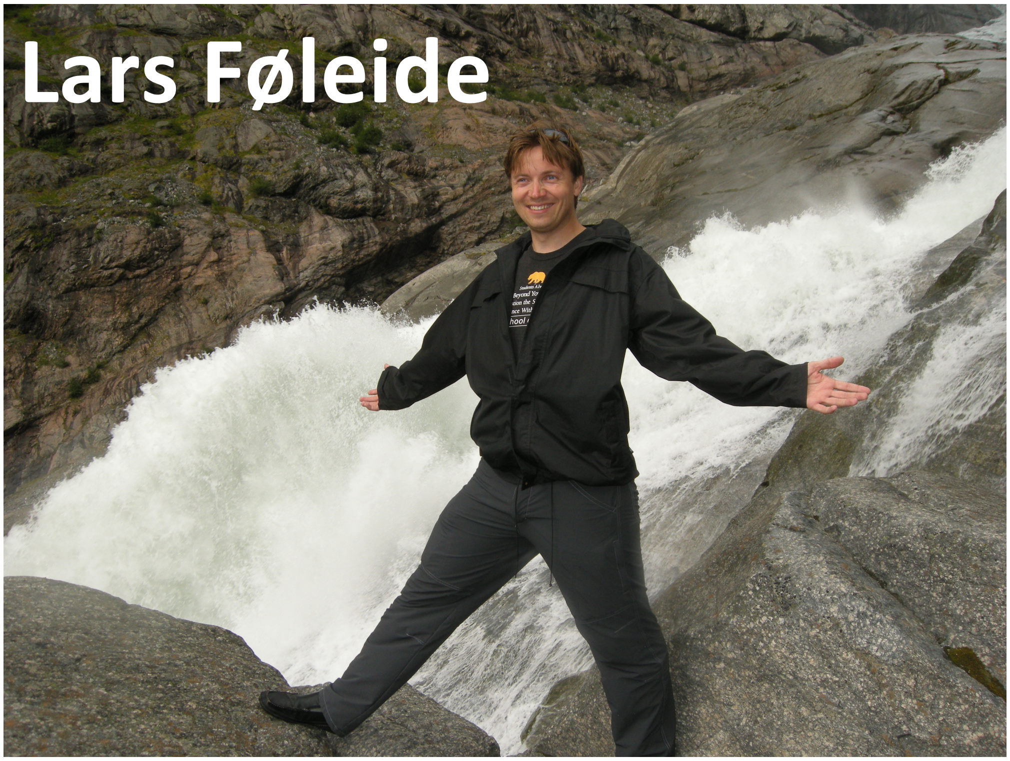
# Nevara

presents

# URBAN AQUAPONICS

www.Aquaponics.Nevara.com




Lars was born in Nordfjordeid 1979, did his two Bachelor's in Computer Science and Marketing at Høgskolen i Ålesund, before moving to Oslo for doing his Master's in Innovation and Entrepreneurship at University of Oslo. In 2008 he started his Master's at Norwegian School of Economics (NHH) and in 2010 he started his PhD in Innovation and Entrepreneurship at BI Business School, which a year later brought him to California – where he stayed for 3.5 years.

While at UC Berkeley, Lars started Nevara as has his research project, focused on building an Urban Farming Platform. In California, Nevara has focused on how to modernize Farmer's Markets with innovative loyalty programs, convenient payment solutions and deliveries. Priority now is to build commercial aquaponics facilities, having teamed up with his friends Jon and Paulo to do this in Norway. Plans are in place for expanding globally, and much effort has already been invested in building strategic partnerships. Lars plays a critical role in securing funding and to make sound investment decisions as we grow our operations.

www.j.mp/CV_Lars
www.about.me/Zyron
www.LinkedIn.com/in/LarsFoleide


Jon is from Madison, Wisconsin, USA. Because his mor and grandmother immigrated to the USA he's been visiting his relatives, the Sønderland and Sandnes families in Nordfjordeid and Måløy, and the Oxaals in Trondheim during summer and winter vacations since he was 13 years old. He's traveled extensively throughout Norway and has developed a solid understanding of Norwegian culture and concerns. Jon connected with Lars through a friend of the family relations.

