**Table A1.1 Characteristics used for wealth stratification using participatory wealth ranking**

| Wealth category | Characteristics outlined by respondents | |
|---|---|---|
| | **Kamarkhola** | **Mithakhali** |
| **Rich** | • Owns >3.4 hectares of agricultural land (About 5 having >20 hectares)<br>• Previously owned large shrimp farms; now mainly leased out land to sharecroppers; some engaged in service sector<br>• Mainly inherited property<br>• Some reside outside the village in nearby towns or cities<br>• Children pursuing tertiary education in cities<br>• Usually have brick houses, motorcycles, TV and good furniture<br>• Union council leader or village chairman are usually from this class<br>• Have good amount of savings, may take loans from banks for investments<br>• Never face food shortage | • Owns >5.4 hectares of agricultural land<br>• Owners of large shrimp farms, often including land leased in from smaller farmers; also engaged in aquaculture related businesses<br>• Some are rich for generations, while others have purchased land in last three decades |
| **Upper middle** | • Owns between 1.3 and 3.4 hectares of agricultural land<br>• Engaged in crop cultivation, as well as moderate scale Galda prawn/ white fish farming.<br>• Durable housing with brick/mud walls and floors and tin roofs<br>• Children pursuing tertiary education outside village<br>• Have moderate amount of savings<br>• Never face food shortage | • Owns between 2.7 and 5.4 hectares of agricultural land<br>• Owners of medium shrimp farms, either independently or with land leased in from others; some involved in service sector |
| **Lower middle** | • Owns between 0.4 and 1.3 hectares of agricultural land<br>• Engaged in crop cultivation, as well as small scale Galda prawn/ white fish farming; some involved in small businesses/service sector<br>• *Kacha* houses with mud floors, mud/bamboo walls and tin/straw roofs<br>• Have sufficiency of rice, but can afford protein only few times a week<br>• Income same as expenditures; hence, no savings | • Owns between 0.8 and 2.7 hectares of agricultural land<br>• Owners of small shrimp farms, either independently or under co-operative system; some involved in small businesses |
| **Poor** | • Owns < 0.4 hectares of agricultural land<br>• Engaged in crop cultivation and wage laboring. | • Owns <0.8 hectares of agricultural land<br>• Mainly lease out land or engage in co-operative farming; many engaged in petty trades and/or wage laboring |

| | | |
|---|---|---|
| | • *Kacha* houses with mud floors, mud/bamboo walls and leaf/straw roofs<br>• Can afford two meals a day, with occasional protein intake<br>• Income usually not enough to meet household expenses; often have loans from NGOs | |
| **Extreme Poor** | • Do not have any agricultural land, many residing on the embankment<br>• Mainly dependent on wage laboring; some engaged in sharecropping.<br>• Poor housing with mud floors and walls/roofs made of palm leaves/straw<br>• Always face food shortage, hardly can afford protein items<br>• Income not enough to meet household expenses; often have loans from NGOs | • Do not have any agricultural land<br>• Mainly dependent on wage laboring/petty trades |

**Table A1.2 Results of wealth stratification using principal component and cluster analysis**

| | **Kamarkhola** | **Mithakhali** |
|---|---|---|
| Number of factors with eigenvalue >1 | 5 | 5 |
| Variance explained (%) by factors extracted | 62.1 | 62.1 |
| KMO measures of sampling adequacy | 0.820 | 0.762 |
| **Number (%) of households in each wealth class (n=150)** | | |
| Rich | 10 (6.7%) | 8 (5.3%) |
| Upper middle | 11 (4.3%) | 17 (12%) |
| Lower middle | 58 (38.7%) | 51 (34%) |
| Poor | 40 (26.7%) | 49 (32.7%) |
| Extreme poor | 31 (20.7%) | 25 (16.7%) |

