THE RESEARCH NEXUS
Volume 2, Issue 1, 2025

EVALUATING VALUE FOR MONEY (VFM) IN FISH FARMING: A CASE STUDY OF MANSEHRA DISTRICT, KHYBER PAKHTUNKHWA, PAKISTAN

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Keywords
VFM Analysis, Fisheries production and WRAP intervention, NbS

Article History
Received: 01 January, 2025
Accepted: 21 February, 2025
Published: 31 March, 2025

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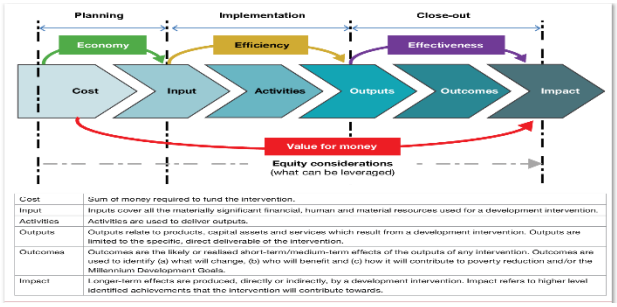
Abstract
This study evaluates the Value for Money (VfM) of fish farming in District Mansehra, Khyber Pakhtunkhwa, under WWF's "Water Resource Accountability in Pakistan" (WRAP) project, supported by the UK Foreign, Commonwealth & Development Office (FCDO). WRAP aims to scale up Nature-based Solutions (NbS) for improved water resource management and climate resilience. The findings demonstrate that fish farming offers strong financial efficiency and effectiveness, with cost-effective interventions and sustainable practices contributing to water security and community resilience. The study highlights the fisheries sector as a vital sub-sector of agriculture in Pakistan, offering significant economic and food security benefits. It also underscores the growth potential of Khyber Pakhtunkhwa's diverse aquatic ecosystem. This research provides a framework for policymakers and development partners to implement integrated VfM assessment systems, enabling evidence-based investment decisions and enhancing the impact of climate-related interventions.

INTRODUCTION

Value For Money (VFM) is a systematic approach that considers economy, efficiency and effectiveness and ensures benefits are distributed fairly and equitably during the project implementation. VFM can be described as followed:

- Economy — minimizing the cost of inputs.
- Efficiency — achieving the best rate of input conversion into outputs.
- Effectiveness— achieving the best possible result for the level of investment.
- Equity — the extent to which aid programs reach the poorest and most marginalized by following "leaving no one behind". Higher impact does not mean an intervention reaches the maximum number of people at the lowest cost. The important point is whether we reach those most in need of support and whether the support is provided in the most economical, efficient, and effective way.
- Cost effectiveness — achieving the ultimate impact of a program overarching objective or the impact that was intended to achieve.



Cost	Sum of money required to fund the intervention.
Input	Inputs cover all the materially significant financial, human and material resources used for a development intervention.
Activities	Activities are used to deliver outputs.
Outputs	Outputs relate to products, capital assets and services which result from a development intervention. Outputs are limited to the specific, direct deliverable of the intervention.
Outcomes	Outcomes are the likely or realised short-term/medium-term effects of the outputs of any intervention. Outcomes are used to identify (a) what will change, (b) who will benefit and (c) how it will contribute to poverty reduction and/or the Millennium Development Goals.
Impact	Longer-term effects are produced, directly or indirectly, by a development intervention. Impact refers to higher level identified achievements that the intervention will contribute towards.

This research study was carried out under the Water Resource Accountability in Pakistan (WRAP) project,

focusing on the establishment of fish farms in District Mansehra. The Project WRAP worth £10.00 Million implementing by WWF Pakistan with the support of the Foreign Commonwealth Development Office (FCDO) of UK Government aims to Scaleup n for Improving Integrated Water Resources Management and Enhanced Water Security in Pakistan. The project proposes to undertake demonstrations of Nature based Solutions (NbS), including Ecosystem based Adaptation (EbA) interventions that will improve water security and governance, build the resilience of communities to climate change at the target sites in Gilgit Baltistan (GB) and Khyber Pakhtunkhwa (KP), and enable the Government and relevant stakeholders to implement and replicate NbS in Pakistan for building climate change resilience (FCDO, 2023).