Possessing degrees in both Civil Engineering Technology at Madison Technical College and Health Care Administration from the University of Wisconsin, Jon has a wide range of expertise in technical aspects of construction, business administration and with project planning, contract management and strategic planning.

Positions he's held include the management of two eldercare facilities in Wisconsin and Michigan, trustee of Kwikee Kwiver Company (sports equipment manufacturer) in Michigan, manager of supply and customer support at IPIX Corporation in New York, Emergency Medical Technician (EMT) ambulance crew, computer repair manager at Galaxy Computer in Michigan, and Planning Commissioner in Acme township in Michigan.

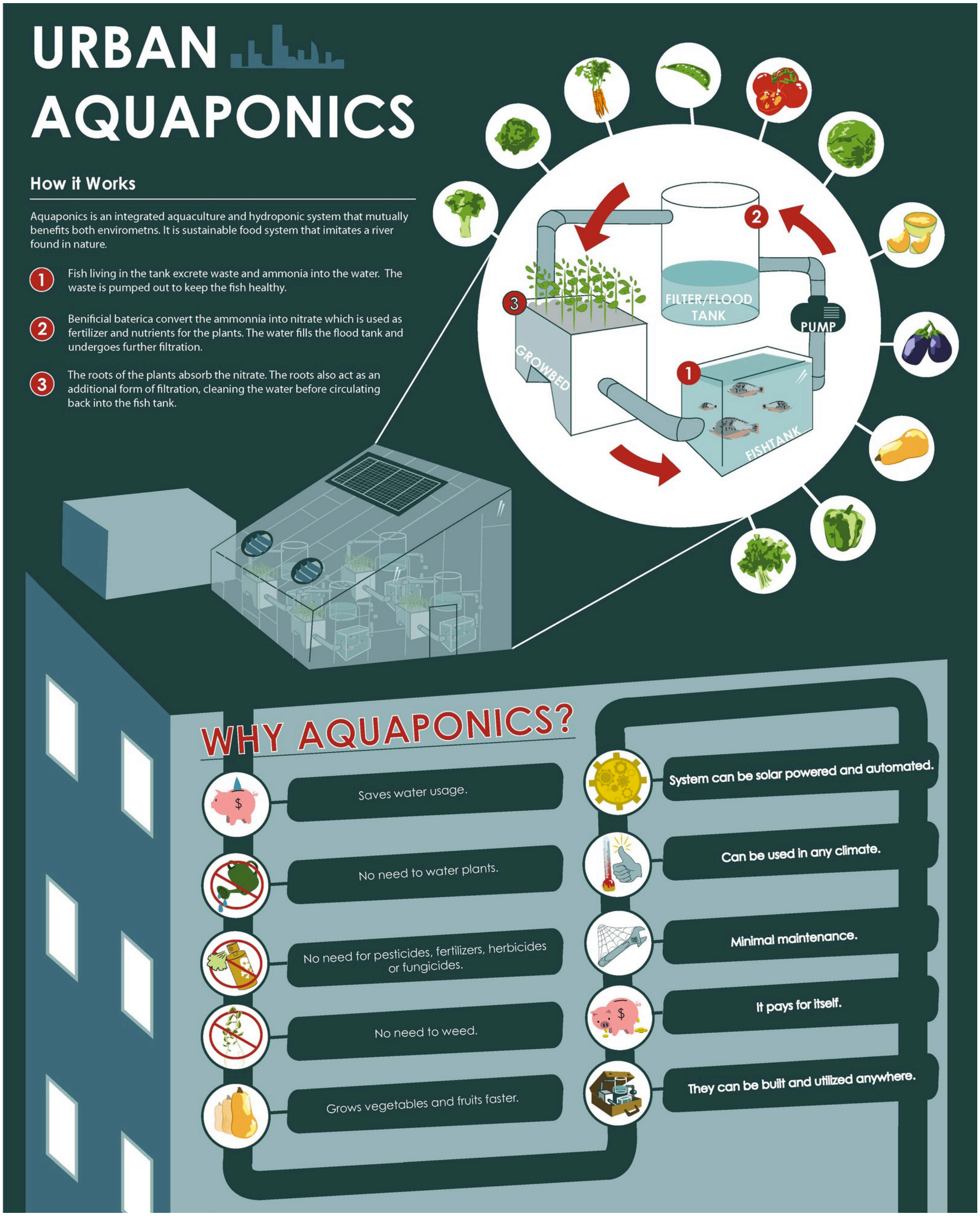
Aside from having a passion for aquaponics, Jon also enjoys sailing, skiing, skin-diving, traveling, festivals, volunteering, and being a private pilot, volunteer fireman and ice hockey referee.


