*Table S1: Overview of purpose, role, achievement and tensions in DFBA-linked hub coordination to address smallholders’ challenges in value chains*

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| **Type of coordination** | **Purpose of hub** | **Role fulfilled in the hub** | **Achievement of hub**  | **Tensions and emerging issues**  |
| Horizontal (among farmers) | Enhance cooperation and business support (entrepreneurship) to mobilise economies of scale | Brokering the day- to-day interaction between farmers and DFBA (broker role) | Many farmers joined the DFBA (as shareholders) and were supplying milk to the CP, symbolising improved cooperation | Market forces (with competing marketing channels) contribute to farmers (including shareholders) side-selling milk, thus still affecting cooperation and loyalty |
|  | Improve mutual trust/reciprocity and loyalty among farmers | Clustering farmers into DMGs(cluster role)  | Some farmers joined the DMGs as local units of farmer-to-farmer cooperation, enabling reciprocity through working together and exchanging ideas | Non-DMG farmers are excluded from accessing some services |
|  | Include all farmers and their representation in decision making | Brokering and facilitating farmers’ participation in the DFBA, including in the selection of representatives (broker role)  | All farmers within the catchment were eligible to supply milk to the DFBA without being shareholders, thus increasing supply | Opting out of being a shareholder influences farmers’ loyalty to the DFBA |
|  | Improve transparency in leadership and decision making | Facilitating farmers’ participation in board selection (through elections) and ensuring a transparent process for hiring the management (broker role) | New governance model with clear separation of roles between board and professionally hired management team increased a sense of transparency | Distrust of the DFBA leadership lingers due to the historical context of the collapse of dairy cooperatives coupled with tensions relating to benefit-sharing through such collective action |

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| Vertical (between farmers and output market actors) | Form business linkages and enhance trust  | Installation by DFBA of CP for bulking and facilitating collective marketing of quality milk (broker role) | DFBAs signed supply contracts with processors aimed at consolidating the DFBAs’ position in the market and enhancing trust with their farmer members and with the processing companies. The contract was intended to stabilise prices and restore farmers’ trust in the market | Because seasonality affects milk volumes, processors are not consistent about prices and milk quality issues (information asymmetry). This affects farmers’ trust of the processors and their loyalty |
|  | Reduce inconsistency and uncertainty | Negotiation by DFBA of supply agreements with buyers to ensure (quality) market for both farmers and processors (broker, one-stop shop role) | Access to services offered through the hub aimed to reduce inconsistency and uncertainty of farmers delivering milk to the DFBA for collective marketing | Farmers’ divided loyalty (due to alternative, attractive markets) results in side-selling and fragmentation of milk due to inconsistency in volumes supplied to the DFBA |
|  | Balance power relations  | Bulking and entering into agreements with buyers to ensure mutual dependences (broker) | The DFBA was able to mobilise milk volumes from farmers and ensure quality through chilling. This gave DFBA/farmers some bargaining power and resulted in higher prices  | Dairy processors have a relatively monopolistic market position vis-à-vis the DFBAs who are targeting the cold milk chain |
| Vertical (between farmers and input/innovation support service actors) | Enhance business links and improve reliability and commitment in input service delivery | Facilitating linkages with various inputs/service providers (broker and one-stop shop role) | Access to services enhanced through the hub arrangements interlinked through the check-off system | Problems with the quality of some service delivery due to lack of adequate monitoring  |
|  | Enhance quality assurance and adequateness of support | Clustering of service providers (e.g. AI, AHA, CESP) and matching them to farmers through check-off system (cluster, one-stop shop role) | Services providers directly linked to the DFBA and paid through the check-off system. This was expected to enhance quality and adequateness of service delivery | Emerging problems with quality and adequateness of some of the services (e.g. AI and extension) |
|  | Balance power relations and enhance trust  | Linking service providers to farmers through service agreements and check-off systems to ensure access (broker and one-stop shop role) | The DFBA offered oversight of service delivery through service agreement and interlinking the services to the check-off system Some services directly integrated into the DFBA (e.g. extension and agro- input supplies) | Opportunistic behaviour by some service providers due to gaps in monitoring their relationships and the quality of service delivery (e.g. extension services) |

Note: AI = artificial insemination; AHA = animal health assistants; CESP = community extension service provider; CP = chilling plant; DFBA = dairy farmers business associations; DMG = dairy management group