It is a well-known fact that the fish production is the major resources to contribute food, secure livelihood, generate employment and support national economy. Fish is rich in nutrition and can alleviate nutritional deficiencies by providing calcium, vitamin A, iron and zinc and help to cure various diseases.

Fishery industry plays an important role in the domestic economy. According to the data from the State Bank of Pakistan, the fisheries sector's total exports in Pakistan were worth 9015 million Pakistani Rupees (PKR) in the fiscal year 2023-24. In the same period, the total exports of Pakistan were worth 665,622 million PKR. Therefore, the fisheries sector's total exports represent about 1.35% of Pakistan's total exports (GoKPK, 2024).

Thailand, China, Vietnam, UAE, Republic of Korea, Malaysia, Kuwait, Japan, Saudi Arabia, & Indonesia are the 10 major importers of Pakistani fish. Over the years, Pakistan's fish imports have almost declined from 22 million in 2017 to 9 million in 2024.

Pakistan's total fisheries production in 2023 was 3,334,268 metric tons. This included both marine and inland capture fisheries as well as aquaculture production. The marine capture fisheries production was 605,960 metric tons, while the inland capture fisheries production was 932,625 metric tons. The aquaculture production was 1,795,683 metric tons. While Khyber Pakhtunkhwa produces inland fisheries and produced 1,132 metric tons in 2019 which is only 0.03% of total production (FAO, 2022).

Fishing industry plays a pivotal role in the national economy. Pakistan is blessed with rich fishery potential with a coastline of about 1,120 km. Fishery provides employment to about 300,000 fishermen directly. Another 400,000 people are employed in associated industries providing jobs for about 1 percent of the country's labour force. The fisheries sector provides jobs for about 1 percent of the country's labor force. Moreover, it adds only 0.3 per cent to overall Gross Domestic Product (GDP), and 1.3 percent to agricultural GDP (GoP, 2023).

Khyber Pakhtunkhwa in Pakistan is a hub for trout farming and other popular fish species like mahseer, catfish, carp, tilapia, and snakehead. The government lends support to fish farmers in the form of technical assistance and subsidies on equipment and fish feed (Recharge Pakistan, 2023). The Fisheries Department generate considerable revenue through fishing licenses, fish seed and fingerling sales, and technical services to farmers. In 2023- 24, the total Fish production in KP was recorded at 3,503.97 metric tons, worth 1,328 million Pakistani rupees (GoKPK, 2024). Back in 2019, Khyber Pakhtunkhwa produced 1,132 metric tons which was only 0.03% of total production. While the sector holds significant potential with its abundant water resources and diverse ecosystem, it faces numerous challenges such as overfishing, pollution, illegal fishing practices, and poor infrastructure, that require attention to ensure the sustainability of the fisheries sector and improve the livelihoods of local communities through aquaculture, value addition, export markets, research & development, training and education (Amir and Habib, 2015).

Table 1. Production of Fish in Khyber Pakhtunkhwa

District	Production (Metric Tonn)	Value (Million PKR)
Mansehra	238.11	117.73
Rest of KP	3,503.97	1,328.99
% age Share	6.79	8.85

Source: Fisheries Department Govt. of Khyber Pakhtunkhwa, 2023-24.

The design, planning and implementation of fish pond is quite critical for the success and sustainability of community-based fish farm. Under WRAP, the pond was designed for a site in Sum valley, Mansehra, aligning with the principles of NbS and VFM. These principles are important in maximizing benefits (fish production) while minimizing input costs (material, implementation, operation and maintenance).