Paulo is from Campinas, Sao Paulo, Brazil. Since his grandparents immigrated from Italy, he choose to earn his degree in International Trade and Business, from the Pontifical Catholic University of Campinas (PUCC). Before traveling to Europe he was the general manager of Eco-Venture in Sao Paulo, where he conducted outdoor training for clients, coordinated staff, and assisted clients on adventure sport tours.

Dedicated to resource preservation, open source technology and safe, high-quality food, he traveled to England to work at an aquaponics facility near Leeds, where was conducting research. Paulo is currently a lead researcher at The Incredible AquaGarden, a government funded aquaponics research facility near Todmorden, England. This exciting and innovative learning resource aims to teach sustainable local food production for schools and the community with minimal environmental impact.

Paulo is helping combine state-of-the-art growing systems such as aquaponics and hydroponics with more traditional techniques, indoors and outdoors, providing unique learning opportunities through an exciting range of activities and workshops focused on growing, nutrition, the environment and wildlife.

Paulo makes an invaluable contribution to our team with his hands on experience as we aim to establish blended research and commercial aquaponics production in Norway.


URBAN AQUAPONICS
How it Works
Aquaponics is an integrated aquaculture and hydroponic system that mutually benefits both envirometns. It is sustainable food system that imitates a river found in nature.
1 Fish living in the tank excrete waste and ammonia into the water. The waste is pumped out to keep the fish healthy.
2 Benificial baterica convert the ammonnia into nitrate which is used as fertilizer and nutrients for the plants. The water fills the flood tank and undergoes further filtration.
3 The roots of the plants absorb the nitrate. The roots also act as an additional form of filtration, cleaning the water before circulating back into the fish tank.
FILTER/FLOOD TANK
PUMP
GROWBED
FISHTANK
WHY AQUAPONICS?
Saves water usage.
No need to water plants.
No need for pesticides, fertilizers, herbicides or fungicides.
No need to weed.
Grows vegetables and fruits faster.
System can be solar powered and automated.
Can be used in any climate.
Minimal maintenance.
It pays for itself.
They can be built and utilized anywhere.

## 1. Motivation

The world is on a collision course with its future, a future which by many measures will often be difficult, challenging, perhaps desperate or even deadly for many who don't live in a country which has prepared for it. From the beginning of time, all that stood between man and extinction was a few inches of topsoil and a little rain at just the right time. Since crop species were domesticated around 10,000 years ago agriculture has been a battle between the forces of natural bio-diversity and the need to produce or gather food in larger quantities and under increasing pressure. Likewise, food gathered from the oceans has grown increasingly difficult and complex. Through advances in science during this century, world food production has increased and become more reliable but the problems with declining soil, water quality, and scarcity have the potential to reverse this trend. In 1999 our global population rose to over 6 billion people and by 2050 may rise to nearly 9 billion. The growing global population and declining farm and ocean health will put pressure on farmers and fishermen to produce more, and more healthful, locally grown food.

