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Beyond equipment provision: Service governance lessons from Maschinenring projects in Senegal and Kenya

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Abstract

Agricultural mechanisation initiatives in smallholder contexts often focus on machinery access, yet long-term viability depends on whether machinery can be organised as a reliable local service. This article examines this challenge through a qualitative case study of Maschinenring projects in Senegal and Kenya, based on seven expert interviews with actors involved in the transfer and implementation network and supporting project documents. The findings suggest that machinery-sharing depends less on equipment provision alone than on locally governed service systems. Three conditions appear particularly important in the implementation-side accounts: coherent partner architecture, active rather than nominal participation, and sufficient organisational density within bounded service areas. The contrast between the two project configurations further suggests that fragmented implementation environments and donor-shaped expectations can complicate contribution-based use. The article offers implementation-side lessons for development organisations, NGOs and policy actors by arguing that machinery-sharing should be designed as service governance rather than equipment transfer.

Keywords: agricultural mechanisation; smallholder farming; service governance; cooperative service provision; development partnerships; Senegal; Kenya; Maschinenring

1. Introduction

Agricultural mechanisation remains a persistent challenge in many smallholder-based farming systems. Tractors, harvesters, mills and processing equipment can reduce labour constraints and raise productivity, yet individual ownership is often unaffordable and economically

inefficient where farms are small, demand is seasonal and service infrastructures are weak (Daum and Birner, 2020; Takeshima, 2017). Development initiatives have therefore increasingly looked beyond individual ownership towards shared access and service-based models. The experience of such initiatives shows that machinery access alone is insufficient. What matters is whether machinery use can be organised, financed, maintained and governed locally over time.

This article examines a case in which a long-standing cooperative machinery-sharing model was transferred from Germany to two contexts in Sub-Saharan Africa. The German Maschinenring is a member-based service organisation that has coordinated farmer access to agricultural machinery since the late 1950s. Since 2018, parts of the Maschinenring network have been engaged in projects in Senegal and Kenya, in cooperation with German and international development actors. The case is analytically useful for development practice because it brings the difference between equipment provision and service governance into sharp focus. In the implementation-side accounts analysed here, Senegal appears to have produced a more coherent local service system despite weaker physical infrastructure, whereas Kenya appears more difficult to stabilise despite stronger digital and transport infrastructure. The comparison is not intended as a country-level comparison between Senegal and Kenya, but as a comparison between two project configurations operating under different partner architectures and donor environments. The contrast suggests that technical readiness alone does not explain viability.

Five practical tensions emerged from the material and are used here to structure the analysis. The first is between machinery provision and service governance: development projects often treat mechanisation as a question of asset transfer, while interviewees pointed to coordination, payment routines, maintenance and conflict resolution as the actually limiting factors. The second is between formal participation and active participation: nominal membership counts can be high while regular paying use remains low. The third is between partner access and partner coherence: a local partner is needed to enter a community, but multiple partners can fragment accountability. The fourth is between donor project cycles and service-system timelines: building a working service organisation takes years, while typical project funding runs in two- to three-year windows. The fifth is between what an external transfer brings in and what is already there: cooperative or quasi-cooperative arrangements rarely arrive in an empty institutional landscape.

Against this background, the article asks: what does the transfer of the Maschinenring model to Senegal and Kenya reveal about the governance conditions under which machinery-sharing services can be locally stabilised? The empirical perspective is that of actors connected to the implementing organisation. The article does not evaluate farmer-level outcomes, nor does it claim to reconstruct local actor perspectives directly. It analyses how those involved in setting up these services interpret the conditions under which the model has stabilised in some places and remained fragile in others. The contribution is practical and reflexive rather than theoretical. The case suggests that machinery-sharing in smallholder development contexts is most usefully designed as the construction of a local service governance system; that partner architecture is a critical and often underestimated design variable; that active participation and bounded density are better indicators of viability than registered membership and geographic reach; and that donor-shaped expectations require reflexive interpretation rather than blame.

2. Conceptual framing

2.1 Service-based mechanisation in smallholder contexts

A growing literature on agricultural mechanisation in Sub-Saharan Africa argues that the most appropriate path is not individual ownership but service provision (Daum and Birner, 2020; Diao et al., 2014; Takeshima, 2017; Van Loon et al., 2020). Smallholder farms are typically too small and too seasonal to absorb the fixed costs of owning a tractor, mill or harvester. Where machinery is owned, utilisation rates are often low, maintenance is uneven, and benefits accrue to comparatively few. Service-based mechanisation decouples access from ownership: a smaller number of machines is shared across many farms through a coordinating actor that manages booking, scheduling, payment, maintenance and dispute resolution.