The site for the pond was selected after conducting soil tests to ensure suitability of the land for establishment of the pond. The site selected has a notable flux of tourists visiting an existing pond, a watch hut, and a canteen. The soil, primarily loam, was determined to be ideal for fish farming. The intervention not only aimed to boost the income of the landowner but also planned to sell fish at subsidized rates to the patients of Dadar Mental Hospital and the local community of Sum Valley, enhancing its social impact and also to ensure sustainable supply of fish which is a prime source of protein (Azeem, 2017).

The main fish pond was constructed alongside a nursery pond, both lined to ensure durability. The total area of the main pond is 21,058 square feet (3.86 kanal), while the nursery pond covers 4,096 square feet. For the pond lining, a mixture of clay mortar and cow dung was used, along with grouted stone pitching. The edges and slopes within the ponds were formed using excavated material to ensure stability.

Water is sourced from the nearby Siran River for which Inlet and outlet drainage channels were constructed to regulate water flow. The water from the fish pond will be drained in the adjacent agricultural land, since it contains organic matter so it will serve as a fertilizer further providing nutrition to the crops (Sheikh, and Adnan, 2010). Recommended fish seeds for the Mansehra Districts from the fisheries department were procured and introduced and daily feed, consisting of wheat and rice husk, is regularly added for fish growth.

The fish are becoming well-established, and it is anticipated that the project will full fill the expected outcomes that is positive impact on the local economy, promotion of fish farming as a sustainable livelihood and encouraging ecotourism.

Fisheries is an important sector of District Mansehra and provides employment to the local people and generates income for the farmers. The findings of this research will provide the guidelines for higher revenue thorough increased fish production per unit area and also provides base for further research on a number of aspects relating to Fish production and trade. Keeping in view the importance of fisheries this research study is designed with the objectives to estimate the VFM Analysis of Fish Production and to determine the contribution of important variables in Fish Production for policy implementation.

2 Methodological Work

VFM is a systematic approach which considers economy, efficiency and effectiveness and ensures benefits are distributed fairly and equitably during the project implementation. The analysis of the WRAP project contained a structured and comprehensive framework for evaluating the project's VFM. This multifaceted analysis encompasses several critical dimensions, including data collection, total costs, total benefits, cost-benefit analysis, and a nuanced assessment of Economy, Efficiency, Effectiveness, and Equity aspects of the VFM (DFID, 2015; Jakupec, and Kelly, 2016). The quantitative model uses a discount rate of 8.66 percent for the base case scenario and 15 percent and 5percent respectively for high and low discount rate scenarios in sensitivity analysis. The analysis assumes upfront sustainability. The undiscounted costs are spread over a 15 years horizon with a linear flow in benefits stream.

2.1 Data collection and modelling for VFM analysis

Data collection on the implementation of the fish pond for the VFM Analysis was meticulously carried out from WRAP, Site Office Mansehra. The supporting data was documented as the Means of Verification (MOVs) which was followed by secondary data.

i. Expected Fish production, essential for assessing the impact of fish farm were derived from a wide array of sources and published reports from relevant agencies within Pakistan. This encompassed district-level information on production. These sources included Agricultural statistics and Fisheries Department of Khyber Pakhtunkhwa.

ii. Estimations of indirect beneficiaries were calculated by analyzing the contribution of community, and influx of tourists.

iii. Economic data, including discount rates, GDP deflator, and inflation rates, crucial for financial assessments, were meticulously extracted from the World Bank database, guaranteeing the use of up-to-date and credible information.

iv. The discount rate applied in the calculation of financial indicators is of paramount importance, as it directly influences the present value of future cash flows. As a key evaluative metric, a social discount rate is calculated for the projects which must be managed for their socio-economic returns – much like WRAP. Such discount figures include space for opportunity cost of investing the money elsewhere, market-based factors of showing real – world benefits of managing cost of capital and estimating the return on savings, and simplicity of application. These calculations are also mirrored in our sensitivity testing, where both the sensitivity tests are based on the measure of average of lending and deposit rates. In this analysis, a discount rate of 8.66 % was utilized. This rate was derived from authoritative sources, specifically the World Bank and the State Bank of Pakistan's macroeconomic data repository.

