

1.4 The role of the National Aquaculture Development Authority in the culture-based fisheries project

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Introduction

In Sri Lanka, development of CBF as an inland fisheries enhancement strategy dates back to the early 1980s, when the fisheries authorities of the country placed a high priority on this initiative. Accordingly, the Inland Fisheries Division of the Ministry of Fisheries has taken steps to develop CBF in small village reservoirs, most of which go dry for a few months during the dry season (commonly known as non-perennial or seasonal reservoirs), as they are proven to be biologically productive (Thayaparan 1982). However, due to lack of scientific inputs for selecting village reservoirs suitable for CBF development based on biological, economic and sociological aspects relevant to this development initiative as well as due to an abrupt policy decision to discontinue state patronage for inland fisheries development during 1989 to 1994, CBF development in inland reservoirs did not sustain.

Under an R&D project funded by ACIAR, scientific strategies for CBF development in small village reservoirs were developed (De Silva et al. 2006; De Silva 2011). Subsequently, ADB supported the project, 'Aquatic Resource Development and Quality Improvement Project (ARDQIP)' to develop inland fisheries and aquaculture sectors of Sri Lanka (ADB 2011), under which the scientific findings of the ACIAR-funded research activity on CBF development were successfully implemented. Most importantly, there are legal provisions to

develop CBF in inland water bodies of the country under the Agrarian Development Act of 2000. Co-management strategies for CBF in small village reservoirs were introduced and as a result, there is evidence about the sustainability of the fishery (Kularatne and Amarasinghe 2025). There was also a scientific initiative to develop CBF in perennial reservoirs under the AEDQIP, which produced encouraging results (Chandrasoma et al. 2015; Chandrasoma and Pushpalatha, 2018).

In Sri Lanka, NAQDA has been mandated for the development of CBF and aquaculture. Until adoption of inland fisheries enhancement in reservoirs in 1980s (Jayasekara 1989), the inland fishery was dominated by exotic cichlid species, *O. mossambicus* and *O. niloticus*. NAQDA has therefore taken steps to diversify species in the landings through regular stocking of fingerlings of Chinese and Indian major carps and common carp. As CBF development in inland reservoirs is a communal activity where there is a necessity to mobilise fishers' societies to adopt the strategy, as part of ARDQIP, an innovative approach for the purpose was initiated. This involved establishment of an active partnership of fisher communities through development of entrepreneurship (business) plans in individual reservoirs.

***M. rosenbergii* in culture-based fisheries**

A giant FWP, *M. rosenbergii*, hatchery was established in the North Western Province

of the country (Pambala) having an annual post larval production capacity of GFP of 13.5 million. Also, under the Technical Cooperation Programme (TCP) of FAO, another FWP hatchery was established in 2008 in the Southern Province (Kahandamodara). This hatchery has the capacity to produce 17 million FWP post larvae annually. The third FWP prawn hatchery with the annual post larval production capacity of 25 million was also established in 2017 in the Eastern Province (Kallarawa). As part of diversification of species in CBF, NAQDA initiated stocking of FWP post larvae in selected reservoirs.

Due to the lucrative export market for FWP, and availability in the landings of reservoirs, several private sector entrepreneurs, most notably Divron Bioventures Pvt Ltd and Southern Coast Pvt Ltd, were attracted as buyers of the commodity at the landing sites of reservoirs. In fact, the Market Development Facility (MDF) of the Australian High Commission in Colombo provided financial support to Divron Bioventures to establish a FWP prawn hatchery. Accordingly, this entrepreneur commenced stocking FWP post larvae in selected reservoirs in the Northern Province, with a mutual agreement facilitated by NAQDA to purchase the prawns for export market. At the ACIAR scoping study undertaken in Sri Lanka in July 2016 to support R&D in the agricultural sector, it was recognised that CBF of FWP in reservoirs of the country as a priority area, which ultimately led to the development of a SRA (FIS/2017/002). This SRA facilitated formation of a research team to develop FWP production and also to identify the knowledge and capacity gaps, and the R&D necessary for the potential of CBF of FWP to be realised. Based on the findings of the SRA, the present research project was implemented.

NAQDA's role in the ACIAR project

In the ACIAR project for the development of CBF in reservoirs with special reference to FWP, NAQDA's main role was to provide field-level support to the research teams in the universities involved in the project. As the major producer of post larvae of FWP in its 3 hatcheries, it was imperative that NAQDA provided stocking material to support the research plans. Accordingly, NAQDA stocked 48 reservoirs in 10 administrative districts according to the stocking plans prepared by the research teams (Table 1.4.1). In this juncture, NAQDA worked closely with Divron Bioventures Pvt Ltd and sought their support to stock some reservoirs.

Apart from facilitation of stocking of post larvae of FWP, NAQDA's aquaculture extension staff is involved in facilitating CBF development through social mobilisation. For this purpose, 48 community workshops were conducted to discuss advantages and disadvantages of adopting CBF of FWP in reservoirs. Through SWOT (strengths, weaknesses, opportunities and threats) analyses, fisher communities were convinced that adoption of CBF would be an effective means to generate supplementary income for the people.

