

# Contribution of Mariculture to Coastal Livelihoods in Kenya: A Gendered Analysis

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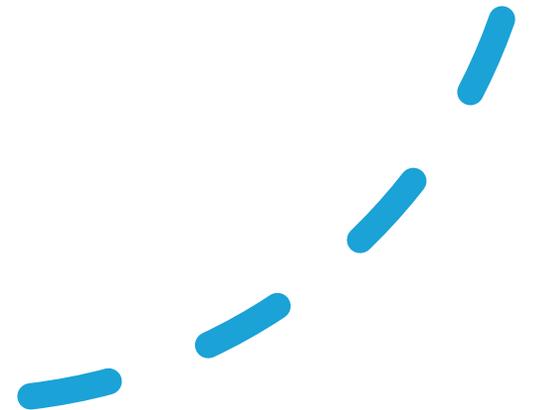
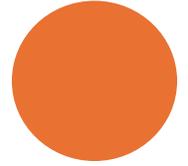
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# Introduction

- Mariculture was introduced in Kenya in the 1980s
- Development of the sector mainly targets women's empowerment, overall community development, and easing pressure from the marine resources
- Participation is mainly dominated by women
- Mainly farmed organisms include shrimps, milk fish, acclimatized (marine) tilapia, crabs, and seaweed



# Introduction cont'd

- Mariculture is conducted in the coastal counties of Kenya. Seaweed mainly produced in Kwale county, other organisms mainly produced in Mombasa, and Kilifi counties
- Production is conducted in community groups, for increased participation, capital sharing and risk distribution, collective labour, and marketing
- There's continued political will power and investments from Government and NGOs
- Research on the state and extent to which mariculture has contributed to the wellbeing of coastal communities is largely lacking

# Objectives

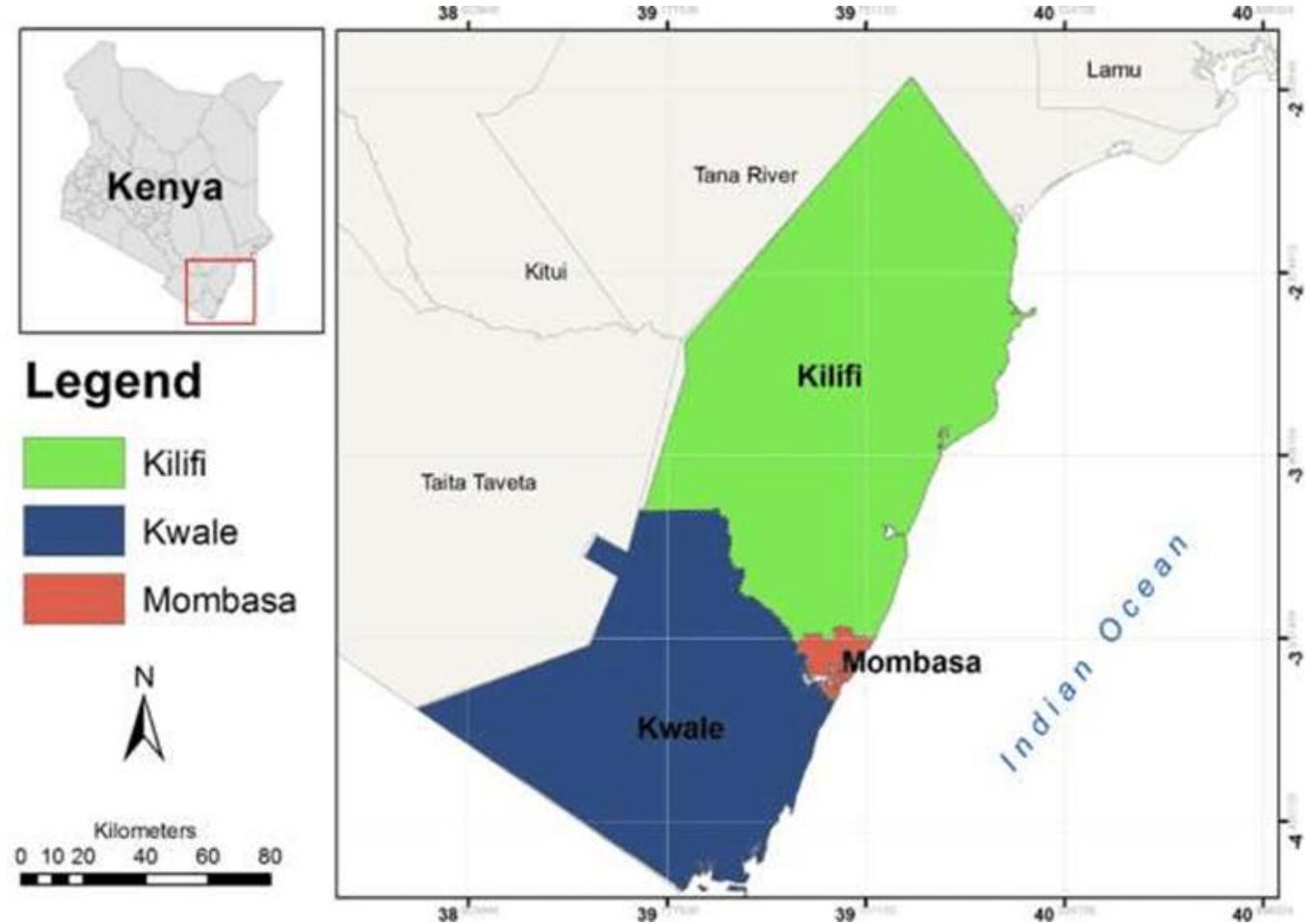
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- To investigate the gender dynamics influencing mariculture-derived income.
- To assess the extent to which mariculture has been adopted as a primary livelihood activity
- To analyse the contribution if mariculture on household's income