## 2. Education

Young people today in folk high schools, upper secondary school, and college who begin learning aquaponic technology (the intense growing of plants and fish together in a closed system) are on a similar collision course. Small-scale, resource poor farmers of developing nations, as well as the more developed western nations, are realizing the need for more efficient, compact food production systems, the types used in aquaponic designs today. Students who experiment with a variety of aquaponic applications demonstrate real-life uses of science, math, reading , agriculture and business concepts. Aquaponics utilizes biology, horticulture, chemistry, math, physics, economics and engineering. It demonstrates nitrification, biology, fish anatomy and nutrition. Young people studying and acquiring skills in this technology are going to be in great demand in the future. Introducing this technology to them may lead to a rewarding and satisfying career that will be as necessary to society in the future as the dot-com kids were to the start-up of the internet age.

## 3. Increasing Demand

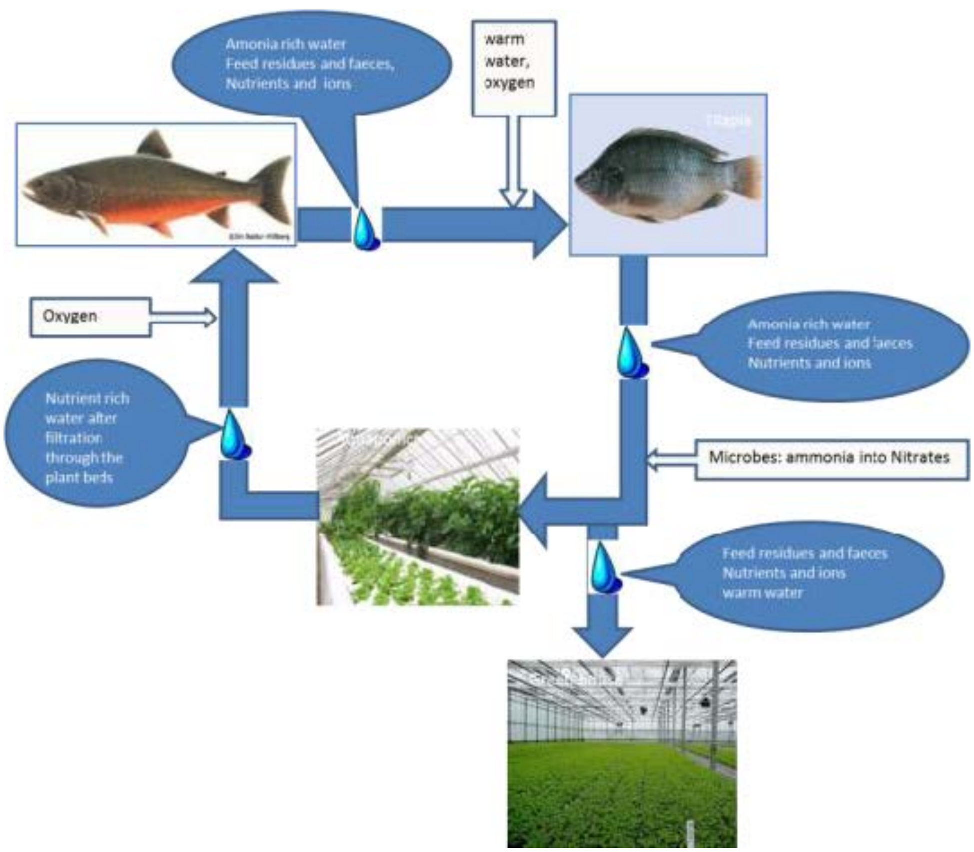
Research scientists, commercial growers, hobbyists and educators have been building, testing and developing aquaponic systems since the 1970's. As awareness of aquaponics increases, so does the amount of research and the number of growers around the world. Indeed, there is a renewed interest in sustainable agriculture and so aquaponics is gaining attention from governments, business and investors, family farms and entrepreneurs. It is estimated that globally we will need to be able to produce twice as much food by 2050 as we are capable of today. Aquaponics will play a role in feeding people as renewed emphasis is placed on highly productive, urban and sustainable food production systems which also feed into existing food value chains. There is also a growing need for a controlled agricultural environment. The fresh food industry has been marred by continued incidence of food contamination and consumer illness, especially from food imported from China and other distant countries with loose production standards. Much of this food is not inspected. In a controlled aquaponics environment the grower has the ability to enforce a bio-security program that will keep the food free of poisons, contamination and pests.

