Role of gender focused intervention in haor floodplain:

Case of women-led cage aquaculture from Kishoreganj haor areas

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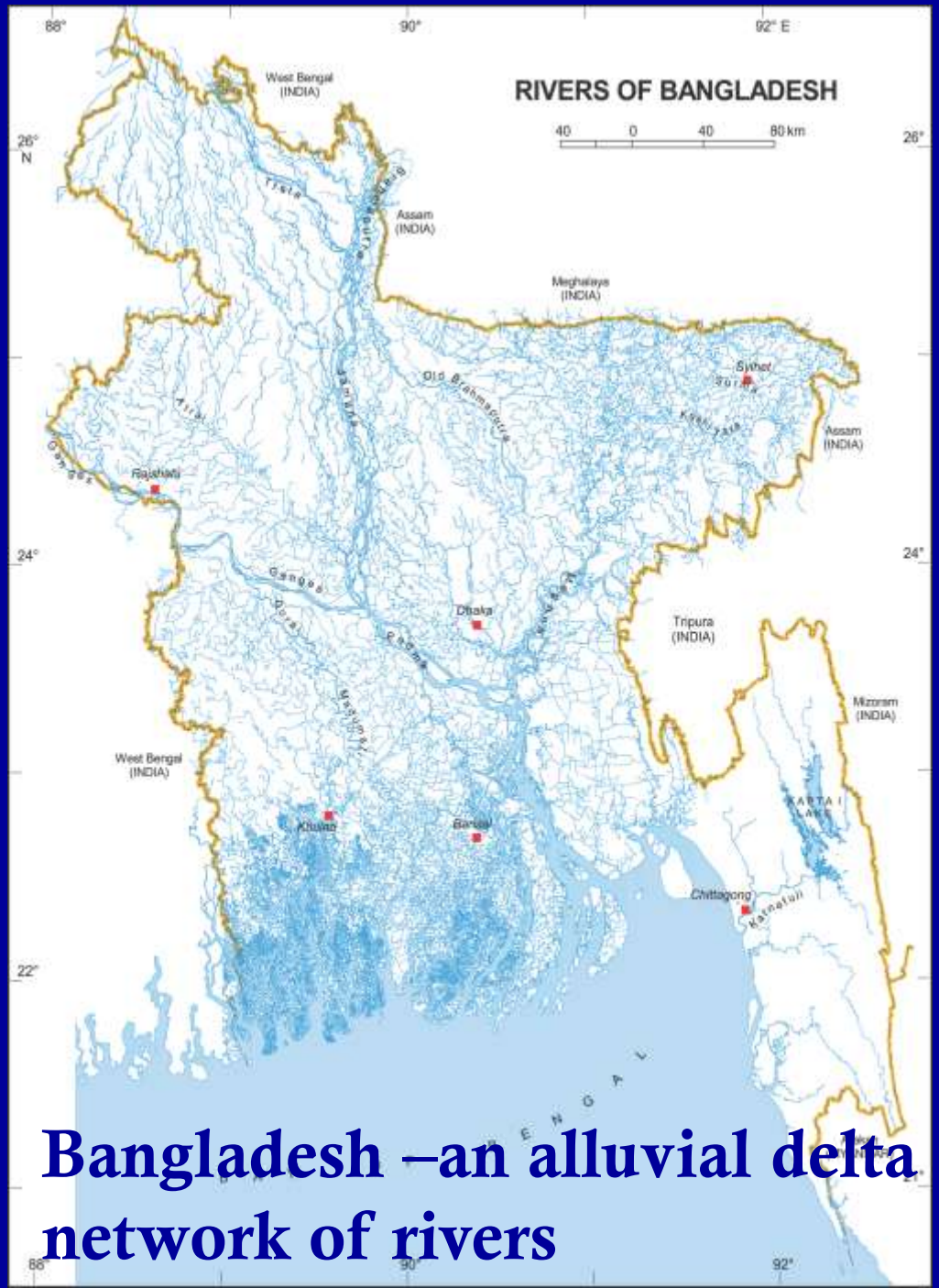


