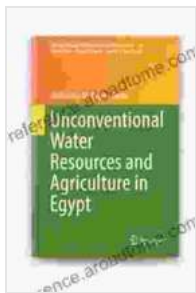


Unconventional Water Resources and Agriculture in Egypt: The Handbook

Water scarcity is a major challenge facing Egypt, a country with a rapidly growing population and a limited supply of freshwater. Conventional water resources, such as the Nile River and groundwater, are increasingly stressed, and new sources of water are needed to meet the growing demand for food and other agricultural products.



Unconventional Water Resources and Agriculture in Egypt (The Handbook of Environmental Chemistry 75)

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Unconventional water resources, such as wastewater, desalination, and rainwater harvesting, can provide a sustainable and cost-effective way to meet Egypt's water needs. These resources are often underutilized or untapped, but they have the potential to make a significant contribution to the country's water security.

Unconventional Water Resources in Egypt

There are a number of unconventional water resources available in Egypt, including:

- **Wastewater:** Egypt produces approximately 12 billion cubic meters of wastewater per year, most of which is untreated and discharged into the environment. Wastewater can be treated and reused for irrigation, industrial purposes, or groundwater recharge.
- **Desalination:** Desalination is the process of removing salt from seawater. Egypt has a number of desalination plants in operation, and the government is planning to build more in the future. Desalinated water can be used for drinking, irrigation, and other purposes.
- **Rainwater harvesting:** Rainwater harvesting is the collection and storage of rainwater for later use. Rainwater harvesting can be done on a small scale, such as by installing a rainwater tank at a home or business, or on a large scale, such as by building a dam to create a reservoir.

Benefits of Using Unconventional Water Resources in Agriculture

There are a number of benefits to using unconventional water resources in agriculture, including:

- **Increased water security:** Unconventional water resources can help to reduce Egypt's dependence on conventional water resources, such as the Nile River and groundwater. This can help to ensure a reliable supply of water for agriculture, even during periods of drought.
- **Reduced water costs:** Unconventional water resources can be less expensive than conventional water resources, such as desalinated

water or groundwater. This can help to reduce the cost of agricultural production and make it more profitable.

- **Improved soil quality:** Unconventional water resources can contain nutrients that can improve soil quality and crop yields. For example, wastewater contains nitrogen and phosphorus, which are essential nutrients for plants.
- **Reduced environmental impact:** Unconventional water resources can help to reduce the environmental impact of agriculture. For example, using wastewater for irrigation can help to reduce the amount of pollution in rivers and streams.

Case Studies

There are a number of successful case studies of the use of unconventional water resources in agriculture in Egypt. For example, the Bahr El Baqar Wastewater Treatment Plant in Alexandria treats wastewater and uses it to irrigate crops in the surrounding area. The project has been successful in reducing water pollution and increasing crop yields.

Another example is the Wadi El Rayyan Project, which collects and stores rainwater in a reservoir to irrigate crops in the surrounding desert. The project has been successful in increasing agricultural production and improving the lives of local farmers.

Best Practices for Using Unconventional Water Resources in Agriculture

There are a number of best practices for using unconventional water resources in agriculture, including:

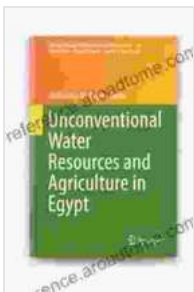
- **Treat wastewater to remove pollutants:** Wastewater should be treated to remove pollutants before it is used for irrigation. This can be done using a variety of methods, such as filtration, disinfection, and reverse osmosis.
- **Use drip irrigation or other water-efficient irrigation methods:** Drip irrigation and other water-efficient irrigation methods can help to reduce the amount of water used for irrigation. This can help to save money and reduce the environmental impact of agriculture.
- **Monitor soil moisture levels:** Soil moisture levels should be monitored to ensure that crops are getting the right amount of water. This can help to prevent overwatering and underwatering.
- **Use drought-tolerant crops:** Drought-tolerant crops can survive with less water than other crops. This can help to reduce the risk of crop failure during periods of drought.

Unconventional water resources have the potential to make a significant contribution to Egypt's water security and agricultural production. By using these resources wisely, Egypt can reduce its dependence on conventional water resources, reduce the cost of agricultural production, improve soil quality, and reduce the environmental impact of agriculture.

The Handbook of Unconventional Water Resources and Agriculture in Egypt provides a comprehensive guide to the use of these resources in agriculture. The handbook includes case studies, best practices, and recommendations for future research and development.

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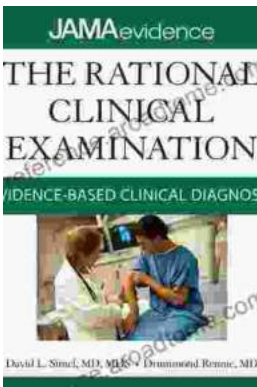
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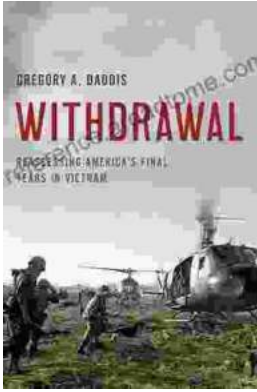
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