v. Currency exchange rates, a fundamental element in financial calculations, were sourced from the official website of the State Bank of Pakistan, ensuring accurate conversions between Pakistani Rupees, Great Britain Pounds, and US Dollars. This comprehensive data collection process ensured that the WRAP project's analysis and assessments were grounded in accurate, up-to-date, and reliable information, forming a robust foundation for subsequent analyses and decision- making processes.

vi. The Excel based model was used for VFM Analysis. This model is a step-by-step and structured framework for conducting a VFM assessment. This toolkit promotes a wholesome approach and take advantage of the full spectrum of VFM criteria, Theory of Change (ToC) and evaluation methods.

2.2 Fish Farm lifespan decision for quantitative analysis

The Fish Farm lifecycle decisions are anchored in a meticulous analysis of each intervention, emphasizing evidence-based support and a nuanced understanding of their anticipated lifespans, see Table 2 below. Fish Farm suggest an expected lifespan of 15 years with routine maintenance and technology updates.

Table 2. Fish Farm lifecycle

S #	Intervention	Characteristics	Expected Lifespan
1	Fish Pond	A fish pond is a controlled pond, small artificial lake or retention basin that is stocked with fish and is used in aquaculture for fish farming, for recreational fishing, or for ornamental purposes.	10-20 years with regular monitoring and reinforcement

3. Cost and Benefit Analysis

3.1 Total Costs

In the VFM analysis, a comprehensive assessment of the total costs associated with the project was conducted to gain insights into the financial aspects of the initiative. The total costs encompassed various components, including program costs and implementation costs, which were meticulously analyzed and classified (Joseph *et al.*, 2020). Table 3 shows total expenditure on establishment of community-based fish farm developed under WRAP project having about 4 kanal in year 2023-24.

Table 3: Total Cost of Fish Farm Per Four Kanal

S.#	Description	Unit	Qty	Per Unit Cost	Amount (PKR)	Community Share (PKR)	WRAP-Share (PKR)
A	LABOUR						
1	Skilled	Person	94	2500	235000		235000
2	Unskilled	Person	787	1500	1180500	295500	885000
	Total (A)				**1415500**	**295500**	**1120000**

B	**MATERIAL**						
	b-Local Material						
1	Excavation through Excavator along with travel	Hr	48	10000	480000		480000
2	Tools & implement cost (Tamping Rods)	Set	1	3000	3000		3000
3	Stones 2"-4"	Cft	750	80	60000	60000	
4	Stones 6"-12"	Cft	2900	80	232000		232000
5	Cement inc; Carraige	Bags	215	2030	436450		436450
6	Sand inc; Carraige	Cft	900	172	154800		154800
7	Aggregate inc; Carraige	Cft	1700	202	343400		343400
8	Clay	Cft	8600	117	1006200		1006200
9	Cow Dung	Cft	1000	124	124000	124000	
10	Chopped Wheat Straw	Kg	1300	43	55900	55900	
12	Formwork on rental basis	Sft	2231	75	167325		167325
13	PVC Pipe 10" Dia (Strainer upto 2 ft in each 7' pipe)	Nos	3	6860	20580		20580
14	PVC Pipe 8" Dia, 6ft in length	Nos	3	4050	12150		12150
	PVC Pipe 8" Dia, 20ft in length	Nos	3	13500	40500		40500
15	PVC Elbow 90 deg, 8" dia	Nos	3	4910	14730		14730
16	GI Steel clamps U-Shaped, With nut & bolts Complete in all respect as directed by engineer	Nos	6	5524	33144		33144
17	Precast RCC mainhole Cover 2ft Dia to be casted specially in 1:1:2	Nos	2	4500	9000		9000
18	Wooden Plank 3'x2'x2"	Nos	1	6000	6000		6000
19	Fish Seed-Grass carp/Silver carp/Big Headcarp/Rohu	Nos	6000	13.5	81000		81000
20	Fertilizer for fish	L.S	1	70000	70000		70000
21	Fish Feed	L.S	1	600000	600000		600000
22	Quick Lime	Kg	400	30	12000		12000
23	Carraiges	L.S	1	50000	50000		50000
	Total (B)				**4012179**	**239900**	**3772279**
	Grand Total (A+B)				**5427679**	**535400**	**4892279**
	Percentage					**10**	**90**

