



# Aquaponics



BY JOHN MASON & STAFF OF ACS DISTANCE EDUCATION

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# CREDITS

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© **Copyright:** John Mason

**Written by**

Written by John Mason *Dip.Hort.Sc.*  
*FIOH, FAIH, FPLA*  
& Staff of ACS Distance Education

**Photos:**

John Mason  
Leonie Mason

**Layout**

Stephen Mason

**Editorial Assistants/Contributors:**

Adriana Fraser  
Barbara Seguel  
Gavin Cole  
Leonie Mason

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ACS Distance Education

P.O. Box 2092, Nerang MDC,  
Queensland, Australia, 4211  
admin@acs.edu.au  
www.acsbookshop.com

P O Box 4171, Stourbridge, DY8 2WZ,  
United Kingdom  
admin@acsedu.co.uk  
www.acsebooks.com

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# PREFACE

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Aquaponics involves growing fish, crustaceans or something else in water; and then taking that water and using it to grow plants. It is an intensive way of producing food, that can be used on a small scale at home, or on a large scale for commercial farming.

The level of sophistication involved in aquaponics can vary from low to high. The biggest challenge is to ensure that when the same water is used to grow two different things, the characteristics of the water needs to be compatible for both.

The type of water required to grow some types of fish, for instance, can be quite different to the type of water needed to grow some types of plants. Success is achieved by both choosing plants and animals to grow that are compatible with the system you set up; and choosing a system that is compatible with the plants and animals you are growing. When you get these compatibilities aligned, you can then move forward, and provided that you manage the system appropriately, the potential for success can be staggering.

Aquaponic farming allows individual families to grow a much wider range of produce, in a much smaller space. They can provide the protein needed for their diet (from fish), as well as the vegetables and fruit they need. Aquaponic systems can be as small as a few cubic meters; or as large as many acres. They are an ideal way of improving productivity on a hobby farm; can be used by restaurants to produce the freshest produce on site, or established inside buildings, in big cities, for urban farming.

This book explores some of the more important considerations, and aims to inspire and inform you about the possibilities for aquaponics, in whatever circumstances you may consider using it.

# CHAPTER 1 SCOPE AND NATURE OF AQUAPONICS

Aquaponics is a way of combining aquaculture or fish farming, with hydroponic growing. This is typically achieved by using the waste from fish tanks to fertilize plants, and waste water from plants to top up water in the fish tanks. The tricky part is to ensure that water taken from plants to fish, is chemically suitable for the fish, and that water taken from fish to plants is chemically appropriate for growing plants.

The nutrient-rich waste from fish tanks can be valuable as plant food to vegetables and herbs grown in hydroponic beds. Chemicals (including nutrients) naturally increase in any water in which fish or other aquatic animals live. Some of these chemicals (such as

ammonia) are the result of excrement from the animals, and others may result from decomposition of dead animal tissue or left over food. As a result of its nutrient composition, water that is used for aquaculture is a useful source of nutrition for growing plants.



Golden Perch (*Macquaria ambigua*) is one of a number of freshwater fish species that have been grown successfully in aquaponics.