## 4. Flexibility

While aquaponics systems don't require soil and can be built on rock, an important aspect of the intense production of fish and plants in a relatively small space is that instead of agricultural lands being lost to urbanization, these small farms can remain in an urban location. Also, as government support of small and mid-size country farms in Norway is reduced, family farms can become profitable and thrive by incorporating closed-loop recirculating aquaponic systems, providing fresh, healthful, local produce and fish to their nearby consumers all year. Excess production or targeted production can be processed and sent to other markets. Existing processors, distributors and retailers of fish and vegetable products will receive a new, local, relatively inexpensive organic, pesticide and herbicide free, raw product source.

## 5. Collaboration

Aquaponics methodology has been tested and implemented in a number of countries and is currently used in Asia, the USA, Australia, Central America and Canada. The Norwegian government has joined projects to study aquaculture such as Bioforsk at the Grimstad research facility and Nordisk Atlantsamarbeid (NORA). The objective of these projects was to build on existing knowledge on technical and economic feasibility of aquaponics systems for implementation of aquaponics into Norwegian and Icelandic aquaculture. The partners from each country are companies in the aquaculture and horticulture industry that are interested in implementing aquaponics into their operational system. Collaboration was established between Iceland and Norway in the beginning and with participants from Denmark joining the group at early phases. Relevant specialists from R&D institutes have been involved in all the Nordic countries and a number of graduate students were involved in the project work at different levels.