Source: Author's own calculations.

3.2 Implementation Costs

Implementation costs, on the other hand, encompassed a broader spectrum of expenditures incurred during the activity execution. This category encompassed expenses such as project operational costs, and other material cost, see Table 4. To ensure a comprehensive evaluation, the methodology considered the anticipated project duration of 15 years lifespan of most of the Green Infrastructure interventions. Accordingly, Operation and Management (O&M) costs were estimated at 4% of the intervention's total cost per year, distributed over the project's expected lifespan.

Table 4: Implementation Cost

S#	Implementation Cost	Cost PKR Million

1	Operational Cost	0.130
2	Other cost	0.100
	Total Cost	0.230

Source: Author's own calculations.

3.3 Total Benefit calculations

The assessment of total benefits within the VFM analysis involved a multi- faceted approach that aimed to provide a comprehensive understanding of the expected gains from the project. The primary data source for benefit calculation was derived from that total production received during the year. In addition, the Siran Vally scenery is important for tourists who are interested in natural and pristine areas, with many choosing particular locations simply because of their attractive settings. Also, this small commercial fish farms may create larger multipliers of all types. Aligning these benefits with the type of costs achieved form the basis of the VFM analysis framework, see the table 5 which shows the backend calculations done to achieve such benefit.

3.4 Financial Metrics and Sensitivity Analysis

The core objective of the Cost Benefit Analysis (CBA) was to gauge the project's financial attractiveness and economic feasibility. To achieve this, a range of financial metrics were computed, including the Net Present Value (NPV), Economic Internal Rate of Return (EIRR), and Benefit Cost Ratio (BCR). These metrics provide valuable insights into the project's profitability, its ability to generate returns, and its cost-effectiveness. One pivotal aspect of the analysis was the incorporation of sensitivity testing. Given the inherent uncertainty in economic and financial environments, conducting sensitivity analyses becomes imperative. It serves as a risk mitigation strategy to counteract potential inconsistencies arising from varying socio-economic factors. Two sensitivity tests were performed—one under high discount rates and the other under low discount rates. These tests aimed to evaluate how changes in discount rates might impact the project's financial outcomes.

3.5 Cost Benefit Analysis (CBA)

For instance, considering the case of the Fish Farm—the initial program cost intervention—it demonstrates a substantial NPV of over PKR 9.515 million and a swift Economic Internal Rate of Return (EIRR) of 21.7%. These figures signify the monetary value of benefits accrued, which surpass the costs of intervention. The NPV shows the amount of returns/benefits from making the intervention, which makes the project's viability extremely potent, and the EIRR shows the rate at which those returns are expected to be received in terms of cash flow, being positive are also a sign of high yield from the investment made. To further gauge the project's robustness, sensitivity testing was carried out. Under the low sensitivity test scenario, the NPV significantly increased to PKR 5.133 million accompanied by a favorable EIRR of 15%. Conversely, the high sensitivity test showed an NPV of PKR 10.661 million and an EIRR of 21.8%. These sensitivity tests reveal the project's resilience in response to potential variations in political and economic conditions. They demonstrate that Fish farm have capacity to deliver maximum benefits while also weathering adverse scenarios. Remarkably, the positive outlook extends across all interventions individually, underscoring the exceptional viability of the project's components. Notably, the nature of intervention here shows great promise and needs to be studied for its specific mitigating qualities to be analyzed for best practices as shown in the Table 7. Performance summary of Fish Farm intervention showing NPV, IRR and BCR and the sensitivity testing of 'high' and 'low' discount rate testing. High percentage used is 15%, while low sensitivity ratio is considered to be 5% (Source: The World Bank, 2023).

