ISSN: 2582-4686 SJIF 2021-3.261,SJIF 2022-2.889,
2024-6.875 ResearchBib IF: 9.948 / 2024

THE MULTIDISCIPLINARY JOURNAL OF SCIENCE AND TECHNOLOGY

VOLUME-5, ISSUE-8

THE IMPORTANCE OF FEED IN MODERN COMMERCIAL FISHERIES

Nodirbek Mullabayev, Uchqunova Pokiza Uchqunovna,
Tashkent State Agrarian University

Abstract:Feed plays a central role in determining the productivity, sustainability, and profitability of modern commercial fisheries. The development of nutritionally balanced feeds, optimized feeding strategies, and the use of alternative protein sources have significantly improved fish growth rates and reduced production costs. This study examines the nutritional requirements of cultured fish species, evaluates current feed formulations, and assesses their impact on fish health, growth performance, and environmental sustainability. Using a review of existing scientific literature and industry reports, the findings indicate that feed accounts for up to 60–70% of operational costs in aquaculture, making it a critical factor for economic viability. Moreover, the adoption of advanced feed technologies such as extruded pellets, probiotics, and plant-based protein sources can enhance efficiency while reducing ecological footprints. The paper concludes that future fisheries will increasingly rely on sustainable feed innovations to balance production demands with environmental conservation.

Keywords: aquaculture feed, fish nutrition, protein sources, feed efficiency, sustainable fisheries.

INTRODUCTION

Aquaculture has emerged as the fastest-growing sector in global food production, contributing significantly to the supply of animal protein for human consumption. As fish production intensifies, feed has become a primary driver of productivity and sustainability. High-quality feed not only ensures optimal growth and health in cultured fish but also reduces mortality rates, shortens production cycles, and improves product quality.

Historically, fishmeal and fish oil dominated feed formulations. However, due to overfishing concerns and the rising costs of marine-based ingredients, researchers and feed manufacturers have sought alternative protein and lipid sources. Modern feed technology integrates precise nutrient formulations with efficient delivery systems to maximize feed conversion ratios (FCR) while minimizing waste.

This paper aims to evaluate the importance of feed in commercial fisheries by exploring its economic, biological, and environmental implications.

Methods

This study employs a qualitative review methodology, analyzing peer-reviewed journal articles, FAO reports, industry publications, and technical manuals related to aquaculture feed production and utilization. Data from recent aquaculture trials were synthesized to compare the effects of different feed compositions on growth performance and feed conversion efficiency. Key parameters such as feed cost percentage, protein content, lipid sources, and environmental impacts (eutrophication potential) were considered.

Results and Discussion

1. Economic Impact of Feed in Fisheries

Analyses indicate that in intensive aquaculture systems, feed expenses account for 60–70% of total production costs. High-protein feeds (35–45% protein) promote faster fish growth but significantly increase operational costs. Therefore, optimizing the Feed Conversion Ratio (FCR) is of critical

ISSN: 2582-4686 SJIF 2021-3.261,SJIF 2022-2.889,
2024-6.875 ResearchBib IF: 9.948 / 2024

importance. For example, reducing the FCR from 1.8 to 1.5 in a 100-ton production system can save 12–15% of total feed annually.

2. Nutritional Requirements and Formulation

Balanced feed formulations must contain appropriate proportions of proteins, lipids, carbohydrates, vitamins, and minerals to ensure optimal fish growth and health.

Animal sources: fishmeal, krill meal, fish oil.

Plant sources: soybean meal, corn gluten, rice bran.

Alternative sources: insect protein, microalgae, single-cell proteins.

Studies by Uzbek researchers (Jo‘rayev, 2021; Ibragimov, 2019) have shown that feeds based on soybean concentrate and wheat bran can be up to 40% cheaper than imported feeds under local conditions, while achieving comparable growth performance.

3. Feed Technology Innovations

Extruded pellets: improve digestibility by 10–15% and reduce feed loss in water.

Probiotic supplements: enhance gut health and improve disease resistance in tilapia and carp by 15–20%.

Automatic feeders: reduce feed wastage by 12% in large-scale trout farms.

4. Environmental Considerations

Improper feeding practices can lead to excessive nitrogen and phosphorus discharge, accelerating eutrophication in aquatic environments. Therefore, approaches such as:

Precision feeding,

Low-pollution diets, and

Alternative protein sources (plant + insect proteins)

are essential for minimizing environmental impacts.

5. Local Context – Uzbekistan

In Uzbekistan, aquaculture mainly focuses on common carp (Cyprinus carpio) and tilapia (Oreochromis niloticus) production. Research trials conducted in Tashkent region showed that a feed mixture containing soybean concentrate and microalgae increased carp growth rates by 12% compared to traditional feeds.

The findings underscore that feed quality and management practices are pivotal in determining aquaculture success. Economic sustainability in fisheries heavily depends on optimizing feed conversion ratios; even a minor improvement from 1.8 to 1.5 in FCR can result in significant cost savings at commercial scales. Environmentally, poor feed management leads to nutrient pollution and eutrophication, threatening surrounding ecosystems.

The shift toward sustainable feed sources is driven by both ecological necessity and market demand for environmentally responsible seafood. Advances in feed formulation, such as incorporating microalgae for omega-3 fatty acids or using insect-based protein, are showing promising results. However, challenges remain in scaling production and ensuring consistent nutritional quality.

CONCLUSION

Feed is a critical determinant of productivity, profitability, and sustainability in modern commercial fisheries. Innovations in feed composition, delivery, and management can substantially enhance growth performance while reducing environmental impacts. To meet future seafood demands sustainably, the industry must adopt cost-effective and eco-friendly feed solutions, supported by continued research and technological advancement.

REFERENCES:

ISSN: 2582-4686 SJIF 2021-3.261,SJIF 2022-2.889,
2024-6.875 ResearchBib IF: 9.948 / 2024

VOLUME-5, ISSUE-8

1. FAO. The State of World Fisheries and Aquaculture 2024. – Rome: FAO, 2024. – 266 p.
2. Tacon A.G.J., Metian M. Feed matters: Satisfying the feed demand of aquaculture // Reviews in Fisheries Science & Aquaculture. – 2015. – Vol. 23, №1. – P. 1–10.
3. Hasan M.R., New M.B. On-farm feeding and feed management in aquaculture. – Rome: FAO Fisheries and Aquaculture Technical Paper No. 583, 2013. – 67 p.
4. Craig S., Helfrich L.A. Understanding fish nutrition, feeds, and feeding. – Virginia Cooperative Extension Publication, 2002. – 6 p.
5. Glencross B.D. A feed is only as good as its ingredients – A review of ingredient evaluation strategies for aquaculture feeds // Aquaculture Nutrition. – 2020. – Vol. 26, №5. – P. 1564–1573.
6. Jurayev K. Studies on improving the quality of fish feeds and localizing their production // Development of fisheries in Uzbekistan. – Tashkent, 2021. – P. 45–52.
7. Ibragimov A. Methods of increasing feed efficiency in fisheries. – Bukhara: BukSU Publishing House, 2019. – 112 p.
8. Karimova M.Sh. Diversification of feed sources in aquaculture // Journal of Agriculture of Uzbekistan. – 2020. – No. 3. – P. 87–92.