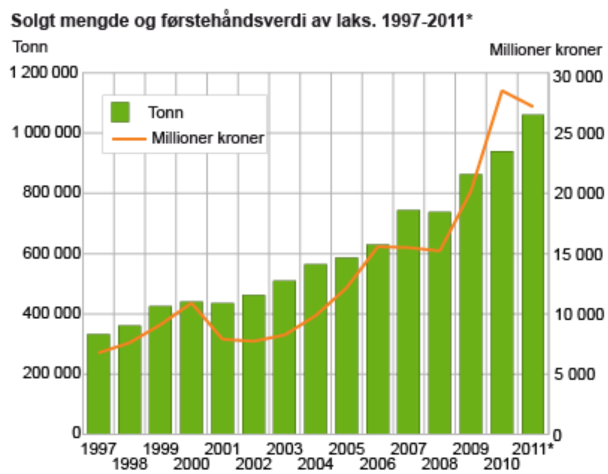



***A diagram showing the aquaponics production concept at Matorka's facilities in Fellsmuli, Iceland.***

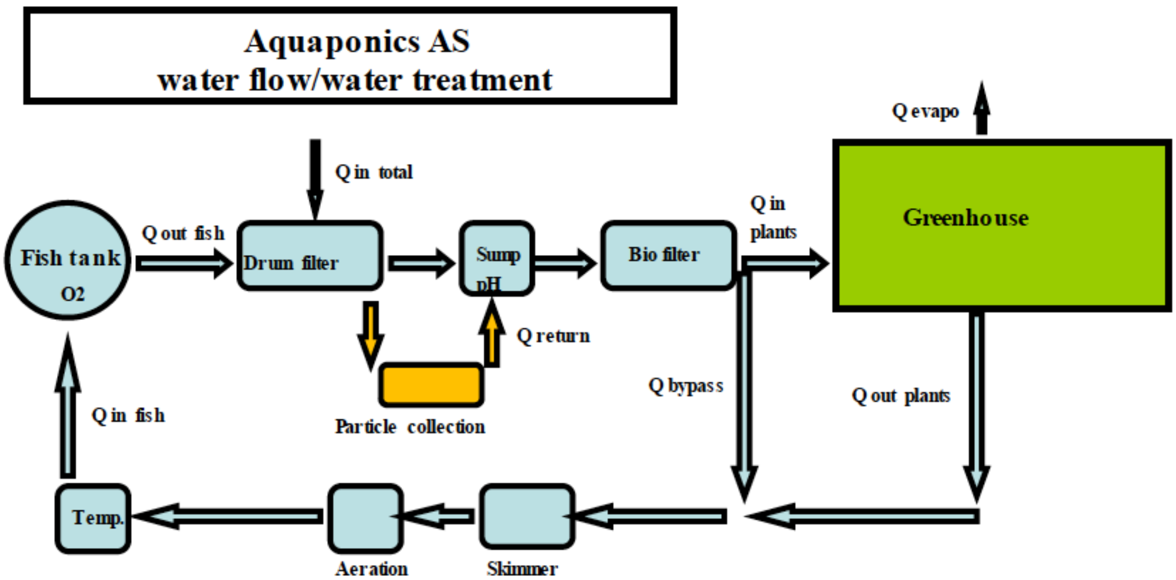
## 6. Added value

The Norwegian consumption from agriculture is 50% self-supported by indigenous production. The Norwegian production of fish is 20 times the consumption, and Norway is the second greatest exporter of seafood in the world, including products from fisheries and aquaculture. We may then ask the question, what is the added value of integrated aquaculture and hydroponics (aquaponics)?

The development in primary production in Norway is similar to the development in the rest of the society, with new knowledge and technology being developed in order to reduce labor costs and stimulate an increased production, higher yield, new products and reduced unit cost. However, only a small amount of the production in Norway, both in aquaculture and in greenhouses, is produced with intensive technology like hydroponics or aquaponics.