# Methods and Study Area

- **Mixed Research Methods**
- *Quantitative data:* Collected through surveys from 603 households. Seaweed farming households = 236, Fish farming households = 367
- *Qualitative data:* Collected through FGDs(22), KIIs(30) and Indepth Interviews (50)



# Findings: Characterization

Description	Seaweed farming households <sup>B</sup>	Fish Farming households
Household and household head's Characteristics	Mean (std. dev)	Mean (std. dev)
Household size	7.24 (2.78)	7.53 (2.92)
Dependency ratio	0.94 (0.78)	0.78 (0.65)
Income from mariculture (annual, KES)	<b>16,813 (28,973)</b>	<b>39,153 (87,384)</b>
Household income (annual, KES)	<b>234,127(174,225)</b>	<b>273,400(197,187)</b>
Distance to the market	5.10 (4.56)	6.94 (4.92)
Age of household head	49.78 (12.61)	51.76 (12.06)
Education level of household head	4.98 (4.19)	6.35(4.55)
Marital status of household head, number (percentage). (Married)	186(78)	278 (76)
Gender of the household head, number (percentage). (Male)	175(75)	275 (76)
<b>Characteristics of Mariculture Farmers</b>		
Respondent's age	43.16 (13.01)	45.51(13.26)
Respondents' years of formal education	<b>4.68 (4.16)</b>	<b>5.25 (4.41)</b>
Mariculture farming experience	6.63 (4.88)	6.85 (5.67)
Respondents' marital status, number (percentage) (Married)	166 (70)	259(71)
Respondent's gender, number (percentage). (Female)	<b>197(83)</b>	<b>248(68)</b>
Respondent's religion (percentage) Islamic	236(100)	99 (27)
Christianity	0	235 (64)
Traditional religion	0	14(4)
None	0	19(5)

# Income from mariculture: sources

## Fish farming

- Mariculture activities
- Donations
- Conservation/ mangrove forest activities
- Bee keeping
- Food and hospitality