Bangladesh –an alluvial delta network of rivers

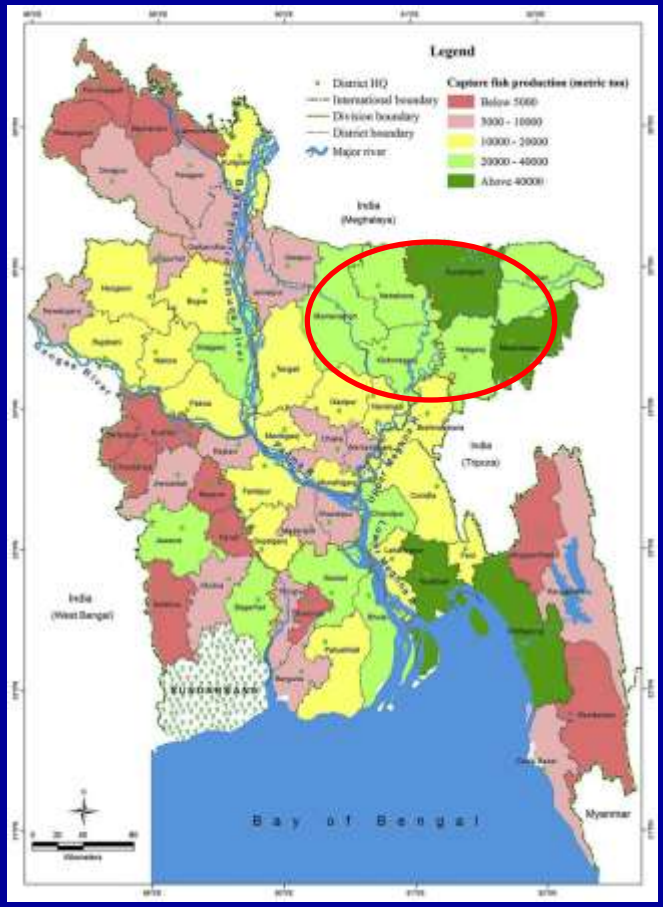
- **Bangladesh has world's largest flooded wetland (Bengal Delta), three main river systems & huge floodplains/ haors**
- **World Ranking: 3rd in both inland capture fisheries production and aquaculture production**
- **Nonetheless, fish production needs to be increased 2 folds by 2050**

Haor in Bangladesh

Haors are huge low lying watersheds, characterized by inundation for 5-6 moths by floodwaters, with average fish production of only 0.3- 0.4 ton ha^{-1}

Opportunity in haor waters with women

- Haors cover about 2.83 million ha in 57 upazilas under 7 Northern districts, homing to about 20 million people
- Cage culture could be a suitable option to increase haor production where rural women can be involved
- In spite of extreme poverty rural women are often reluctant to be engaged in fishery related business



We compared the performances of two women groups in cage culture in *haor* waters

Ujandhanu Nadi Matshayajibi Samabaya Samiti (EFW)

Chonnoagaon Matshayajibi Samabaya Samiti (MFW)


N
Cage position
KARIMGANJ UPAZILA
TARAIL
ITNA
KARIMGANJ
KISHOREGANJ SADAR
KATIADI
NIKLI
Image © 2017 DigitalGlobe
© 2016 Google
Google Earth
2009
Imagery Date: 1/24/2017 24°27'39.96" N 90°58'16.59" E elev 17 ft eye alt 774 ft

Experimental layout

Ujandhanu Nadi Matshayajibi Samabaya Samiti (EFW)

- Ethnic fisherwomen- 10
- 10 cages: one cage to each
- Cage size: rectangular, submerged volume - 27 m^3
- Fish: monosex tilapia-
- Size of fry: 7±0.2 cm / 30±2 g
- Stocking density : 35 indiv. $m^{3.-1}$
- Feeding: CFF, 10% $\longrightarrow$ 2%, twice
- Water quality monitoring: same
- Growing period: 4 months

Chonnoagaon Matshayajibi Samabaya Samiti (MFW)

