ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2019; 5(5): 290-292
www.allresearchjournal.com
Received: 22-03-2019
Accepted: 24-04-2019

Dr. Dipti Kumari
Ph.D. Department of Zoology, L.N.M.U. Darbhanga, Bihar, India

Correspondence
Dr. Dipti Kumari
Ph.D. Department of Zoology, L.N.M.U. Darbhanga, Bihar, India

Limited water resources and its future approaches for fisheries in Mithilanchal

Dr. Dipti Kumari

Abstract
Aquaculture one of the world's major and fastest growing food Production sector, is already facing competition for water and aquatic habitat in many areas. Hence, future methods for aquaculture need to be more advanced and smarter, which will be able to support culture's sustainability as well as high culture efficiency in terms of space utilization, water resources and food. A shift from "experience driven to knowledge-driven approaches" is therefore essential to get aquaculture growth right and better optimize aquaculture production to contribute to a sustainable food future.
The general hydrological equation inflow=outflow +change in storage, can be used to make accurate estimates of water use by ponds for inland aquaculture projects The primary inflows are precipitation, runoff and regulated water additions. The main outflows are evaporation, seepage, overflow after storms and intentional discharge water conservation measures such as maintaining storage capacity in ponds equal to the normal, maximum daily precipitation, reduction in seepage beneath dams, fish harvest without draining ponds, and water re-use are discussed. Even with the implantation of water conservation measures pond aqua culture is a water-intensive endeavour which consumes more water per unit area then irrigated agriculture. However, the value of aquacultural production per unit of water used greatly exceeds that of gated agriculture. Reduction in effluent volume is the most effective water saving means, and not only reduces water consumption but also reduces the pollution potential of pond aquaculture.

Keywords: limited water resources, multiple skill for multipurposes use of water, sustainability, fisheries, future assessment

Introduction
Water security is the adaptive capacity to safeguard the sustainable availability of access to, and safe use of an adequate reliable and resilient quantity of water for health, livelihood, ecosystems and productive economies, and also the key to food security.
The amount of water wasted globally in growing crops that never reach the consumer, so, the actions to prevent, reduce, rense and recycle food losses and waste should not be a forgotten priority to reduce pressure on natural resources including water. In aquaculture systems most water is depleted indirectly and efforts to improve water productivity, cutting across all agricultural subsectors, from crop to livestock production, aquaculture and agro-forestry, based on introduction of best practices in soil and water management, need to be focused to address issues of water scarcity.
Today's question is future aquaculture may be not without water but with minimal water, may be with fishes that are able to live out of water for extended periods of time valued food -fishes like snakeheads (*Channa* spp.) can survive out of water for up to four days and climbing perch (*Anabas testudineus*) can live out of water for six days and also can tolerate extremely unfavourable water conditions. So, we can think to promoting these fishes for "future water stressed aquaculture".
Planned use of treated and partially treated waste water for aquaculture can provide benefits to the ecosystems through reducing freshwater abstractions, recycling and reusing nutrients allowing fisheries and other aquatic ecosystem to thrive by minimizing water pollution and recharging depleted aquifers use of these wastewater from domestic and great potential in aquaculture purposes.

Methods and Recommendation

Being water intensive endeavour aquaculture is already facing opposition in freshwater environments from parties who perceive the industry to contribute to the demand for freshwater or to pollute fresh waters. However, it requires only 50 litres of water to raise one kg of fish in a Recirculating Aquaculture system (RAS). So, if done properly, aquaculture has enormous potential to play a vital role to address water scarcity as an industry that can produce a healthy form of protein with minimal water usage. There is wide range of technologies and management strategies that can help in improving land, water and overall environmental efficiency of aquaculture.

Improving feed conversion ratio (FCR): Fish have lower &more efficient feed conversion ratio (FCRs) than other terrestrial animals. On an average fish or crustaceans require less than 2kg of grain concentrate for each kg produced, making them the most efficiently producing animals in terms of FCR, as well as in terms of feed associated water use. Managing certain environmental aspects such as optimizing oxygen levels in rearing systems could significantly improve FCR in more tropical production systems for species including carps, catfishes tilapia etc. Development of species wish system specific feeding standards, improving feed management and farm monitoring systems, would improve FCRS and 'water footprint' in aquaculture through technological developments and better feed and on-site management.

