Organic Urban Agriculture in Dry Agro-ecosystems

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Urban agriculture is the practice of cultivating processing and distributing food in or around village, town, or city. Urban agriculture can also involve animal husbandry, aquaculture, and agro forestry, urban beekeeping, and horticulture. Urban and peri-urban agriculture (UPA) provides food products from different types of crops (grains, root crops, vegetables, mushrooms, and fruits), animals (poultry, rabbits, goats, sheep, cattle, pigs, guinea pigs, fish, etc.) as well as non-food products (e.g. aromatic and medicinal herbs, ornamental plants, tree products). UPA includes trees managed for producing fruit and fuel wood, as well as tree systems integrated and managed with crops (agro forestry) and small-scale aquaculture. UPA can make an important contribution to household food security, especially in times of crisis or food shortages. It is an important component of FAO's Special Programme for Food Security (SPFS). In addition, it is a spontaneous response to the increased demand for food linked to urban population expansion, which is more pronounced in developing countries as a result of high birth rates and immigration from rural areas [www.fao.org].

In other hand, Iran is located in an arid and semi-arid region. Due to the unfavourable distribution of surface water, to fulfil water demands and fluctuation of yearly seasonal

streams, Iranian people have tried to provide a better condition for utilization of water. Climatologically, of the total area, 13% has a cold and mountainous weather, 14% has a moderate climate and the remaining 73% is covered by dry weather. Water balance of the country according to 30 years of data shows that the average annual precipitation is 250 mm. 30% of the precipitation occurs in the form of snow and the rest in the form of rain [Khorasanizadeh. SH, 2001]. Due to most Iran's territory is located at arid and semi-arid and shortage of fresh water in recent year in order to development of urban agriculture is better to use of endemic Iranian plants and plants which are resistant to drought. We recommend rosa, pistachio and saffron. Farmers can harvest and make income two times a year from rose and saffron during the first three years, and three times a year from all components including pistachio, after the fourth year of cultivation. The ridge-furrow plantation design of this system also regulates the three species water requirements.

Rosa

Rosa damascenamill L., known as Gole Mohammadi in Iran is one of the most important species of Rosaceae family flowers. R. *damascenamil* is an ornamental plant and beside perfuming effect several pharmacological properties including anti-HIV, antibacterial, antioxidant, antitussive, hypnotic, antidiabetic, and relaxant effect on tracheal chains have been reported for this plant. Its origins were traditionally thought to have been in the Middle East (Iran).

Pistachio

The pistachio a member of the cashew family, is a small tree originally from Central Asia and the Middle East .Pistachio trees can be found in regions of Iran, Syria, Lebanon, Turkey, Greece, India. Pistachio is a desert plant, and is highly tolerant of saline soil. It has been reported to grow well when irrigated with water having 3,000–4,000 ppm of soluble salts. Pistachio trees are fairly hardy in the right conditions, and can survive temperatures ranging between −10 °C (14 °F) in winter and 48 °C (118 °F) in summer. They need a sunny position and well-drained soil. Pistachio trees do poorly in conditions of high humidity, and are susceptible to root rot in winter if they get too much water and the soil is not sufficiently free-draining. Long, hot summers are required for proper ripening of the fruit. [Wikipedia, the free encyclopedia].

Saffron

Saffron (*Crocus sativus* L.) belongs to the large family of Iridacee and to the genus *Crocus*, which includes about 80 species distributed primarily in the Mediterranean and south-western Asia. Saffron is an autumnal flowering geophite whose dried stigmas, well known for their aromatic and colouring power, have been used since immemorial time as a spice in human nutrition, for medicinal purposes and as a dye. Saffron, recognised as the most expensive spice in the world. It's known only as a cultivated species; it propagates solely vegetative by means of corms, underground stems acting as storage and reproduction structures, and does not produce seeds or exist as a spontaneous plant. Saffron is a very attractive crop for organic and low input agriculture considering that no irrigation, chemical fertilisation or chemical weed treatments are applied in some environments in which it is cultivated. The main management techniques such as corms planting flower harvest, stigma separation and corm lifting are carried out manually and this contributes to its high price. Saffron is an autumnal flowering geophyte characterized by a long summer rest in which the plant survives periods of drought by means of corms. Its biological cycle starts with its above-ground vegetative growth at the first autumn rains with the emission of leaves and flowers almost immediately and ends with the production of replacement corms in about 220 days [Lombardo et al. 2008].

Saffron is native to the Mediterranean environment, characterised by cool to cold winters, with autumn-winter spring rainfall, and warm dry summers with very little rainfall. It can withstand substantial frosts (-10°C), and can tolerate occasional snow in the winter. Saffron flowers in the autumn, about 40 days after planting, and continues for 30-40 days, depending on the weather. The flowering period of each plant may last up to 15 days. Rain 10-15 days before flower picking results in excellent flowering and high production, whereas under drought conditions, small flowers with small stigmas can be expected. A cold period or a late planting can retard flowering. [Douglas. M., 2003]

Organic taste from green waste

Saffron has been cultivated at the baskets (during the warm season we can put the baskets at the suitable place) which are contained vermincompost obtained from home waste and mixed it with dried lawn residues which make its weight light and more porosity. In other words, the vermicompost was obtained from home wet wastes including fruit, vegetables and egg shell residues.