## Seaweed farming

- Donations
- Mariculture activities
- Value addition



# Income from mariculture: determinants

## Pooled sample

Overall ave. =  
KES 30,410

Male Famers =  
KES 56,438.41

Female Famers =  
KES 20,335

## Fish farming households

Overall ave. =  
KES 39,153

Male Famers =  
KES 67,296.4

Female Famers =  
KES 29,507.17

## Seaweed farming households

Overall ave.=  
KES 16,813

Male Famers =  
KES 36,512

Female Famers =  
KES 12,913

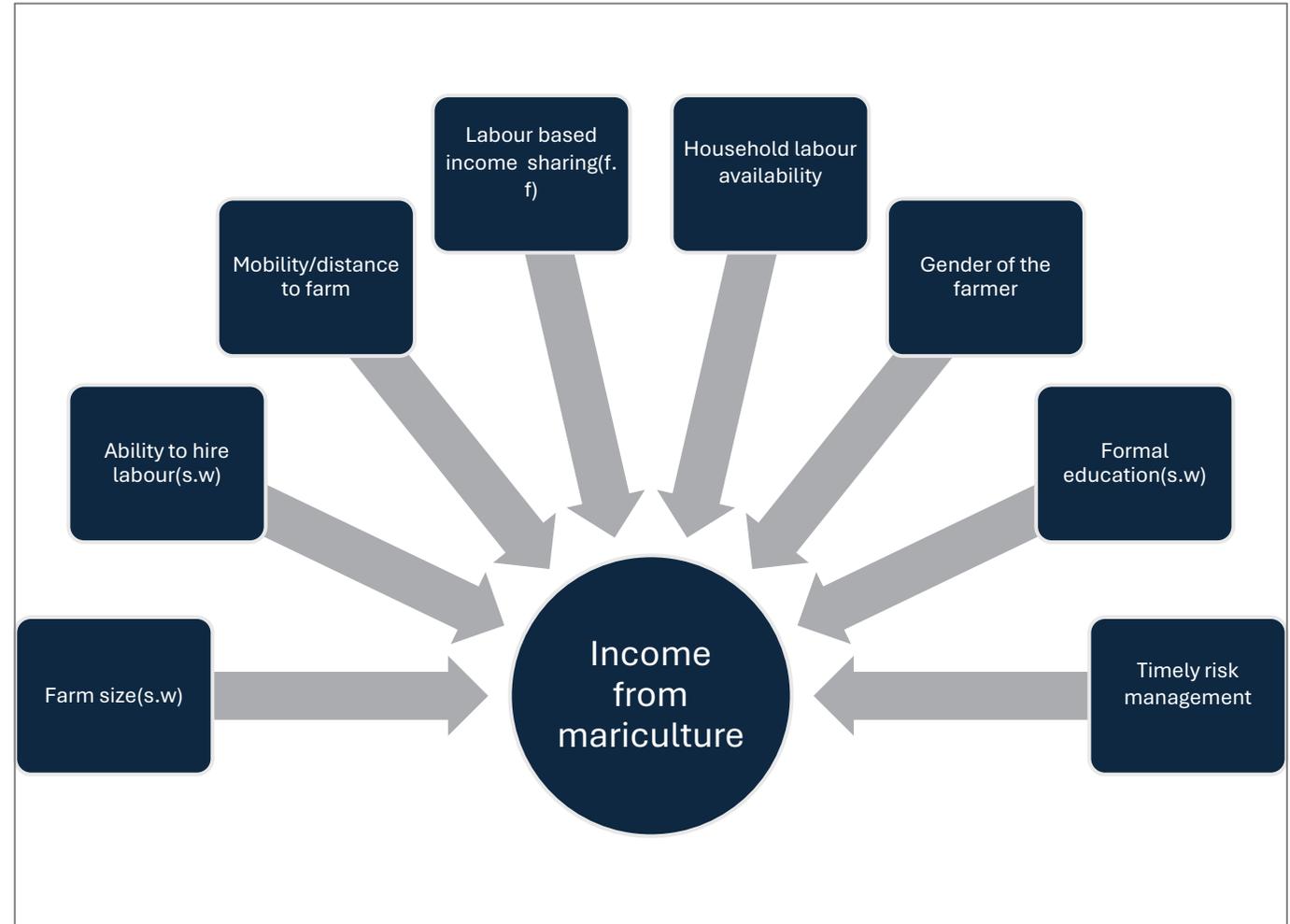
# Findings: Income from mariculture

Variables	Pooled data		Fish farming households		Seaweed farming	
	Coeff (std error)	Exponentiated Coeff.	Coeff (std error)	Exponentiated Coeff.	Coeff (std error)	Exponentiated Coeff.
Respondent's age	0.01(0.004) ***	1.012***	0.012(0.006) **	1.013**	0.01(0.005) **	1.010**
Respondent's gender (male)	0.44(0.12) ***	1.554***	0.43(0.17) **	1.078**	0.46(0.17) **	1.669**
Respondent's education level	0.08(0.04) *	1.084*	0.05(0.05)	1.056	0.17(0.06) ***	1.195***
Respondents' marital status (married)	-0.07(0.10)	0.926	0.07(0.15)	1.059	-0.12(0.12)	0.901
Mariculture farming experience	0.01(0.01)	1.011	0.01(0.01)	1.010	0.012(0.01)	1.012
Distance from homestead to the farm	-0.05(0.01) ***	0.948***	-0.04(0.01) **	0.953**	-0.03(0.02)	0.972
Distance to the market	-0.02(0.01) **	0.978**	-0.01(0.01) **	0.961**	-0.009(0.01)	0.990
Wealth index	0.14(0.03) ***	1.1154***	0.07(0.05)	1.078	0.20(0.04) ***	1.211***
Number of adult females in the household (15-64 years)	0.03(0.03)	1.036	0.04(0.04)	1.045	0.01(0.04)	1.007