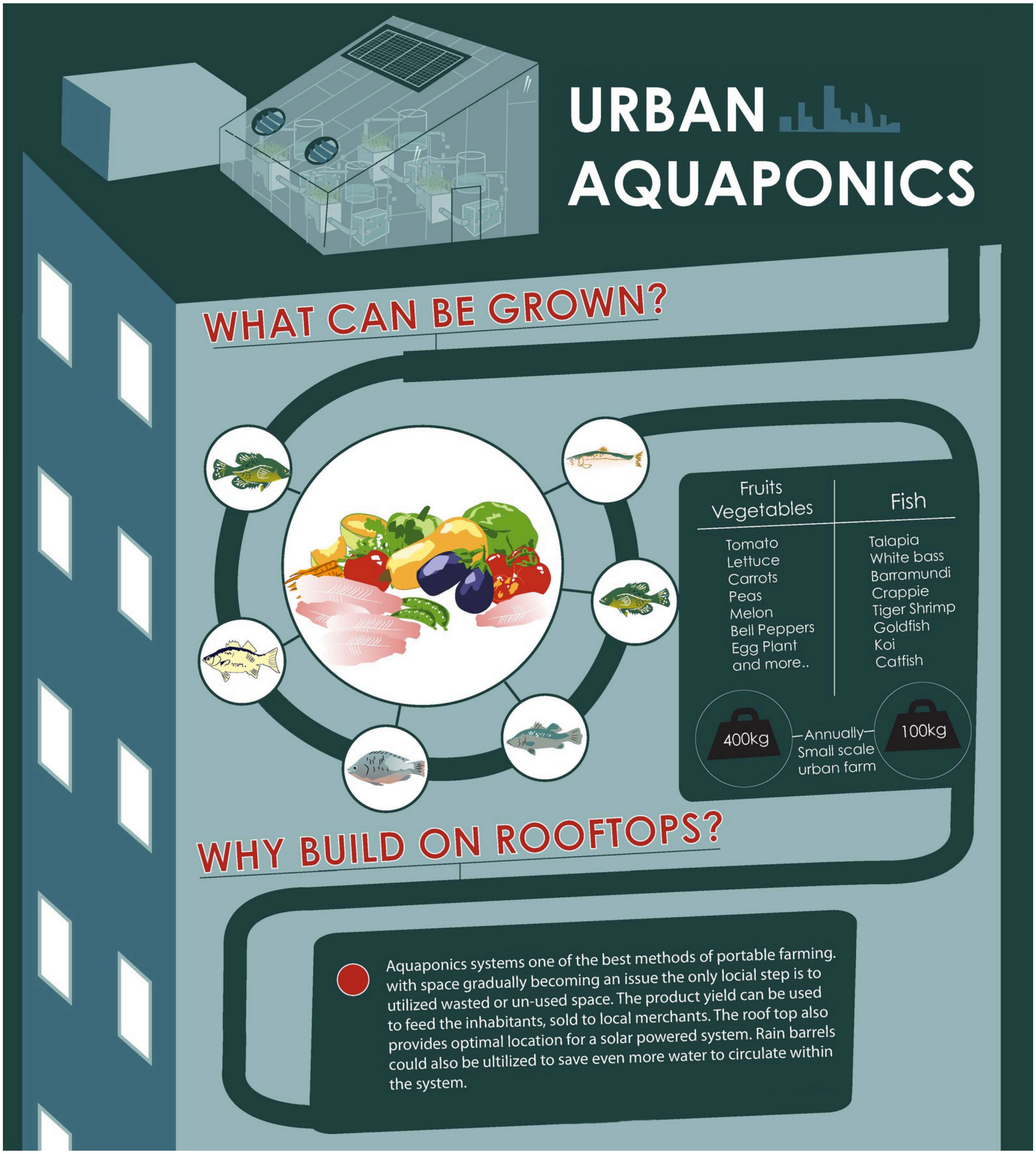

The Norwegian aquaculture industry is mainly producing in seawater using rather large sea cages. One exception from this is the production of juveniles of salmon and rainbow trout (smolts). This production is carried out in fresh water, and an increasing number of the facilities are now looking into the possibilities for intensive production such as aquaponics due to lack of water resources, sea born pests and available suitable locations. In addition, the entire industry is getting more restrictions in terms of effluent loading, and new methods for collecting, keeping, conserving and utilizing effluent water. Norway therefore has good opportunities to contribute to an integrated production of plants and fish based on optimized energy consumption in an expanded production base, especially through the development of integrated production systems based on hydro and bio energy and land based aquaponics. Integrated aquaculture has not been explored and developed into large commercial units in Europe and aquaponics could become the breakthrough needed for European aquaculture.




| | |
|---|---|
| Q evapo | = evaporation from plants |
| Q in total | = intake water |
| Q in fish | = water to fishtanks |
| Q out fish | = water out from fish tanks |
| Q in plants | = water to greenhouse |
| Q out plants | = water out from greenhouse |
| Q bypass | = adjustable water bypassing greenhouse |
| Q return | = return of cleaning water from drumfilter |

## 7. Conclusion

Nevara therefore proposes to work with aquaculture and horticulture entities to provide a more cost effective means of production, produce new and added food chain value through the production of agricultural and aquaculture produce, establish aquaponics open-source educational venues for students, interested farmers and the general public, network and coordinate with other research projects and agencies in Norway and attract and implement new technologies as they develop.


URBAN
AQUAPONICS
WHAT CAN BE GROWN?
Fruits Vegetables
Fish
Tomato
Lettuce
Carrots
Peas
Melon
Bell Peppers
Egg Plant
and more..
Talapia
White bass
Barramundi
Crappie
Tiger Shrimp
Goldfish
Koi
Catfish
400kg
Annually
Small scale
urban farm
100kg
WHY BUILD ON ROOFTOPS?
Aquaponics systems one of the best methods of portable farming. with space gradually becoming an issue the only locial step is to utilized wasted or un-used space. The product yield can be used to feed the inhabitants, sold to local merchants. The roof top also provides optimal location for a solar powered system. Rain barrels could also be ultilized to save even more water to circulate within the system.