Service-based mechanisation, however, takes several distinct forms. Private custom-hiring services are organised around individual operators who own equipment and sell machinery time on commercial terms. Donor-provided machinery pools place equipment under the management of external programmes, with use coordinated through the implementing agency rather than through local membership. Cooperative or member-based machinery-sharing arrangements organise access through a local membership structure that holds collective claims on equipment and decision rights over its use, pricing and maintenance. Models such as the Maschinenring occupy a specific position within this field. Their viability depends on a hybrid arrangement in which machinery access is organised through local membership, service routines, and collective accountability for the rules under which equipment is used and

replaced. In this article, service governance refers to the local rules, roles, routines and accountability mechanisms through which machinery access is organised as a recurring service rather than as a one-off asset transfer.

Service models, however organised, do not assemble themselves once equipment is in place. Their viability depends on a set of organisational tasks that are easy to overlook in project design: booking systems reliable enough to plan around, payment routines that work in environments with limited banking infrastructure, maintenance arrangements drawing on accessible spare parts and mechanics, conflict resolution that operates without recourse to formal contracts, and visibly consistent service quality over time. The literature on mechanisation service provider models (Van Loon et al., 2020) and on cooperative machinery sharing (Diakité et al., 2022; Lagerkvist and Hansson, 2012) emphasises that these tasks are organisational, not technical.

In smallholder contexts, an additional layer is the spatial constraint of physical service. Equipment is heavy, transport is costly, roads are uneven, and seasonal demand peaks compress operations into short windows. The effective service radius of a mechanisation service is bounded, and density of demand within this radius matters more than national-level reach. This is a different scaling logic than that of digital platforms, which can grow through low-cost geographic expansion (Frenken and Schor, 2017). Physical service systems often scale through depth before breadth.

2.2 Governance of development partnerships

A second body of work helps to explain why such service systems become difficult to stabilise under development-partnership conditions. The cross-border transfer of organisational models is rarely a clean import; it involves selective translation, partial adoption and recombination with existing institutional materials. Cleaver (2002) calls this institutional bricolage: actors blend novel arrangements with structures and norms already embedded in social and economic relations. Work in this tradition shows that externally introduced rules take effect through their negotiation with existing village structures, kinship obligations and prior project histories. The same logic is visible here. Caritas dioceses, Sunday services, village authorities, agricultural officers, prior FAO-funded farmer groups, and accumulated experience with development cooperation all shape what a transferred model can mean and do.

Donor practice itself is a constitutive part of this institutional landscape. Several decades of writing on aid effectiveness, ownership and partnership have argued that donor logics, funding cycles and accountability requirements substantially shape what can be built on the ground (Eyben, 2010; Mosse, 2005; Wallace, Bornstein and Chapman, 2007). Project-induced expectations, the well-documented tendency for repeated donor presence to alter local readiness to invest, are not best understood as cultural traits but as rational responses to a long history of externally funded interventions. This shift in framing matters: it moves the analysis from individualizing diagnoses of local actors towards a systemic reading of the donor configuration that has produced these expectations.

Two further governance themes are relevant. First, the role of local intermediaries. In partnership-based interventions, intermediaries provide more than access to communities; they stabilise rules, manage expectations, mediate conflict and uphold communication (Brinkerhoff, 2002; Kolk and Lenfant, 2015; Lewis, 2014). At the same time, intermediation is a power-laden relationship in which accountability frequently flows upward to donors more readily than downward to intended beneficiaries (Walsh, 2016). Second, the distinction between formal and substantive participation. Participation in projects can range from symbolic registration to substantive co-determination, and the difference matters for legitimacy and outcomes (Cornwall, 2008). Cooperative governance research makes a parallel point: membership figures alone do not capture cooperative health (Cornforth, 2004; Cornée, Le Guernic and Rousselière, 2020). Repeated, contribution-based use, voluntary financial commitment and visible local management capacity are more meaningful indicators. Both themes return throughout the empirical material below.

3. Case and methods

3.1 The Maschinenring as a service-governance model

The German Maschinenring originated in 1958 in Bavaria as a farmer-led response to the cost pressures of post-war mechanisation. Today, around 230 regional Maschinenringe organise machinery sharing for approximately 178,000 member farms (Bundesverband der Maschinenringe e.V., 2024). Member farmers gain access to machinery without owning it individually; a local coordinator matches demand and supply, organises scheduling and payment, and arranges maintenance; conflicts and quality issues are addressed through familiar local communication channels rather than formal contracts. The model emerged from capital-scarce smallholder agriculture and has remained locally embedded even as it has grown.