Number of adult males in the household (15-64 years)	0.07(0.03) **	1.078**	0.08(0.05)	1.097	0.05(0.04)	1.038

# Income from mariculture

## From qualitative data

- Labour based income sharing(Fish farming)
- Size of farm(seaweed)
- Household labour availability
- Ability to hire labour(seaweed)
- Timely risk management



# Mariculture as a primary livelihood activity

	Pooled Sample			Seaweed Farming Households			Fish Farming Households		
Primary Livelihood Activity	% of households under the primary activity	Household ave. monthly Income (std. dev) <sup>3</sup>	% of income derived from mariculture <sup>4</sup>	% of households <sup>1</sup>	Household ave. monthly Income (std. dev) <sup>3</sup>	% of income derived from mariculture <sup>4</sup>	% of households <sup>1</sup>	Household ave. monthly Income (std. dev) <sup>3</sup>	% of income derived from mariculture <sup>4</sup>
Formal employment	42 (7%)	376,750 (261,433)	13%	3%	345,300 (225,378)	3%	9%	384,150 (271,745)	16%
Fishing	<b>151(25%)</b>	260,254 (195,521)	8%	<b>37%</b>	264,865 (85,447)	7%	17%	253,986 (209,774)	10%
Mariculture	<b>79(13%)</b>	243,866 (219,998)	<b>39%</b>	12%	213,931 (174,812)	18%	14%	261,228 (242,370)	<b>52%</b>
Casual labor	58(9%)	221,941 (171,357)	11%	8%	181,406 (92,186)	7%	11%	240,181 (195,222)	13%)
Small business and trade	<b>152(25%)</b>	<b>224,288</b> <b>(171,272)</b>	10%	32%	223,913 (178,656)	10%	<b>21%</b>	224,663 (164,745)	11%
Crop farming	103(17%)	167,080 (105,903)	12%	5%	162,276 (65,481)	12%	<b>24%</b>	167,774 (110,777)	12%

