



# Ancient Technology Still Relevant in Modern Society

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## Background

- The Aztec Empire ranged from about the 14th to 16th century C.E. They built their capital Tenochtitlan where five lakes meet. Some of these were freshwater and some others saltwater. They used dikes (a barrier used to regulate water levels) to separate the freshwater and saltwater lakes from each other. Before the Aztecs, people would not settle on the island because they had trouble separating the water and cultivating crops for their people.<sup>2,4</sup>

## Definition

- "Chinampa" comes from the Nahuatl or Native Mexica word "chinamitl", which means "reed" or "twig-mat".<sup>9</sup>
- They are also known as "floating gardens", they were stationary and constructed side-by-side with canals in between and over top of freshwater lakes.<sup>9</sup>
- This system had been practiced on the margins of the lake by people prior to the Aztecs, it became one of the most intensive and productive methods of farming that has ever been devised.<sup>3</sup>

## System

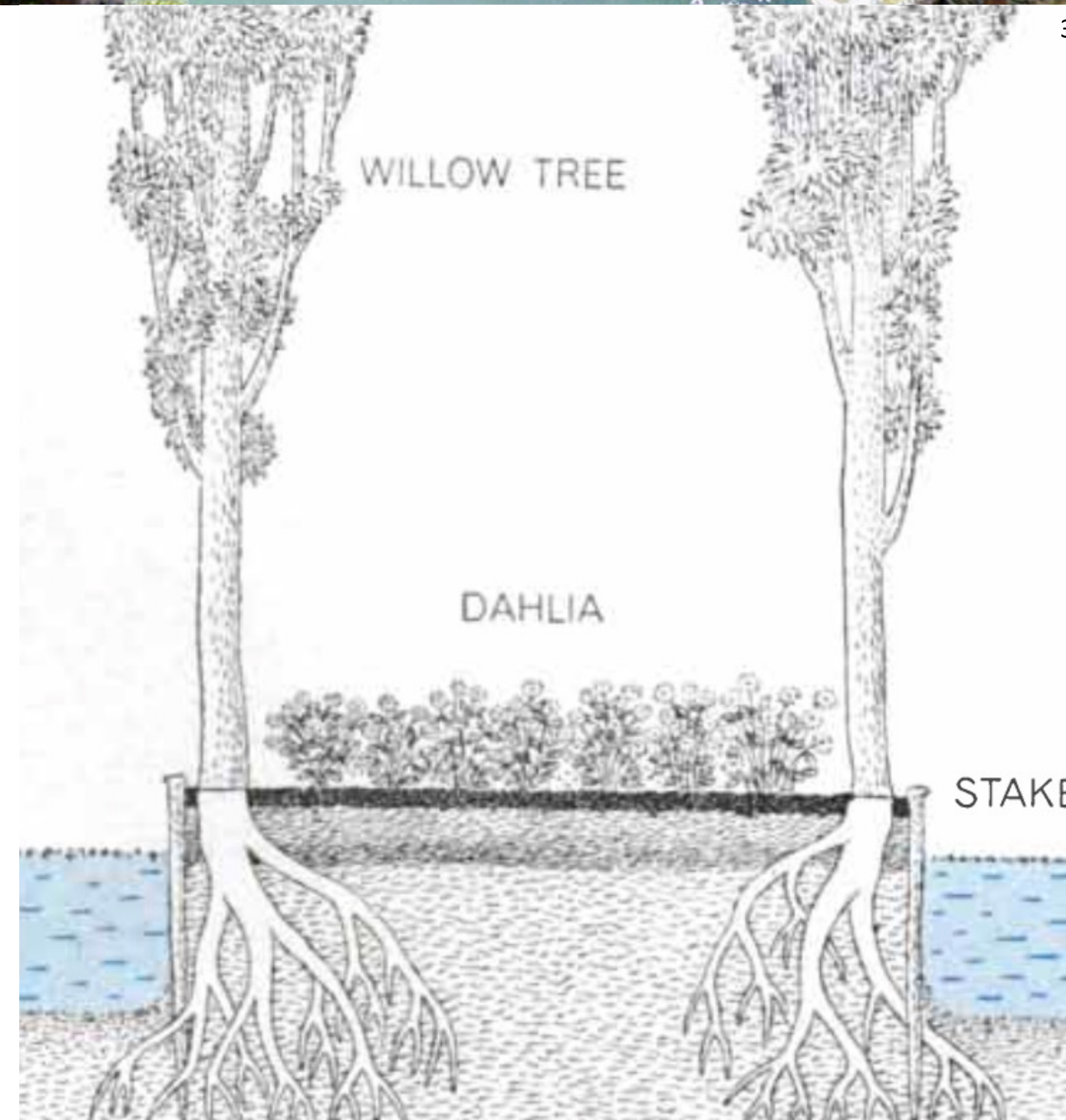
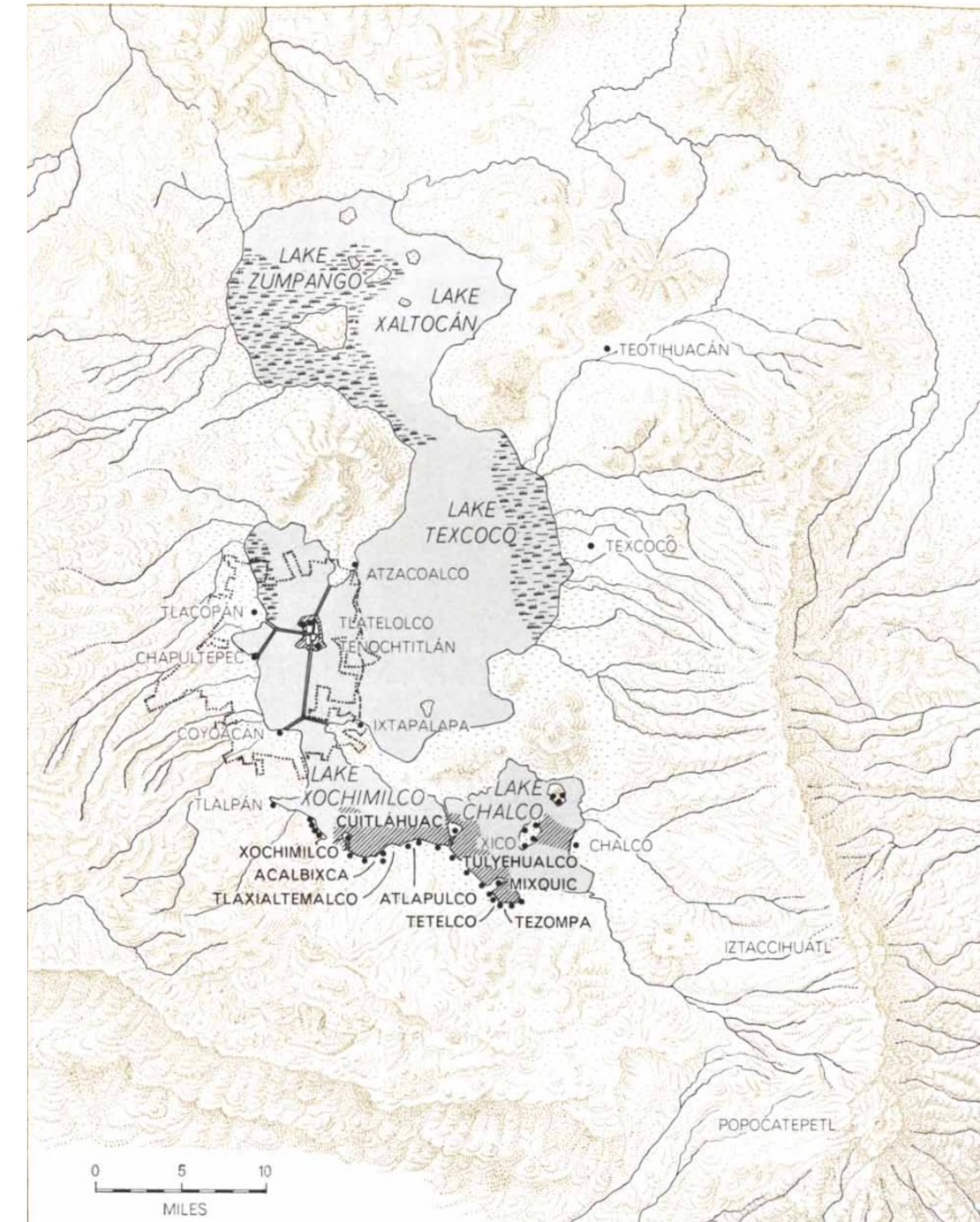
- The chinampa plot was constructed by staking out a rectangular enclosure of about 30m by 2.5m on the lake bed.<sup>2</sup>
- A fence was woven between the stakes, and the area would be filled in with mud and vegetation.
- With time, the stakes would grow roots, most of these were willow trees that offered shade to humans and the vegetation; as well as holding soil for the chinampas.<sup>3</sup>
- The next rectangle would be parallel to this one, with room for a canal in between that was used for the transportation of goods.
  - These canals offered irrigation and provided food of their own such as fish and waterflow.
- The land would be fertilized with human "manure".<sup>8</sup>
- Previous researches estimated the size chinampas covered an area of 12,000 hectares in Xochimilco-Chalco. Aztecs would grow different types of vegetables and grains. The main vegetable they would grow is corn-maize, looking at the data: Aztecs would produce 4,000 kilograms per hectare per year.<sup>7</sup>