Table7: Performance Summary

Performance Summary				
		Base case	Low	High
Net Present Value	PKR (M)	9.515	5.133	10.661

BCR		2.733	1.938	2.935
Internal Rate of Return	%	21.7%	15%	21.8%

Note: Performance summary of Fish Farm intervention showing NPV, IRR and BCR and the sensitivity testing of 'high' and 'low' discount rate testing.

Table 8: Cost & Benefit Calculation- at Base year Discount Rate (8.66%)

Sub-activity	Intervention	Total	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
1.1	Establishment of Communit Based Fish Farm	5.550	5.420	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Costs	Total Undiscounted	5.550	5.420	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
	Total Discounted (Present Value	5.491	5.420	0.008	0.007	0.007	0.006	0.006	0.005	0.005	0.004	0.004	0.004	0.003	0.003	0.003	0.003	0.002
Benefits	Fish output	12.000		1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200
	Tourist Attraction	3.580		0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358
	Replication of activity (Multiplyin Effect)	2.700		-	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
	Total Undiscounted	27.570		1.558	1.858	1.858	1.858	1.858	1.858	1.858	1.858	1.858	1.858	1.858	1.858	1.858	1.858	1.858
	Total Discounted (Present Value	15.006		1.434	1.574	1.448	1.333	1.227	1.129	1.039	0.956	0.880	0.810	0.745	0.686	0.631	0.581	0.535

Table 9: Cost & Benefit Calculation- at High Discount Rate (15%)

			-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Sub-activity	Intervention	Total	2,023	2,024	2,025	2,026	2,027	2,028	2,029	2,03	2,031	2,032	2,033	2,034	2,035	2,036	2,037	2,038
1.1	Establishment of Community Base Fish Farm	5.550	5.420	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Costs	Total Undiscounted	5.550	5.420	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Total Discounted (Present Value)		5.471	5.420	0.008	0.007	0.006	0.005	0.004	0.004	0.003	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.001
Benefits	Fish output Tourist Attraction	12.000		1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200
Replication of activity (Multiplying Effect)		3.580		0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358
Total Undiscounted		2.700		-	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
Total Discounted (Present Value)		27.570		1.558	1.858	1.858	1.858	1.858	1.858	1.858	1.858	1.858	1.858	1.858	1.858	1.858	1.858	1.858
		10.604		1.355	1.405	1.222	1.062	0.924	0.803	0.698	0.607	0.528	0.459	0.399	0.347	0.302	0.263	0.228
Intervention		Total	2,023	2,024	2,025	2,026	2,027	2,028	2,029	2,030	2,031	2,032	2,033	2,034	2,035			

Table 10: Cost & Benefit Calculation- at Low Discount Rate (5%)

Sub-activity																			
1.1	Establishment of Community Based Fish	5.550	5.420	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Costs	Total Undiscounted	5.550	5.420	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Total Discounted (Present Value)		5.510	5.420	0.008	0.008	0.007	0.007	0.007	0.006	0.006	0.006	0.006	0.005	0.005	0.005	0.005	0.004	0.004	
Benefits	Fish output	12.000		1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	

