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# Sustainable Agriculture Through Ancient Technology

## *The Endurance of Rice Paddies Through Time*

Written by Melita Wiles

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**W**hen we hear the word technology, we often think of cell phones and computers, futuristic toys and electronics, but there was a time when technology meant something different. We rarely think about it, but the items we utilize in our everyday life were cutting-edge technologies when they were first invented. Some have been improved with new innovations, while others have not changed much because their efficiency and necessary function were already created almost perfectly ages ago. An important ancient technology that we still use today is the rice paddy. Rice feeds over half of the world and has helped build multiple cultures throughout history. This type of agriculture is sustainable and ingrained in the culture and traditions of these communities.

Rice paddies were created by the Neolithic cultures around 10,000 to 4,500 BCE in southern China. The engineering techniques they developed spread rapidly throughout China. These “paddies” are flooded fields of plowable land used for growing crops, such as rice. The best place to start these rice paddies are on a slightly sloped hill, where there is a constant water source. These paddies also need gravel, topsoil, and stones nearby. At the bottom of the paddy, rocks are built up to create a wall, and gravel is placed on the adjacent sides. The water transports and distributes the gravel to the correct place, and gravel is covered

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by eight to 12 inches of dirt and topsoil to create a bed for the rice to grow. The final step in creating the paddy is inundating it with water. The depth of the water can be controlled in various ways using multiple outlets.

The rice is planted from seeds, and when it is ready to be harvested, the water is simply drained from the top paddy to the next paddy on the slope. While the top bed is harvested, the next bed along the slope is planted and grown. A key theme throughout rice fields is the importance of irrigation. Fast-flowing streams irrigate the fields in the form of channels descending from the top of the slopes. If the area is less than ideal for rice growth, animals like water buffalo can be used to transport additional water and other necessary materials for the fields. The only changes to this ancient technology have been the introduction of different tools, such as cast-iron tools and different plows. Other than those subtle changes, the technology and engineering behind rice fields

or paddies remains the same.

One concern with this type of farming is that these paddies emit methane. Rice paddies account for 20 percent of human-related emissions of methane. The water in the flooded field blocks oxygen from the soil, creating perfect conditions for microscopic organisms to emit methane. This is harmful to the environment and specifically contributes to climate change, but also makes the rice grow faster, which is beneficial to farmers. In 1980, a team found that draining these paddies in the middle of the season increases rice yield and decreases methane emissions, a technique that many farmers have adopted since then. Because of this change, China has seen a 70 percent reduction in methane levels. This mid-season drainage does create other issues, though; the process causes another harmful greenhouse gas, nitrous oxide, to be released.

While the science and engineering behind these fields are ingenious and truly effective for production, there are cultural and traditional aspects associated with this development that are equally important to the farms’ durability. Some countries identify the cultivation of rice as a huge contributor to the development of their culture. Usually, the whole community stationed around the rice paddies will work together to grow the rice. Schedules are created to alert people when it is their turn to plant or harvest the rice. In order to harvest the rice, the highest paddy must be drained into the paddy directly below it, and this step requires careful planning and teamwork among community members.

Not only do communities work together, but these techniques have been passed down from generation to generation through families. This type of communal farming has taught cultures how to work together better and support others outside of their direct family, deepening community bonds. Through the dependency developed by these practices, countries that take part in rice farming are better at collectivist thinking. In recent studies, psychologists found that they could identify where Chinese people grew up in the country based on whether they had individualistic or communal outlooks. Other studies found that people from areas with more rice paddies thought more holistically.

While this is not a perfect science, these paddies have been feeding humanity for years. Exactly 11 percent of the world’s plowable land is used for rice cultivation. Over 100 million people in Southeast Asia rely on deep-water rice for sustenance, and more than half of the world’s people rely on rice to live. The creation of these paddies is important for sustaining human life, as well as to culture, communities, and generational traditions. While we may take ancient technologies for granted, they continue to shape our world in unseen and impactful ways. ● ● ●