## Tulare Lake

- Tulare Lake is in the San Joaquin Valley of California. During the late 19th century, it began disappearing due to people's desire to take public land. Last year it was the coldest year in California, due to the precipitation and rain, Tulare Lake resurfaced.<sup>1,6</sup>
- The reappearance of Tulare Lake is of great news for environmentalists. However, because it has been years since the lake was there, this land has been occupied by citizens. The main two groups of people that are being affected, are farmworkers and growers.<sup>5</sup>
- The main issue is that their homes and crops are being flooded. Therefore, the state has started to move the water from Tulare Lake to nearby farmlands within Kings County. They are planning on draining the lake one more time, so farmers and growers can continue working.<sup>11</sup>
- Even though there is not much we can do about the flooding of their homes, these people do not have to stop working. The state must change its mindset, and instead of working against nature, we should find a way to adapt.
- A way of adapting agriculture with a lake, could be the use of chinampas.

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## Chinampas in Tulare Lake

- From the "system" section, we know the way chinampas were built and some of the characteristics needed for one.
- For starters, the soil in Lake Xochimilco which was the main lake used for chinampas was fertile and it was also a shallow lake. With a depth of 2.4-3.0 meters.<sup>8</sup>
- Tulare Lake has a depth of around 1.5-2.0 meters. Making it a shallow lake bed with fertile soil. Therefore, the Central Valley of California is the most productive agricultural region of the United States.<sup>10</sup>
- Aztecs would scoop rich mud from the bottom and spread it on the surface of chinampas. Ideally, the surface of the chinampas was no more than a few feet above water. In the wet season, the water held in the chinampas provided enough moisture for crops, in the dry season the crops needed to be watered.<sup>3</sup>
- For Tulare Lake, keeping the canoes for the creation of chinampas would be smart to not contaminate the water. Farmers could use different tools to scoop the mud and for the dry season, we could implement an irrigation system that is scheduled to water the crops at the best time.
- We know chinamperos would use human manure as part of their technique to keep the seeds in fertile areas.
  - Nowadays for Tulare Lake, we do not have to use human manure, we could get it from cattle.
- The Aztecs had to worry about two things, to keep the water level high and to keep the chinampas from flooding. The main difference between Tulare Lake and Lake Xochimilco is the weather. California has drier weather than Tenochtitlan, the Aztecs built dikes and canals to manage the stormwater between all five lakes. For Tulare Lake, we could implement a drainage system whenever the lake reaches a certain volume. The extra water would be then moved through pipes to a reservoir tank, and later we could use that water for irrigation or other farmlands close by.<sup>3</sup>
- Looking at the production of maize in the chinampas, we get an idea of how much chinampas could produce today. For a better understanding, an adult needs in average 2kg of food per day.<sup>7</sup>

## Conclusion

- We have these land areas where based on the weather we get a lot of rain, or if it is a more tropical area like Tenochtitlan we have rain all year. Looking at ideas from the past and different types of systems we can adapt them with new technology based on the circumstances and apply them on today's time. Tulare Lake is an example fairly local, however, there are plenty of lakes in many places that could benefit of the use of chinampas. We would not know if chinampas will work in Tulare Lake, but this is a great opportunity to research old systems and see the impact in today's society. The use of chemicals in the agricultural space would be reduced by using chinampas, they are also sustainable. Furthermore, by seeing the results of production per year per hectare of only one of their crops. We can conclude that chinampas would not reduce the productivity of the farmers, it could increase it.
- Chinampas is a great example of an old method and system that could be applied in the present. We know that the environment benefited from the chinampas, and it had its own ecosystem. By studying certain areas with similar weather and characteristics or by finding a way to implement the chinampas in any weather, we could bring something old and turn it into something new and better.

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