Tourist Attraction	3.580		0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358	0.358
Replication of activity (Multiplying Effect)	2.700			0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
Total Undiscounted	15.580		1.558	1.558	1.558	1.558	1.558	1.558	1.558	1.558	1.558	1.558	1.558	1.558	1.558	1.558	1.558	1.558
Total Discounted (Present Value)	16.172		1.484	1.413	1.346	1.282	1.221	1.163	1.107	1.055	1.004	0.956	0.911	0.868	0.826	0.787	0.749	

3.6 The 4Es of the VFM framework

A VFM framework serves as a strategic approach aimed at optimizing the productivity of every facet of a program, meticulously evaluating its performance across four essential dimensions (King, and OPM, 2018): Economy, Efficiency, Effectiveness, and Equity (4E's). This comprehensive assessment ensures that resources are allocated judiciously, activities are executed efficiently, intended outcomes are achieved effectively, inclusivity is promoted equitably. We also add an impact measurement which will allows for a holistic statement of the VFM analysis.

3.6.1 Economy Analysis in VFM

The Economy section of the VFM analysis serves as a vital component in the assessment of the WRAP project's VFM analysis. This section is dedicated to the aggregation, structural classification, and thorough assessment of the project's total costs, with a critical evaluation of its economic value in comparison to two different closely related benchmark projects namely: "Development of Cold-Water Fisheries in Khyber Pakhtunkhwa (Provincial Share-PM's Agriculture Emergency Program)". Additionally, this analysis extends to encompass the number of beneficiaries, facilitating a per capita evaluation of the entire WRAP project. When considering the number of beneficiaries, the per capita cost equates to a mere PKR 0.012 million. A comparative analysis with both the benchmark projects reveals compelling insights. The Development of Cold- Water Fisheries in Khyber Pakhtunkhwa, despite its similarity in terms of interventions, incurred a significantly higher cost of PKR 0.014 million per beneficiaries as shown in table 11.

Table 11: Economy Final Summary

ECONOMY			
Are inputs of appropriate quality bought at a minimised price?			
Metric	**Projected Value- M PKR**	**Discounted Cost M PKR**	**Adjusted cost per beneficiary -M PKR**
Establishment of Fish Pond at Siran	5.430	4.960	0.012
Benchmark Value	Development of Cold- Water Fisheries in Khyber Pakhtunkhwa (Provincial Share-PM's Agriculture Emergency Program).		0.014
Difference			**0.002**
Benchmark: Development of Cold-Water Fisheries in Khyber Pakhtunkhwa (Provincial Share-PM's Agriculture Emergency Program).			

3.6.2 Efficiency Analysis in VFM

The Efficiency section of the VFM analysis serves as a crucial dimension for evaluating the effectiveness of the WRAP project. This section primarily focuses on assessing the benefit-cost ratio (BCR) of the entire project. The fundamental unit of analysis revolves around the conversion of inputs into outputs, emphasizing the cost- efficiency and value generation embedded in the project's interventions. Imbued in the notion of understanding per input benefits received, Efficiency in VFM work in a modular function for each intervention and provides a systematic analysis of the whole project. To calculate the efficiency ratio for each intervention type, we consolidate the discounted costs and benefits per intervention. This calculation provides a quantitative measure of the benefits achieved per unit of cost incurred, offering unique insights into resource

allocation efficiency. Furthermore, this analysis extends to encompass a list of beneficiaries, an integral component of the finalized summary within the VFM analysis framework. This comprehensive assessment not only quantifies per project efficiency but also incorporates per capita perspectives, enhancing the depth of the project's evaluation.

Table 12: Individual Efficiency of the WRAP Project Interventions

S.No	Output	Discounted Cost (PKR M)	Discounted Benefit (PKR M)	B/C (Discounted Benefit/Discounted Cost)
1	Fish Pond	5.069	15.006	2.960

In above tables, the establishment of Fish Farm an impressive BCR of 2.960, signifying that every PKR 1 invested as a cost generated PKR 2.960 in benefits.