What is transferable in this case is therefore not a piece of equipment, nor a fully codified franchise, but a coordination logic combining shared access, locally managed service routines, and member-based governance. Whether this logic stabilises in another context is in part a question of whether the surrounding governance conditions allow the routines to take hold.

3.2 Senegal: a single intermediary configuration

The Senegal engagement began in 2018, drawing on a longstanding partnership between the Bavarian diocese of Bamberg and the Senegalese diocese of Thiès. Initial funding was modest, in the order of forty-five thousand Euros, and the project was framed as exploratory. Caritas Thiès served as the local implementation partner. In the early phase, agricultural engineers already employed by Caritas were seconded to the project; over time, they transitioned into Maschinenring positions. The Senegal interviewees consistently described the project as moving relatively quickly from initial sensitisation to first cooperative foundations and into the use of simple machinery. According to project documentation, by early 2025 the network reportedly comprised more than 250 local cooperatives across eight of the country's fourteen regions (Maschinenring Foundation, 2024). Interviewees reported self-financing levels of around 40 per cent after four to five years of operations; these figures are practitioner accounts and have not been independently verified.

3.3 Kenya as a contrasting context

The Kenya engagement began in 2021 in a markedly different setting. Multiple development and implementation actors were already active in the same regions, including GIZ, SEQUA and the Volkswagen Foundation, and the Kenyan agricultural sector had absorbed sustained donor presence over decades. Digital infrastructure was strong, mobile money via M-Pesa was well established, and main transport corridors were comparatively reliable. None of these advantages translated automatically into a more coherent local service system. Interviewees reported registered membership figures of around 8,000 across the network, alongside an estimated active share of only 10 to 20 per cent. After approximately four years, self-financing reached around 10 per cent, considerably lower than in Senegal over a comparable period. These figures are interview-derived practitioner estimates rather than externally validated metrics. The contrast is not framed here as a story of failure but as an analytical lens through which the conditions for local stabilisation become visible.

3.4 Data and analysis

The empirical material consists of seven semi-structured expert interviews and supporting documents. Interviews were conducted between late 2025 and early 2026 with respondents involved in strategic coordination, foundation-level implementation, academic and network support, and country-specific operational work in Senegal and Kenya. The sample includes the strategic architect of the internationalisation (E5), the foundation director (E6), the Senegal country coordinator (E3), the Kenya country coordinator (E4), an East Africa coordinator (E1), the West African field coordinator (E7) originally from Guinea, and a manager of an academic-network project connected to the Maschinenring internationalisation process (E2). Interview duration ranged from 35 to 95 minutes. Total transcript material amounts to 214 pages.

All interviews were conducted in German, including with the West African field coordinator. This sampling and language choice both enabled access and constituted a constraint, in that it privileged actors fluent in the operational language of the German implementing organisation. The article does not evaluate farmer-level outcomes or long-term development impacts; it analyses how actors involved in the transfer and implementation process interpreted the practical governance conditions of establishing machinery-sharing services in Senegal and Kenya. Local farmers' own interpretations of participation, contribution and trust are not systematically captured. The Discussion returns to this scope explicitly.

The supporting documentary material consisted of ten public sources covering 2018 to 2025, including project descriptions and country reports published by the Maschinenring Foundation, organisational web texts of the implementing partners, public announcements by funding actors (Bavarian state government, BMZ, GIZ), and project presentations made publicly available by the Maschinenring network. They were used to verify timelines, organisational structures, reported project milestones and publicly communicated project aims, but were not treated as an independent impact dataset.

The author was not part of the implementing organisation and did not hold operational responsibility for the projects. Prior academic contact existed through university-based supervisory work on student research connected to the Maschinenring internationalisation process. This positionality facilitated access to knowledgeable respondents but also required reflexive attention to insider framings; interview interpretations were therefore treated as implementation-side accounts rather than as neutral descriptions of local realities. Coding was theory-guided and proceeded in three iterations, supported by MAXQDA. The strategy combined within-unit pattern reconstruction (inside Senegal, inside Kenya) with cross-unit

comparison around four recurring themes: partner architecture, participation, governance routines, and scaling. Memos were used throughout to develop practical lessons rather than typological claims. Quotations reproduced below are translated from German; they are reported as interview material, not as objective accounts of local conditions.