- Mainstream fisherwomen-10
- 10 cages: one cage to each
- Cage size: rectangular, submerged volume - 27 m^3
- Fish: monosex tilapia
- Size of fry: 7±0.2 cm / 30±2 g
- Stocking density: 35 indiv. $m^{3.-1}$
- Feeding: CFF, 10% $\longrightarrow$ 2%, twice
- Water quality monitoring: same
- Growing period: 4 months

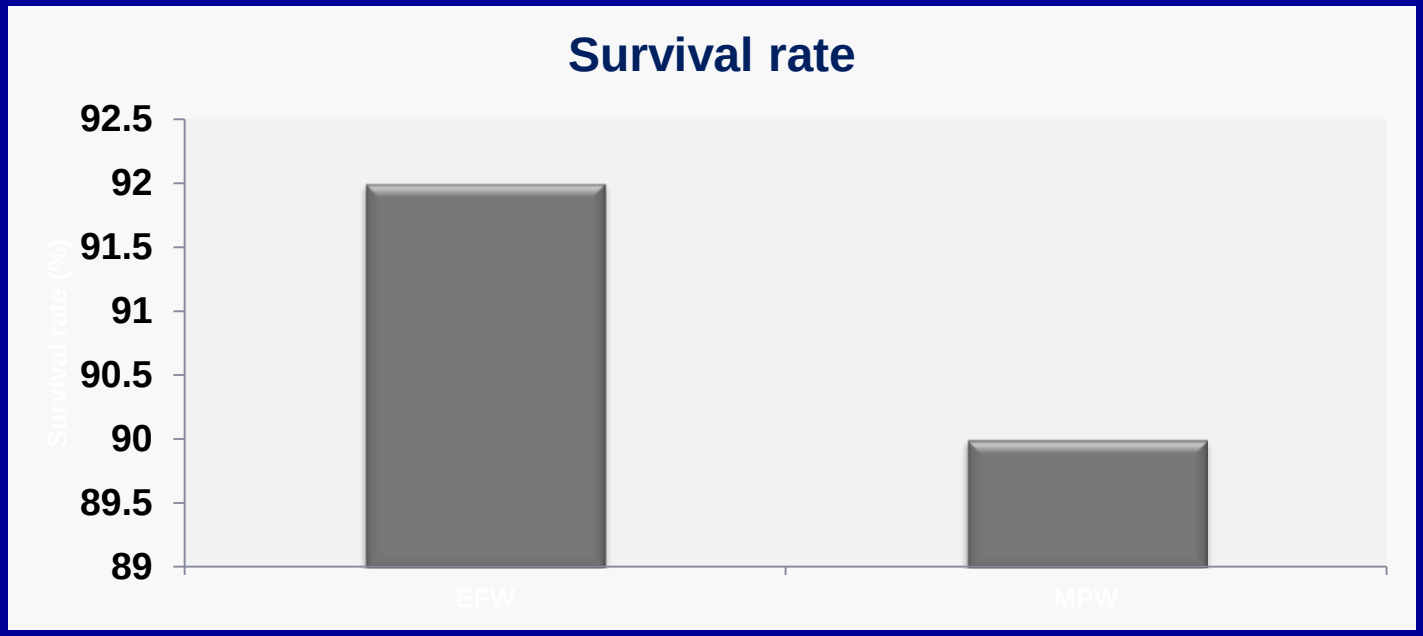
Ethnic community (EFW) in cage operation