3.6.3 Effectiveness Analysis in VFM

The Effectiveness section of the VFM analysis is a critical dimension for evaluating the WRAP project. This section assesses the project's ability to achieve predefined outcomes in relation to the costs incurred to attain these outcomes. Leveraging the logical framework of WWF, the analysis entails a comprehensive cost-benefit assessment of these outcomes. It is imperative to emphasize that the finalization of outcomes hinges on the project's capacity to measure the benefits accrued and align them with the intended outcomes. Akin to that limitation, and the pre-established Outcome indicators taken from Logical framework by WWF, interventions were treated as exclusive outcomes.

It is imperative to emphasize that the finalization of outcomes hinges on the project's capacity to measure the benefits accrued and align them with the intended outcomes. Akin to that limitation, and the pre-established outcome indicators taken from Logical framework of WWF, interventions were treated as exclusive outcomes. The first breakdown of the analysis reveals the attainment rate for the outcome titled NbS introduced for integrated water resource management, river basin management, and watershed management protection', which stands at an impressive 3.89, see Table 13.

Table 13: Effectiveness Calculation.

S.No.	Outcome	Total Discounted Costs (PKR M)	Total Discounted Benefits (PKR M)	Effectiveness Ratio
1	Outcome 1: Nature-based Solutions (NbS) introduced for integrated water resource management, river basin management, and watershed management protection	5.550	15.006	2.704

3.6.4 Equity Analysis in VFM

The Equity section of the VFM analysis plays a pivotal role in ensuring inclusivity and fairness within the Water Resource Accountability Pakistan Project (WRAP). This section is dedicated to upholding the principles of non-discrimination and equality, ensuring that the project extends its benefits to all vulnerable populations without any form of bias. Through a comprehensive assessment, the Equity analysis strives to promote equitable access to project interventions, see Table 14 below:

Table 14: Equity index

CRITERION WEIGHTING	Indicator Projected Value	Indicator Goal	Indicator Percentage Achieved	Weighted Equity Metric
Working Women and Homemakers	200	403	50%	50%

Disable (Source: National Disability Survey Module PSLM (Pakistan Social and Living Standard Measurement 2023)	8	403	2%	0%
Total equity metric	50%			

According to the disaggregated intervention data, the project achieved 50% of its planned milestone, which aimed to reach 200 women and 8 Disable population.

4. LIMITATIONS, CONCLUSION AND RECOMMENDATIONS

The VFM Analysis has been carried out for fish production in District Mansehra. Results revealed that the VFM analysis of through this intervention-WRAP demonstrates its commendable financial efficiency and effectiveness in achieving the defined objectives. With economic expenditure, cost-effective interventions, and inclusive practices, Fish Pond construction contribute to a sustainable water resource management and climate resilience. Recommendations emphasize setting specified targets for various populace categories (e.g. children, widows, etc). By addressing the unique needs of different demographic groups, the WRAP project can further enhance its impact and contribute to a more equitable and inclusive water resource management framework. In conclusion, fishing is an important sub-sector of agriculture that contributes significantly to Pakistan's economy and food security. The fisheries sector in Khyber Pakhtunkhwa (KPK), Pakistan has significant potential for development and investment with a diverse aquatic ecosystem that supports a range of fish species. Expanding the production of new fish species, developing aquaculture, value addition, accessing export markets, and investing in research and education are some of the opportunities that could improve the sector's sustainability and generate more income for local communities. However, the sector also faces several challenges, including overfishing, illegal fishing practices, pollution, and climate change, lack of regulation and enforcement, and poor infrastructure. Addressing these challenges will require a concerted effort from government, private sector, and civil society actors to ensure the long-term sustainability of the sector while benefiting local communities. That being the case, this research study is expected to guide the researchers, policy makers, development sector aid agencies and implementing partners in putting in-place a system for developing an on-going and integrated mechanism for assessing the key VFM metrics which helps to generate the evidence base for it and adds to the overall efficiency, cost-effectiveness, and impact of the organization.

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