The available data do not allow a systematic gender analysis of machinery-sharing participation. This is a limitation, particularly because machinery access, landholding, payment capacity and participation in farmer organisations are often gendered in smallholder contexts (Othman, Oughton and Garrod, 2020). Where interview material referred specifically to female users (notably in connection with mills and dehusking machines), this is reported in the findings; the systematic question of how women and men experience and access these services differently is left to future research that includes farmer-level data.

4. Findings

4.1 Machinery provision is not enough

The most consistent message across the interviews is that machinery-sharing projects do not stand or fall on equipment supply. They stand or fall on whether equipment can be organised as a service that members find reliable and worth paying for. The strategic architect of the internationalisation formulated this directly when describing the early conviction problem in Senegal:

> *The hardest part at the beginning was not getting the funds. It was explaining to people on the ground that they had to pay for the service. That principle, in its strict form, was not easy to enforce. Many had known other projects where mills were donated. When the mill broke, they simply said: "The mill is broken," and waited for the next donation. (E5)*

The same respondent contrasted this with the Maschinenring response: when groups arrived saying that a donated mill had broken, the project agreed to look at the repair but introduced the rule that future repair and use would have to be paid for. The shift from gift to service, mundane in formulation, redefines what a mechanisation project actually is. From this perspective, the relevant outcome is not the number of machines distributed but whether a recurring revenue stream covers maintenance, repairs and eventual replacement.

This reframing has practical consequences. Initial machine choices were tilted towards equipment that produced immediately visible relief from labour, including small mills,

dehusking machines, simple seeders drawn by donkeys, and basic weeding implements. As the same respondent put it, the priority was to ensure that users "immediately feel that their daily work becomes lighter", while paying a price calibrated to refinance the equipment over time. Heavier or specialised machinery, where economics required larger user groups, came later. The pattern is consistent with the broader literature on appropriate mechanisation (Daum and Birner, 2020; Van Loon et al., 2020), but the case adds an organisational point: even simple equipment fails as a development intervention if it is not embedded in a service routine that members can rely on and pay for.

Decentralised service points emerged as a recurring practical adaptation. The Kenya country coordinator described how small shops were established at strategic locations, often around mills, to make the Maschinenring physically visible and to bundle access to advisory services, inputs and equipment use. What matters is not the form of these shops but what they do organisationally: they convert a machinery project into a recognisable local service node.

4.2 Local partners as governance intermediaries

A second consistent finding concerns the role of local partners. In conventional project language, a partner provides access to a community. The interview material suggests that the more important function is governance intermediation: stabilising rules, managing expectations, mediating conflict, and bundling communication across an unfamiliar organisational landscape.

In Senegal, Caritas Thiès performed this role. The Senegal country coordinator described the early entry as follows:

> *The first contacts went through Caritas, initially in Thiès. I explained the Maschinenring system to the Caritas managers, in my more or less workable French. Their reaction was unambiguous: "This is exactly what we need." Caritas then selected suitable specialists, mostly agricultural engineers already working in the organisation, who became the operational leaders of the first Maschinenringe. (E3)*

The intermediary function went beyond access. Caritas provided pre-existing contact networks with farmers, communicated with diocesan and municipal authorities, and lent the project an institutional legitimacy that a foreign organisation could not have produced on short notice. Crucially, Caritas allowed clear lines of accountability to emerge, because there was effectively one address for early implementation problems. The first cooperatives could be set up while a

single partner held responsibility, rather than being negotiated across a coalition of organisations with different mandates.

The Senegal trajectory also illustrates the limits of relying on a single religiously affiliated intermediary indefinitely. The same coordinator described a deliberate later separation:

> *There was a turning point. We deliberately separated from Caritas as institutional carrier, even though they had been a reliable and important partner and continued to play a role in new foundations. The central idea was that Maschinenringe must exist as independent organisations. (E3)*

This sequence is analytically important. Caritas Thiès was not only a productive intermediary but also a structuring one: the channels it opened, the parishes through which sensitisation moved, and the diocesan networks that lent legitimacy were also forms of selection. They favoured groups already connected to Catholic infrastructures and could in principle have left other groups underserved. Interviewees did not describe the Senegal configuration as free of tensions. The later separation from Caritas indicates that the same intermediary capacity that had enabled rapid entry could also become a constraint on organisational autonomy as the network matured. This reading is consistent with the strategic architect's reflection that religious affiliation was not the actual mechanism of uptake; the mechanism was the model itself, and Caritas served as the path along which it could travel. Partner coherence is therefore not a once-and-for-all configuration but a sequence: a coherent intermediary at entry, followed by gradual organisational autonomy. Whether the transition succeeds is itself a governance task, not an automatic consequence of growth.