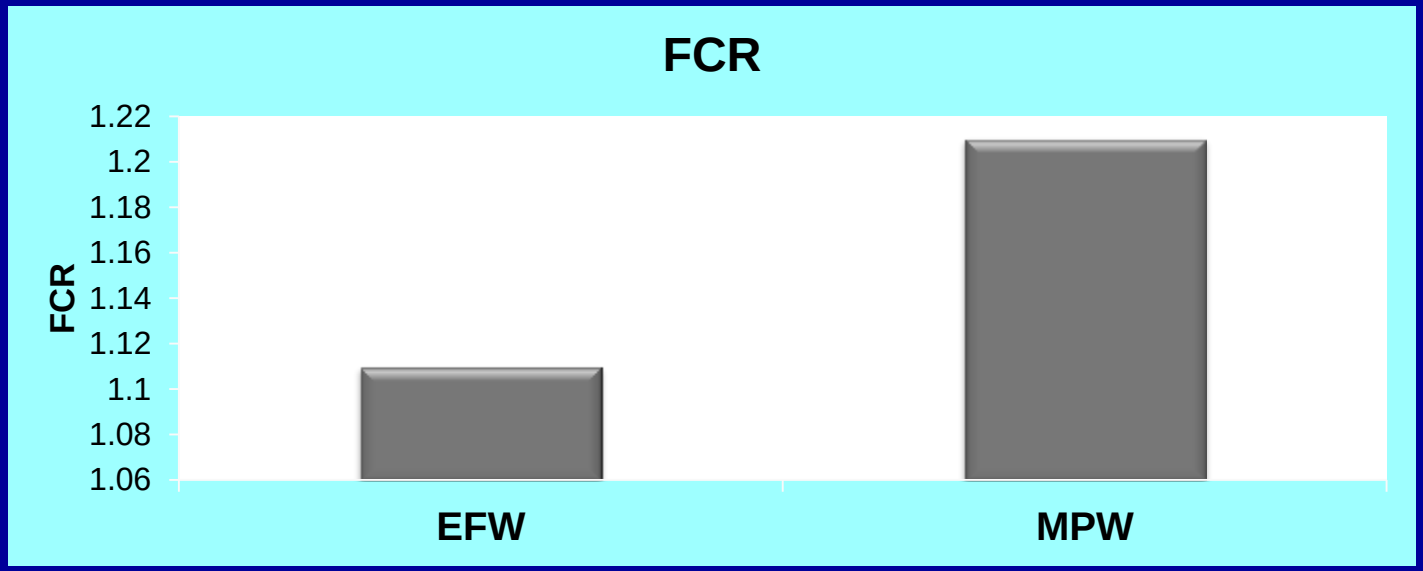
Mainstream poor fisherwomen community (EFW) in cage operation

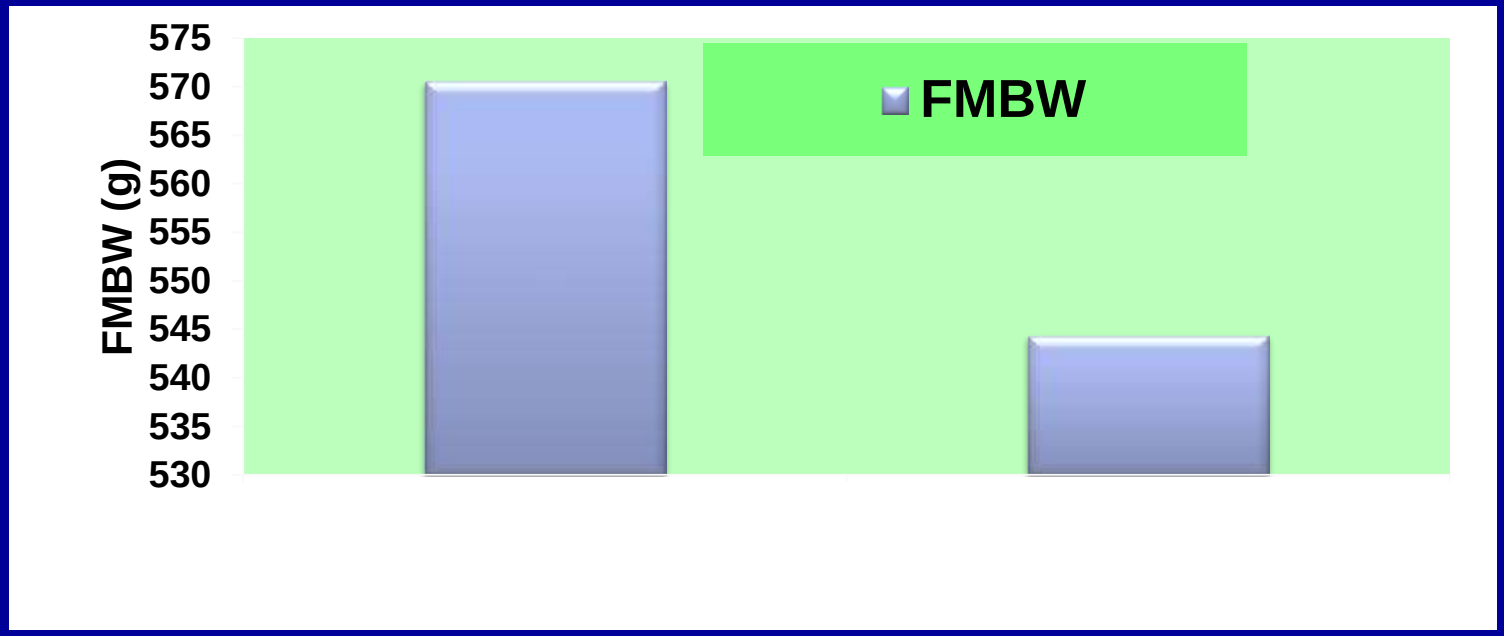
Tilapia yield parameters in two women groups (mean ±SD)