**Table A1.3 Descriptive statistics for 17 indicators in Kamarkhola and Mithakhali**

| Dimensions | Variables | Type of variable | Kamarkhola | | | | Mithakhali | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Mean | Variance | Minimum | Maximum | Mean | Variance |
| Housing | Wall material | Ordinal | 1 | 5 | 3.11 | 2.05 | 1 | 5 | 3.47 | 0.88 |
| | Roof material | Ordinal | 1 | 4 | 2.47 | 1.31 | 1 | 4 | 2.71 | 0.63 |
| | Floor material | Ordinal | 1 | 3 | 1.34 | 0.56 | 1 | 3 | 1.19 | 0.34 |
| | No. of rooms | Scale | 1 | 7 | 2.61 | 1.14 | 2 | 8 | 3.88 | 1.36 |
| Consumptive assets | No. of furniture items | Scale | 0 | 20 | 5.31 | 17.3 | 3 | 26 | 10.1 | 14.4 |
| | No. of TV | Scale | 0 | 1 | 0.36 | 0.23 | 0 | 1 | 0.44 | 0.25 |
| | No. of Radio/CD player | Scale | 0 | 1 | 0.13 | 0.12 | 0 | 1 | 0.04 | 0.04 |
| | No. of mobile phones | Scale | 0 | 5 | 1.61 | 0.91 | 0 | 5 | 2.11 | 1.08 |
| | No. of motorcycles | Scale | 0 | 1 | 0.07 | 0.07 | 0 | 1 | 0.07 | 0.07 |
| Productive assets | No. of fishing nets | Scale | 0 | 8 | 1.22 | 1.13 | 0 | 20 | 2.51 | 6.71 |
| | No. of tools | Scale | 0 | 12 | 3.41 | 4.87 | 0 | 10 | 4.26 | 4.30 |
| Livestock | No. of cows/buffalos | Scale | 0 | 15 | 2.04 | 5.81 | 0 | 10 | 0.57 | 2.41 |
| | No. of goats/sheep | Scale | 0 | 5 | 0.41 | 1.25 | 0 | 20 | 1.14 | 7.26 |
| Agricultural land | Amount of agricultural land (decimals[1]) | Scale | 0 | 2310 | 248 | 174096 | 0 | 3960 | 373 | 262484 |
| Homestead Area | Amount of homestead land (decimals) | Scale | 0 | 247 | 20.8 | 645 | 0 | 264 | 36.6 | 1937 |
| | Area of pond (decimals) | Scale | 0 | 165 | 10.5 | 400 | 0 | 200 | 11.1 | 462 |
| Education | Percentage of adult with SSC degree or above | Scale | 0 | 100 | 39.1 | 1299 | 0 | 100 | 22.8 | 625 |

[1] 1 hectare = 247 decimals

**Table A1.4 Factor loadings of the first principal component (weightages) of the 17 indicators in Kamarkhola and Mithakhali**

| Dimensions | Variables | Kamarkhola | Mithakhali |
|---|---|---|---|
| Housing | Wall material | 0.69 | 0.56 |
| | Roof material | 0.70 | 0.55 |
| | Floor material | 0.60 | 0.52 |
| | No. of rooms | 0.78 | 0.71 |
| Consumptive assets | No. of furniture items | 0.81 | 0.80 |
| | No. of TV | 0.40 | 0.40 |
| | No. of Radio/CD player | 0.26 | 0.24 |
| | No. of mobile phones | 0.59 | 0.66 |
| | No. of motorcycles | 0.56 | 0.42 |
| Productive assets | No. of fishing nets | 0.36 | 0.45 |
| | No. of tools | 0.54 | 0.32 |
| Livestock | No. of cows/buffalos | 0.54 | 0.32 |
| | No. of goats/sheep | -0.13 | 0.36 |
| Agricultural land | Amount of agricultural land | 0.80 | 0.78 |
| Homestead Area | Amount of homestead land | 0.61 | 0.71 |
| | Area of pond | 0.26 | 0.39 |
| Education | Percentage of adult with SSC degree | 0.39 | 0.43 |

**Table A1.5 Mean ownership of assets by wealth class in Kamarkhola**

| Dimensions | Indicators | Extreme poor (n=31) | Poor (n=40) | Lower middle (n=58) | Upper middle (n=11) | Rich (n=10) |
|---|---|---|---|---|---|---|
| Housing | Wall material (1 = Leaves/straw/ cardboard/ plastic, 2 = Jute/bamboo, 3 = Mud or unfired brick, 4 = Tin/ corrugated iron, 5 = Concrete/ brick) | 2.23 | 2.75 | 3.29 | 4.36 | 4.90 |
| | Roof material (1 = Leaves/straw/ cardboard, 2 = Tin/ corrugated iron, 3 = Concrete/ brick) | 1.53 | 1.58 | 1.84 | 2.36 | 3.00 |
| | Floor material (1 = Mud or unfired brick, 2 = Wood, 3 = Concrete/ brick) | 1.13 | 1.18 | 1.21 | 1.91 | 2.80 |
| | No. of rooms | 1.97 | 2.13 | 2.76 | 3.73 | 4.40 |
| Consumptive assets | No. of furniture items | 3.23 | 2.88 | 5.74 | 11.5 | 12.2 |
| | No. of TV | 0.13 | 0.33 | 0.41 | 0.45 | 0.80 |
| | No. of Radio/CD player | 0.10 | 0.08 | 0.16 | 0.09 | 0.40 |
| | No. of mobile phones | 1.10 | 1.35 | 1.74 | 2.64 | 2.30 |
| | No. of motorcycles | 0.00 | 0.00 | 0.07 | 0.18 | 0.50 |
| Productive assets | No. of fishing nets | 1.00 | 1.05 | 1.22 | 1.82 | 1.90 |
| | No. of tools | 2.94 | 2.55 | 3.64 | 5.64 | 4.50 |
| Agricultural land | Amount of agricultural land (decimals) | 0.13 | 57.8 | 220 | 597 | 1554 |
| Homestead area | Amount of homestead land (decimals) | 6.87 | 11.48 | 22.69 | 43.55 | 65.50 |
| | Area of pond (decimals) | 7.74 | 4.53 | 11.7 | 21.5 | 23.8 |
| Livestock | No. of cows/buffalos | 0.74 | 1.40 | 2.26 | 4.82 | 4.30 |
| | No. of goats/sheep | 0.35 | 0.45 | 0.57 | 0.00 | 0.00 |
| Education | Percentage of adult with SSC degree or above | 15.8 | 35.0 | 46.1 | 63.6 | 60.0 |

