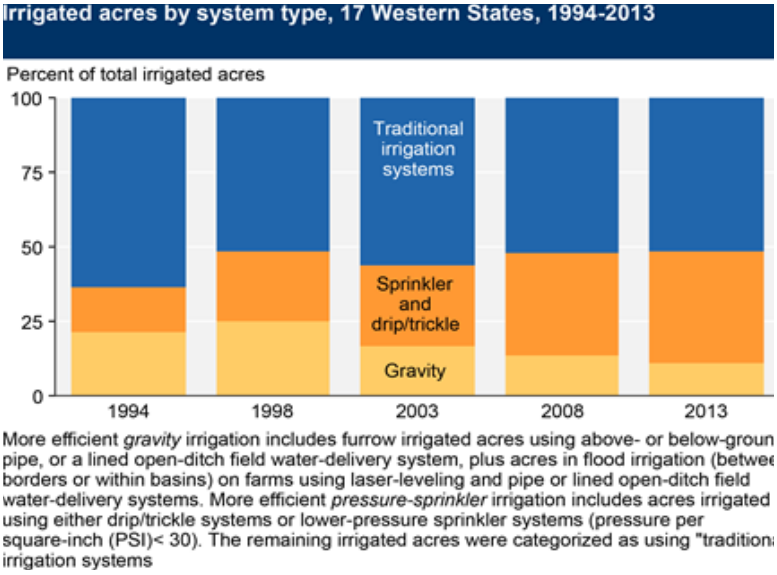
DESIGN CHALLENGE: PRODUCT IDEATION

a. America's largest water use goes to irrigating its farmlands. 80% of all water used goes to irrigation. Growing climate crisis and declining fresh water sources have caused not only drought seasons but have significantly contributed to increase in the price of water. Water scarcity is a scary yet inevitable part of our changing climate. Effective irrigation techniques are more essential now than ever for sustainable water usage. Millions of acres of farmlands even in developed nations still rely on non-efficient irrigation methods. A transition into more sustainable farming methods requires cost-effective and consumer friendly alternatives.



Source: United States Department of Agriculture
Economic Research Service

b. The idea is to build a smart irrigation system that operates in both a fully automated and a manual mode. The system operates by sensing the soil moisture level in different areas of the field and when the water level is below the required amount for the given plant sends a signal to the devices smart hub module which turns the drips on and off on a need basis. We will assess the water requirements for plants in different geographic conditions and set a recommended limit based on the farm's locality. The system will have an app interface which has two modes: an auto mode which can be used to select a portion of the farm and monitor water usage, estimated water volume, soil moisture level, leak detection, and overall efficiency. The manual mode can be used to customize and control every portion drip system, adjust water use, and turn portions of the system on and off. Because the device is Wi-Fi

enabled it can be controlled at any time from any internet accessible area. The data and statistics collected by individual systems are sent to the cloud to enable us to detect larger patterns and further optimize our product.

c. The current lack of interest in smart irrigation products can be attributed to several factors:

i. Lack of awareness
ii. Governing bodies extensively subsidizing water that is used for irrigation
iii. High cost of replacing the existing irrigation infrastructure

Problems addressed above can be tackled using various smart marketing techniques. Farmlands in countries like India, previously privately owned and managed by families, are increasingly being acquired by corporations and commercial businesses. The companies consolidate farmland and use larger areas for growing crops uniformly on larger scales. In fact, my family alone owns a hundred acres of farmland in India where we grow a variety of crops. The demand for cost effective irrigation techniques is only growing in countries like India. Rising cost of water can also be a driver in demand for our product in the marketplace.