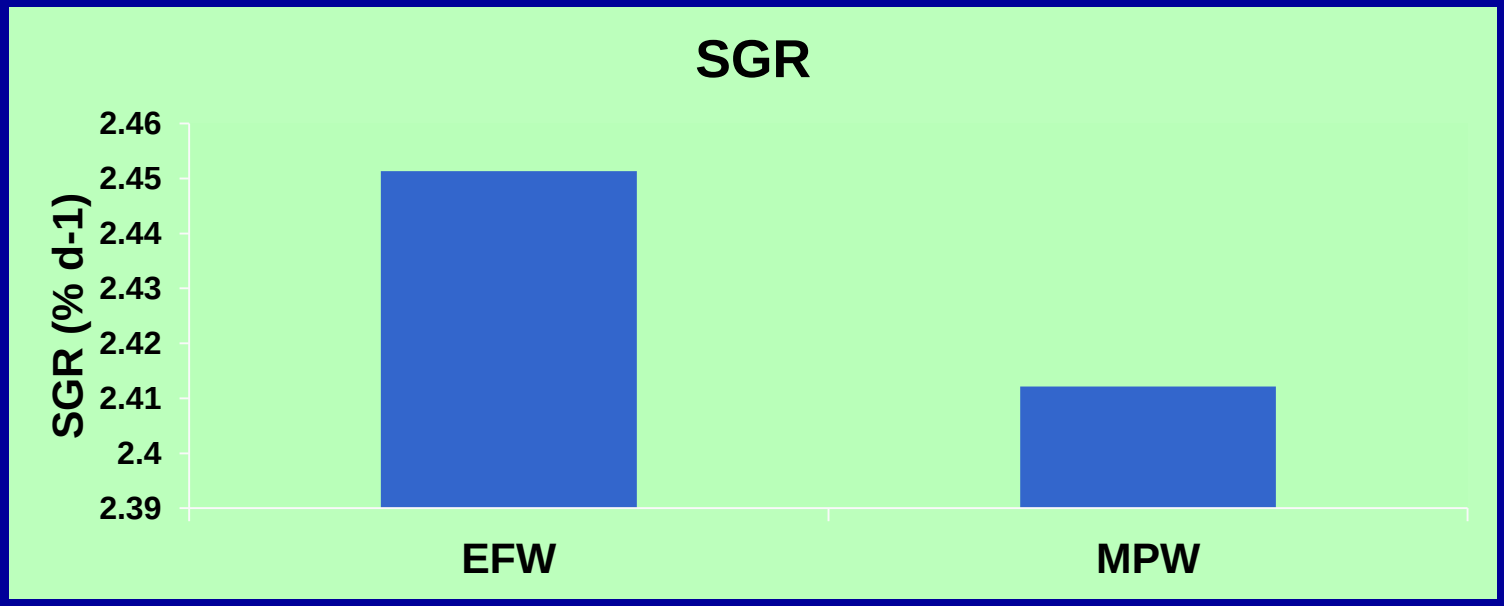
Parameters	EFW	MFW
Initial average body weight (g)	30.12±2.43	30.12±2.43
Stocking density (indv. m^{-3})	35	35
Biomass gain (kg. m^{-3})	**15.86±1.77^{a}**	**14.12±1.91^{b}**
FCR	**1.11±0.02^{b}**	**1.21±0.03^{a}**
Survival (%)	92%^{a}	90%^{a}