Intensification of pond aquaculture: Intensifying operations can help produce more fish per unit of water. Water use by conventional land-based extensive ponds is about 45,000 liters kilogram of fish produced, where as intensive pond aquaculture with additional inputs uses only 2700 liters of water per kilogram of fish produced. It is also found that, in intensive pond culture with supplementary feeding and aeration and achieved more production and the water productivity was almost double compare to semi-intensive pond culture so, the future focus should be on using intensive and super intensive culture practices for aquaculture production.

Diversification of aquaculture systems: As competition for land as well as freshwater is increasing, aquaculture operations need to intensify production in a manner that reduces the land requirements for fish culture and also reduces water use per kilogram of production. Use of alternative water source for aquaculture and multiple use of water can also contribute to improve overall fresh water productivity.

Recirculating aquaculture system (RAS) is an intensive aquaculture production system, that treats and reuses waste water and thus substantially reduces both water and land use water use per kilogram of fish produced in fresh water RAS can be as little as 50 litres. RAS can be designed around indoor or outdoor culture systems, and owing to their low water requirements it can be operated on land that is unsuitable for other types of food production, such as in deserts.

Aquaponic system: Aquaponic production system join intensive recirculating aquaculture with Hydroponics to use nutrient waste from aquaculture as an input to plant growth. In aquaponic water serves dual purpose; bosting fish and growing crops, generating two products at once and generally water use per unit produced is only about 10% compare to conventional fish farming and plant production systems. As high as 98% water recycling have been reported in some aquaponics systems, translating to water use of about 320 litres per kilogram of fish produced.

Integration of intensive aquaculture with agriculture (IIAA): There is also double use of water first for fish farming and next for irrigation. This is an efficient way of using water in situations where the water supply is limited especially when intensive fish production systems are used, the application of the aquaculture system's effluent for irrigation purposes contributes to savings on fertilizers and other costs and overall productivity and value generated per unit of water is improved. Integration of intensive production systems such as cages or raceways with irrigation systems is particularly water efficient. Intensive fish production techniques involving concrete basins, aeration and high fish densities. The effluent resulting from partial water replacement of aquaculture unit was used to irrigate crops and fruit trees.

Aquaculture using alternative sources of water: Use of treated and partially treated wastewater from domestic, industry and flood area, for purposes aquaculture has great potential.

Aquaculture down the food chain: Farming of fishes lower on the food chain reduces animal protein requirement in feed and thus reduces pressure on land and water resources used directly by aquaculture. "Farming down the food web" has an environmentally positive meaning while the opposite "Farming up the food web" is believed by some to be a more environmentally unsustainable.

Conclusion

Water is essential and basic need for all living beings. The population growth, urbanization, industrialization, rising living standards and changing consumption patterns causes water scarcity and there should be future focus on use and reuse of limited water resources and get nutrition through aquaculture by means of treated and partially treated water.

References

1. FAO. The state of the world's land water resources for food and agriculture (SOLAW)-Managing systems at risk Food and Agriculture Organization of the United Nations.
2. FAO. FAO water Reports 33-scoping agriculture wetland interactions-Towards a sustainable multiple-response strategy. Food and Agriculture Organization of the United Nations 2008.
3. Gleick PH. Basic water Requirements for Human Activities: Meeting Basic Needs. Water International 1996.
4. Nace RL. Are we running out of water U.S Geological Survey Circular 1967;7:536.
5. UNEP. Freshwater use by sector at the beginning of the 2000s-vital water graphics the United Nations environment programme 2008.
6. FAO. Expert Meeting on How to feed the world in 2050 food and Agriculture Organization of the united Nations 2009.

7. OECD Environmental outlook to 2050 the consequences of inaction. The Organisation for Economic Co-operation and Development 2008.
8. Falkenmark M. The massive water scarcity threatening Africa-why isn't it being addressed Ambio 1989;18(2):111-118.
9. Falkenmark M, Widstrand C. Population and water resources; a delicate balance. Population Bulletin 1992;47:1-36.
10. CWC. Water and related statistics. Water Resource Information system Directorate, water Planning and Project wing Central water commission New Delhi 2010.