The aquaculture extension officers of NAQDA also assisted the research team to develop good rapport with the fisher communities. This has considerably facilitated gleaning CBF stocking and production data from the logbook records of the fisheries societies. Also, members of the fisheries societies helped the research teams to collect water and sediment samples for studying water and sediment quality and biological productivity in reservoirs.

Table 1.4.1.1: Targeted and realised stocking of post larvae (PL) of FWP in selected reservoirs in 2021–2024

District	Reservoir	Extent (ha)	Targeted PL to be stocked				Realised number of PL stocked				Responsibility			
			2021	2022	2023	2024	2021	2022	2023	2024	2021	2022	2023	2024
Kilinochchi	Akkarayankulam	809	809,000	809,000	809,000	809,000	0	809,000	930,939	548,396	NAQDA	NAQDA	Divron	Divron
	Iranamadu	2,927	2,927,000	2,927,000	2,927,000	1,463,500	0	2,681,329	600,441	797,930	NAQDA	NAQDA	Divron	Divron
Mullative	Puthumurippu	151	302,000	302,000	302,000	302,000	0	302,000	392,828	468,132	NAQDA	NAQDA	Divron	Divron
	Muthiyankaddu	1,255	1,255,000	1,255,000	1,255,000	1,255,000	0	950,000	1,209,392	800,000	NAQDA	NAQDA	Divron	Divron
	Vavunikulam	1,275	2,550,000	2,550,000	2,550,000	900,000	0	1,993,168	217,366	413,890	NAQDA	NAQDA	Divron	Divron
Vavuniya	Bogaswewa	472	472,000	472,000	472,000	472,000	0	672,000	103,279	0	NAQDA	NAQDA	Divron	Divron
	Mamaduwa	243	486,000	486,000	486,000	486,000	0	490,000	0	150,000	NAQDA	NAQDA	Divron	Divron
	Kalmadu	102	153,000	153,000	153,000	153,000	0	153,000	155,070	150,000	NAQDA	NAQDA	Divron	Divron
	Morawewa	769	1,153,500	1,153,500	1,153,500	1,153,500	0	1,153,500	0	0	NAQDA	NAQDA	Divron	Divron
Trincomalee	Wendrasanwewa	410	615,000	615,000	615,000	615,000	0	615,000	616,504	949,127	NAQDA	NAQDA	NAQDA	Divron
	Mahadiulwewa	543	1,086,000	1,086,000	1,086,000	1,086,000	0	1,086,000	1,031,858	300,000	NAQDA	NAQDA	NAQDA	NAQDA
	Wanela	113	113,000	113,000	113,000	113,000	0	113,000	0	0	NAQDA	NAQDA	NAQDA	NAQDA
	Unnichchai	1,392	2,088,000	2,088,000	2,088,000	2,088,000	0	1811482	2,188,000	0	NAQDA	NAQDA	NAQDA	NAQDA
Batticaloa	Kaddumurivu	320	480,000	480,000	480,000	480,000	0	480,000	516,329	0	NAQDA	NAQDA	NAQDA	NAQDA
	Wadamunai	220	220,000	220,000	220,000	220,000	0	220,000	229,313	0	NAQDA	NAQDA	NAQDA	NAQDA
	Nachchaduwa	1,781	2,671,500	2,671,500	2,671,500	1,335,750	0	251,400	1,046,562	560,114	NAQDA	NAQDA	Divron	Divron
Anuradapura	Manankattiya	310	620,000	620,000	620,000	620,000	0	567,821	996,852	408,261	NAQDA	NAQDA	Divron	Divron
	Ranawa	60	120,000	120,000	120,000	120,000	0	0	0	117,640	NAQDA	NAQDA	Divron	Divron
	Hurululuwewa	1,619	3,238,000	3,238,000	3,238,000	3,238,000	0	0	0	0	NAQDA	NAQDA	NAQDA	NAQDA
	Maha wilaachchiya	971	1,456,500	1,456,500	1,456,500	1,456,500	0	0	1,456,500	0	NAQDA	NAQDA	NAQDA	NAQDA
	Mahakanadarawa	1,457	1,457,000	1,457,000	1,457,000	1,457,000	0	690,000	1,457,000	0	NAQDA	NAQDA	NAQDA	NAQDA
	Aluthdiulwewa	239	239,000	239,000	239,000	239,000	0	147,951	239,000	0	NAQDA	NAQDA	NAQDA	NAQDA
	Kiulekada	205	307,500	307,500	307,500	307,500	0	162,355	331,271	0	NAQDA	NAQDA	NAQDA	NAQDA