Mean values with different superscripts in the same row are significantly different (p <0.05) based on DMRT


Survival rate
92.5
92
91.5
91
90.5
90
89.5
89
Survival rate (%)
EFW
MPW


FCR
1.22
1.2
1.18
1.16
1.14
1.12
1.1
1.08
1.06
FCR
EFW
MPW


575
570
565
560
555
550
545
540
535
530
FMBW (g)
FMBW


SGR
2.46
2.45
2.44
2.43
2.42
2.41
2.4
2.39
SGR (% d-1)
EFW
MPW

Harvest of EFW

Harvest of MFW

Participations of women groups in cage operation

Village	Activities	Participation		Remarks
		Men	Women	Cage culture activities performed by the household members varied between the two groups.
EFW (n=10)	Cage installation	10 (100)	-	
	Collection of fingerling	10 (100)		
	feeding	2 (20)	8 (80)	
	Sampling	3 (30)	7 (70)	
	Transportation and selling	-	10 (100)	
MFW (n=10)	Cage installation	10 (100)	-	
	Collection of fingerling	10 (100)		
	Feeding	6 (60)	4 (40)	
	Sampling	6 (100)	4 (40)	
	Transportation and Selling	8 (100)	2 (20)	

Participation in marketing of fish

Marketing patterns	Groups		Comments
	EFW (%)	MFW (%)	Marketing of cage produce was mainly done by the EFW group themselves while the MFW group took assistance from their husbands
On-farm selling	9	15	
Retail market sell*	65	24	
Wholesale (local auction center)	26	61	
Total	100	100	

* Through partial harvest

Comparative cost benefit analysis (US$) of tilapia cage aquaculture for 4 months

Particulars		EFW	MFW
Fixed cost	Cage construction cost	21.25	21.25
	Depreciation cost (cage)	5.5	5.5
Sub total		26.75	26.75
Variable cost			
	Feed cost crop^{-1}	291.25±22.51^{a}	296.25±32.54^{a}
	Fingerling cost crop^{-1}	23.06^{a}	23.06^{a}
	Labor cost crop^{-1}	10.5	10.5
	Medicine cost crop^{-1}	4	4
	Miscellaneous cost crop^{-1}	4	4
Sub-total		327.31±33.36^{a}	332.31±49.54^{a}
Total cost (TC) crop^{-1}	TC= (FC+VC)	354.06±66.66^{a}	359.06±61.77^{a}
Gross revenue (GR) crop^{-1}	GR= (kg of fish harvested* price kg^{-1})	630±85.33^{a}	578.20±77.12^{b}
Gross margin (GM)	GM=(GR-TC)	297.63±39.23^{b}	250.63±25.01^{a}
Net profit (NP) crop^{-1}	NP=(GR-TC)	275.94±44.29^{a}	219.14±35.16^{b}
Profit margin (%)		43.80± 4.92^{a}	34.78± 7.14^{b}

Mean values (±SD) in the same row having different superscripts are significantly different ($p < 0.05$)

Conclusions

- Cage culture seemed to be an easy option to increase household income in both EFW and MFW groups in *haors*
- **Ethnic fisherwomen participated more in cage culture and sold fish by themselves in retail markets than mainstream fisherwomen and earned higher profit**
- Ethnic fisherwomen are more capable in cage operation and fish marketing than mainstream fisher women
- **Participation of women in productive cage culture venture, increased household income, less vulnerability to social risks and increased food security of household created a new scope of fish trading that earns additional cash income for women**

Access to fish is human right but quality fish is the key to ensure food security

‡Zvgiv Avgvq mnR n‡Z Kn †h
mnR K_v hvq bv ejv mn‡R