# Mariculture as a primary livelihood activity: determinants

Variables	Overall pooled sample			Fish farming households' sample			Seaweed farming households' sample		
	Fishing		Mariculture	Crop farming		Fish farming	Fishing		Seaweed farming
	Coeff. <sup>¥1</sup>	ME £ for fishing	ME£ for mariculture	Coeff. <sup>¥2</sup>	ME£ for crop farming	ME£ for fish farming	Coeff. <sup>¥3</sup>	ME £ for fishing	ME£ for seaweed farming
Household's head age	-0.05(0.007) ***	-0.008(0.001) ***	0.001(0.0006) ***	0.001(0.01)	0.004(0.001) **	0.001(0.0008) *	-0.05(0.02) *	-0.007(0.002) ***	0.001(0.001)
Household's head years of education	-0.20(0.03) ***	-0.02(0.005) ***	0.008(0.002) ***	-0.04(0.03)	0.004(0.001)	0.008(0.003)	-0.20 (0.06) ***	-0.03(0.007) ***	0.007(0.005)
Household's number of livelihoods	0.37(0.13) ***	0.01(0.02)	-0.03(0.01) ***	0.04(0.14) ***	0.01(0.01)	-0.04(0.01)	0.33(0.24)	-0.007(0.02)	-0.03(0.019) **
Number of adult males in the household	0.34(0.13) ***	0.003(0.004) ***	-0.02(0.01)	-0.01(0.23) **	-0.01(0.03)	-0.004(0.01)	0.77(0.32) **	0.05(0.02) **	-0.05(0.02) *
Distance to the farm(kms)	-0.08(0.04)	-0.007(0.004)	0.004(0.005)	-0.05(0.05)	0.002(0.005)	0.008(0.009)	-0.11(0.10)	-0.02(0.01) **	0.001(0.007)
Gender of the household head (male)	2.33(0.81) ***	0.29(0.10)	-0.09(0.05)	0.35(0.79)	-0.007(0.07)	-0.05(0.09)	3.57(0.94) ***	0.05(0.08) ***	-0.08(0.07)
Mariculture farming experience (years)	-0.04(0.01) **	-0.001(0.002)	0.004(0.002)	-0.06(0.02) ***	-0.006(0.003) *	0.005(0.002) *	-0.009(0.06)	0.0007(0.007)	0.001(0.005)

# Proportion of household income from mariculture

Variables	Pooled sample	Fish farming households' sample	Seaweed farming households' sample	
	Coef. (std. error)	Coef. (std. error)	Coef. (Robust std. error)	Exp (b)
Primary livelihood - Livestock keeping	-0.21(0.05) ***	-0.31(0.07) ***	Not estimated	Not estimated
Primary livelihood - Crop farming	-0.19(0.03) ***	-0.28(0.03) ***	-0.34(0.54)	0.65
Primary livelihood - Fishing	-0.20(0.02) ***	-0.27(0.04) ***	-0.80(0.27) ***	0.42
Primary livelihood - Small businesses and trade	-0.19(0.02) ***	-0.29(0.04) ***	-0.99(0.36) ***	0.36
Primary livelihood - Casual labor	-0.19(0.03) ***	-0.28(0.04) ***	-1.77(0.27) ***	0.35
Primary livelihood - Salaried employment	-0.23(0.03) ***	-0.31(0.04) ***	-0.98(0.26) ***	0.16
Single female household head	Not estimated	Not estimated	0.46(0.13) ***	1.60
Gender of the household head (female)	-0.07(0.05)	0.18(0.06)	Not estimated	Not estimated
Marital status of the household head (single)	-0.10(0.04) **	0.05(0.06)	Not estimated	Not estimated
Household head gender## marital status (single female)	-0.05(0.04)	-0.23(0.09) **	Not estimated	Not estimated
Household head's age	0.001(0.007)	0.003(0.01)	0.07(0.08)	1.06
Household head's education, years	0.003(0.004)	-0.002(0.006)	-0.03(0.04)	0.94
Mariculture farming experience, years	0.004(0.001) **	0.001(0.002)	0.0003(0.02)	1.00
Number of livelihoods	-0.02(0.007) ***	-0.03(0.02) ***	-0.10(0.09)	0.89
Household size – working age	0.001(0.003)	-0.0003(0.005)	0.03(0.03)	1.04
Wealth index, count	0.02(0.01) *	0.02(0.02)	0.45(0.21) **	1.63
Land size	0.01(0.007) **	0.005(0.01)	0.16(0.07) **	1.19

# In summary

- Involvement of rural women in income generating is a step towards women's empowerment. Analysing the gender differences in the derived benefits is necessary. Participation alone doesn't imply women's empowerment or reduced gender inequalities.
- Gender and social norms directly and indirectly influence the income.
- Mariculture is still a supplementary or diversification livelihood activity
- The proportion of income that mariculture contributes to overall household's income influence the uptake of mariculture as a primary activity

# Conclusion

- Reorientation of the mariculture towards less time and labour-intensive production systems
- Intensify efforts to address social norms that overburden women and limit their potential benefits from mariculture
- Efforts to increase income from mariculture can promote the livelihood as an important (primary) activity and ease dependence marine resources.
- Important to address challenges in the overall sector that limit income



Thank You

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