Plate 1. Different stages of preparing vermicompost from home wastes and use of them in cultivation saffron in yard of home

In this study we also designed and made a simple device which can convert household waste and natural materials in to a useful solution (liquid fertilizer) at home with minimal cost. This product is mixed of enriched vermiwash with extract of aloe vera and nettle. In Aqua-bio fertilizer unit production, enriched water with mineral and microorganisms' that can stabilize nitrogen from aquarium and bio-tank was passed through of column of worm. In separate unit, fresh nettle and aloe vera was mixed with microorganisms in the tank without any oxygen.

In fact enriched vermiwash is a mixed biofertilizer contains vermiwashed enriched with aquarium and bioreactor (nitrosomonass, nitrobacter and nitrospira) water which increase amount of macronutrients particularly nitrogen and herbal (aloe vera and nettle) extracted by mountain microorganisms in deferent proportion with concern to crop situation. All materials and methods used in the enriched vermiwash production unit are permitted in organic agriculture rules enacted by International Federation of Organic Agriculture Movement

(IFOAM). Each farmer can buy one of these unit productions and provide the fresh biofertilizers which need cheap by available materials.

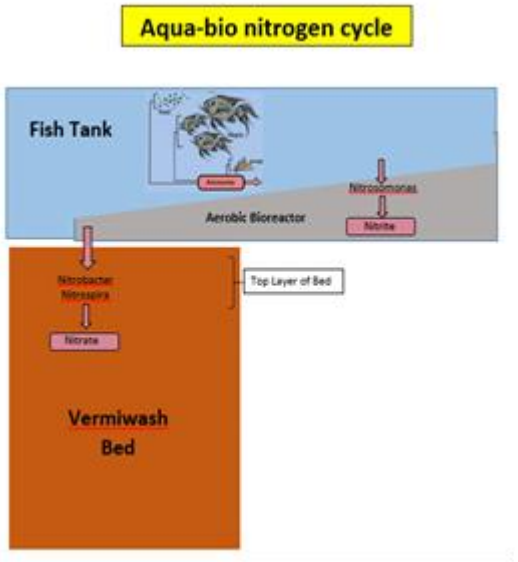

Fig. 1. Aqua-Bio Nitrogen Cycle

The product of this unit is a biofertilizer use as bio-regulator and bio-tonic contains vitamins, hormones, effective microorganisms and extracted herbs. It improves soil microorganisms and quality of organic and conventional crops and fruits without any side chemical effects.

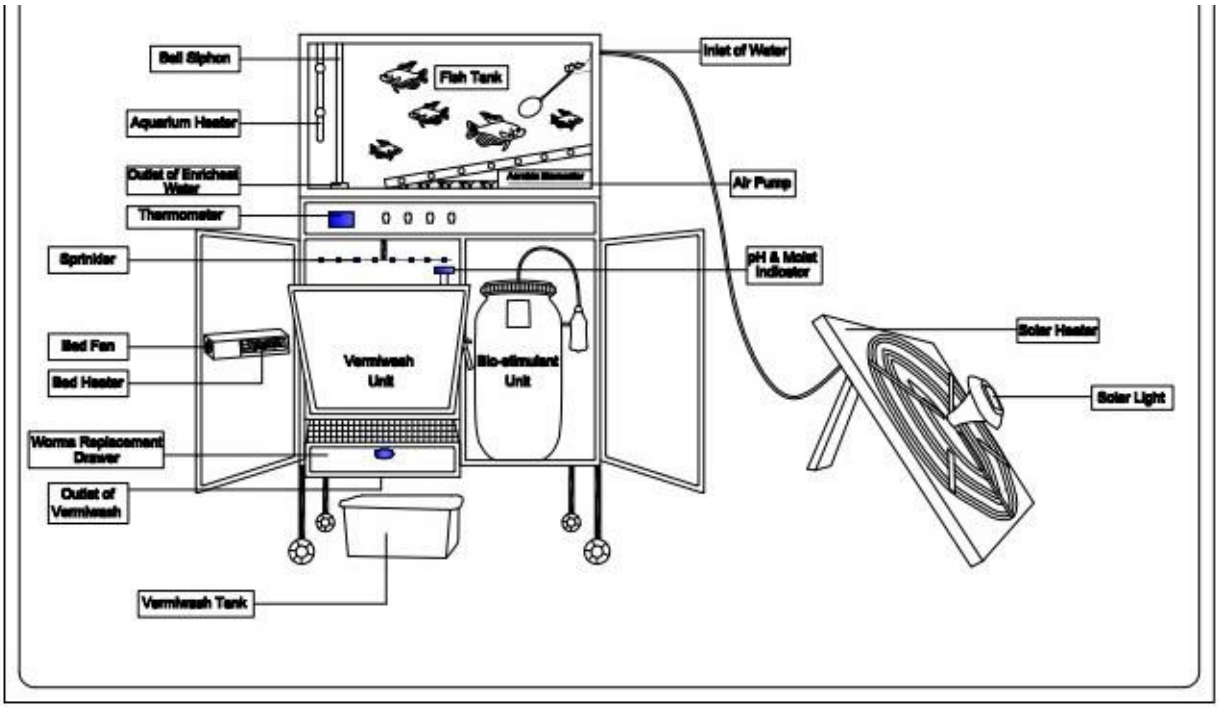

Fig. 2. Diagram of aqua-bio fertilizer production unit (Inventors: M.R. Davari, Marjan Varmazyar and Pedram Nabiri)

As a result at the same climate and with minimum use of water and with garbage, natural material with less cost we are able to produce heath product at our home.

Plate 2. Aqua-bio fertilizer production unit

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