**Table A1.6 Mean ownership of assets by wealth class in Mithakhali**

| Dimensions | Indicators | Extreme poor (n=25) | Poor (n=49) | Lower middle (n=51) | Upper middle (n=17) | Rich (n=8) |
|---|---|---|---|---|---|---|
| Housing | Wall material (1 = Leaves/straw/ cardboard/ plastic, 2 = Jute/bamboo, 3 = Mud or unfired brick, 4 = Tin/ corrugated iron, 5 = Concrete/ brick) | 3.04 | 3.38 | 3.50 | 3.89 | 4.29 |
| | Roof material (1 = Leaves/straw/ cardboard, 2 = Tin/ corrugated iron, 3 = Concrete/ brick) | 1.52 | 1.88 | 1.92 | 1.94 | 2.43 |
| | Floor material (1 = Mud or unfired brick, 2 = Wood, 3 = Concrete/ brick) | 1.04 | 1.12 | 1.15 | 1.33 | 2.14 |
| | No. of rooms | 3.04 | 3.94 | 3.73 | 4.33 | 6.14 |
| Consumptive assets | No. of furniture items | 7.52 | 9.78 | 9.58 | 12.6 | 18.1 |
| | No. of TV | 0.13 | 0.34 | 0.50 | 0.72 | 1.00 |
| | No. of Radio/CD player | 0.04 | 0.02 | 0.04 | 0.00 | 0.29 |
| | No. of mobile phones | 1.35 | 2.12 | 2.13 | 2.33 | 3.71 |
| | No. of motorcycles | 0.00 | 0.04 | 0.04 | 0.22 | 0.43 |
| Productive assets | No. of fishing nets | 1.13 | 2.08 | 2.37 | 4.44 | 6.14 |
| | No. of tools | 3.57 | 4.24 | 4.19 | 5.17 | 4.86 |
| Agricultural land | Amount of agricultural land (decimals) | 4.22 | 143 | 378 | 736 | 2253 |
| Homestead area | Amount of homestead land (decimals) | 5.48 | 28.9 | 32.5 | 65.9 | 149 |
| | Area of pond (decimals) | 3.30 | 10.7 | 9.8 | 13.7 | 42.9 |
| Livestock | No. of cows/buffalos | 0.00 | 0.76 | 0.31 | 1.00 | 1.86 |
| | No. of goats/sheep | 0.39 | 1.60 | 0.56 | 0.83 | 5.43 |
| Education | Percentage of adult with SSC degree or above | 8.39 | 20.1 | 26.4 | 29.3 | 46.7 |

**Table A1.7 Characteristics used for structuring and analyzing data in relation to the adaptive cycle**

| | Characteristics of a SES in terms of its potential and connectedness | Characteristics of the shrimp industry as identified from empirical evidence |
|---|---|---|
| **Exploitation phase** | • Abundance of resources, allowing competition among alternative social or ecological groups and formation of new hierarchies;<br>• System exhibits flexibility and high resilience | • Availability of fallow land during the dry season;<br>• Abundance and diversity of post-larvae and fish juveniles in tidal water;<br>• Adoption of export-oriented growth policy, creating demand for market-based products<br>• Traditional patron-client peasant societies being replaced by commercial aquaculture |
| **Conservation phase** | • Accumulation of ecological capital, such as biomass and nutrients, and social capital, such as skills, networks, trust and human relationships.<br>• System exhibits stability and rigidity, as resources are bound up by tight organisation, thus, excluding domination by alternative species or social institutions | • High levels of financial investments by the government as well as large local farmers;<br>• Development of ancillary services along the supply, creating employment and trade networks<br>• Shrimp cultivation became the dominant livelihood activity, occupying private farmland, mangrove forests, public land and waterbodies |
| **Release phase** | • Release of accumulated capital and collapse of system structure;<br>• Social capital and behavior can break away from normalised routines and positions. | • Increased salinity leading to adverse impacts on subsistence based livelihood activities; Disease outbreaks in shrimp farms;<br>• Reluctance to continue brackish water shrimp farming and social movements against outside entrepreneurs;<br>• Occurrence of severe cyclones and tidal surges |
| **Re-organisation phase** | • Social learning and memory support experimentation and development of novel ideas, while crisis provide windows of opportunity;<br>• Specific coalitions of interests emerge and compete for discursive dominance | • Skills acquired from brackish water shrimp cultivation used to experiment with white fish or freshwater prawn cultivation<br>• Destruction by cyclone Aila providing opportunity for changes in farming systems<br>• Difference in perceptions on brackish water shrimp cultivation; recognition of the ecological and economic potential for integrated freshwater prawn and paddy farming |