District	Reservoir	Extent (ha)	Targeted PL to be stocked				Realised number of PL stocked				Responsibility			
			2021	2022	2023	2024	2021	2022	2023	2024	2021	2022	2023	2024
Kurunegala	Maeliya	120	240,000	240,000	240,000	240,000	0	0	0	0	NAQDA	NAQDA	Divron	Divron
	Maha-Siyambalangamuwa	210	210,000	210,000	210,000	210,000	0	234,824	208,208	221,844	NAQDA	NAQDA	Divron	Divron
	Hakwatunaoya	389	778,000	778,000	778,000	778,000	0	800,000	791,943	300,000	NAQDA	NAQDA	NAQDA	NAQDA
	Usgala-Siyambalangamuwa	769	769,000	769,000	769,000	769,000	0	292,870	780,482	0	NAQDA	NAQDA	NAQDA	NAQDA
	Kimbulwanaoya	238	357,000	357,000	357,000	357,000	0	0	0	0	NAQDA	NAQDA	NAQDA	NAQDA
	Karavitararaya	256	256,000	256,000	256,000	256,000	0	267,616	265,910	0	NAQDA	NAQDA	NAQDA	NAQDA
Puttalam	Mahauswewa	212	318,000	318,000	318,000	318,000	0	100,000	324,305	0	NAQDA	NAQDA	NAQDA	NAQDA
	Kottukachchiya	70	70,000	70,000	70,000	70,000	0	0	70,628	0	NAQDA	NAQDA	NAQDA	NAQDA
	Maha Andarawewa	85	170,000	170,000	170,000	170,000	0	0	140,000	0	NAQDA	NAQDA	NAQDA	NAQDA
	Pahariya	74	111,000	111,000	111,000	111,000	0	150,000	0	0	NAQDA	NAQDA	NAQDA	NAQDA
	Devalahandiya	257	514,000	514,000	514,000	514,000	0	516,422	215,041	0	NAQDA	NAQDA	Divron	Divron
	Tabbowa	607	1,214,000	1,214,000	1,214,000	1,214,000	0	563,705	0	0	NAQDA	NAQDA	Divron	Divron
	Vijayakutupotha	243	364,500	364,500	364,500	364,500	0	666,667	217,674	0	NAQDA	NAQDA	Divron	Divron
	Ridiyagama	871	1,742,000	1,742,000	1,742,000	1,742,000	0	1,542,126	1,394,497	500,000	NAQDA	NAQDA	NAQDA	NAQDA
	Weerawila Wewa	567	567,000	567,000	567,000	567,000	0	567,000	531,693	150,000	NAQDA	NAQDA	NAQDA	NAQDA
	Maha Aluthgam ara	70	140,000	140,000	140,000	140,000	0	140,000	144,991	0	NAQDA	NAQDA	NAQDA	NAQDA
Monaragala	Maha wewa	80	80,000	80,000	80,000	80,000	0	110,000	83,955	53,000	NAQDA	NAQDA	NAQDA	NAQDA
	Mahagaliwewa	140	210,000	210,000	210,000	210,000	0	214,509	276,043	0	NAQDA	NAQDA	NAQDA	NAQDA
	Hamdegamuwa	210	420,000	420,000	420,000	420,000	0	420,000	425,261	0	NAQDA	NAQDA	NAQDA	NAQDA
	Handapanagala	226	452,000	452,000	452,000	452,000	0	452,000	458,081	0	NAQDA	NAQDA	NAQDA	NAQDA
	Kiribban wewa	375	375,000	375,000	375,000	375,000	0	375,000	389,076	0	NAQDA	NAQDA	NAQDA	NAQDA
	Muthukandiya	560	840,000	840,000	840,000	840,000	0	840,000	861,874	0	NAQDA	NAQDA	NAQDA	NAQDA
	Urusita wewa	262	393,000	393,000	393,000	393,000	0	393,000	422,192	0	NAQDA	NAQDA	NAQDA	NAQDA
	Balaharuwa wewa	150	150,000	150,000	150,000	150,000	0	150,000	150,000	0	NAQDA	NAQDA	NAQDA	NAQDA
	Gestupana wewa	80	120,000	120,000	120,000	120,000	0	120,000	120,000	0	NAQDA	NAQDA	NAQDA	NAQDA

Future strategies and conclusion

The comprehensive R&D project 'Improved productivity, efficiency and sustainability of the culture-based fishery for finfish and giant freshwater prawn in Sri Lankan reservoirs' (FIS/2018/157) has produced tangible outcomes for sustainable development of CBF of finfish and FWP. As revealed from the value chain analysis of FWP, there is an obvious imbalance of financial benefits to the market chain players in various nodes. Of the market-chain players, the producers (such as fishers), collectors and middlemen are least benefited financially while the major monetary beneficiary is the exporter. According to the existing strategy, members of the fisheries societies should bear the cost of stocking of FWP post larvae, which appears to be an additional financial burden to them. This benefit-sharing method therefore needs to be revisited, and accordingly, the exporters are needed to be motivated to bear the cost of stocking for sustainability of FWP CBF.

Also, there is additional research need in future for screening broodstock for better genetic quality. As the broodstock of *M. rosenbergii* is wild caught, their genetic variability may not be uniform, especially due to the fact that this species tends to interbreed with other *Macrobrachium* species in the wild.

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