In Kenya, the situation was different. Several development and implementation actors were active in the same regions, often working with overlapping farmer groups. The Kenya country coordinator described how the Maschinenring approach had to be adjusted in conversation with local colleagues, who pointed out that direct outreach in this environment would not work:

> *I discussed the approach with local colleagues. Their reaction was very clear: "This will not work that way. That is typical German thinking. We need to involve the churches." So colleagues organised event spaces through churches. Pastors announced in Sunday services that there would be information events about the Maschinenring. We additionally involved Agriculture Officers. (E4)*

This is bricolage in Cleaver's sense (Cleaver, 2002): the transferred model worked through existing local institutions, including churches and state agricultural extension, rather than

around them. Yet the broader pattern in Kenya was less one of productive integration than of competing donor initiatives addressing the same farmer groups. The same coordinator described an episode that captures the resulting fragmentation:

> *We had a situation at the level of GIZ and FAO that led to discussions in Nairobi. FAO had become aware of our project and donated two tractors because they were convinced of our work in Bungoma and wanted to support rice production there. When GIZ found out, they were very annoyed because another organisation had "inserted itself" into an ongoing project. A GIZ staff member once said to me very openly: "We are competing for the same farmers, essentially for the same customers." And the farmers know it. (E4)*

Two organisational dynamics interacted here. Multiple donors operated in the same geography with different equipment lists, different assumptions about contribution and ownership, and different time horizons. Farmers, in turn, had practical reason to compare offers, hold back commitments, and wait for whichever programme would impose the lightest cost. The Senegal trajectory had benefitted from the absence of this configuration; the Kenya trajectory had to find ways to operate inside it. The implication is not that more partners mean better implementation. Where partner architecture is fragmented, accountability becomes diffuse, and active local commitment becomes harder to mobilize.

4.3 Registration does not equal participation

A third pattern, more strongly emphasised in the Kenya material than in Senegal, concerns the gap between formal membership and active use. According to the strategic architect of the internationalisation, the proportion was strikingly low:

> *In the first project we ended up with around 8,000 members in the Maschinenringe. But if I look at how many we are actually working with day to day, that is perhaps 10 to 20 per cent. The others are on paper, deliver impressive numbers, but the real operational factor is much smaller. With those 10 to 20 per cent, however, we can do something. That is the basis of sustainable Maschinenring work. (E5)*

Two implications follow from this implementation-side account. First, headline numbers commonly used in project reporting are at best weak indicators of viability. Second, what differentiates active from nominal members is not enthusiasm at registration but the pattern of subsequent contribution: repeated paying use, willingness to take on bank-financed equipment, capacity to keep records and to manage breakdowns. The same respondent gave a concrete picture of what real traction looks like: five farmers who pool resources, take a bank loan to

buy a tractor, deploy it through the Maschinenring, and pay back the loan from machine revenue. Whether such groups form is, in this material, a more meaningful test than total membership.

A reflexive caveat is required when interpreting the lower active share in Kenya. Several interviewees framed this through the lens of donor-shaped expectations, arguing that repeated exposure to externally funded projects had altered local readiness to contribute financially. The Kenya country coordinator illustrated the dynamic with a specific encounter:

> *A farmer recently said: "We in the group where the FAO donated need a third tractor." I told him very clearly: "Look at your neighbours. They bought their own tractor with bank financing. If they can do it, you can do it too. I no longer have any interest in collecting money for tractors for you." (E4)*

Read on its own, the term "project mentality" used by some respondents risks individualising what interviewees themselves described as a systemic phenomenon. Several respondents interpreted the region's long history of donor-funded interventions as having produced an environment in which equipment had repeatedly been delivered as gift rather than as service. Where actors have experienced externally funded projects as benefit-providing and temporary, expectations about contribution, ownership and sustainability differ from those embedded in cooperative service models (cf. Eyben, 2010; Mosse, 2005). This does not imply that local actors are passive or opportunistic. It suggests that project histories shape rational expectations about what externally supported initiatives are likely to demand and deliver. The empirical observation, therefore, points less to a feature of local actors than to a feature of the cumulative donor configuration interviewees described. Given the limited farmer-level data in this study, this should be read as an implementation-side interpretation rather than as a definitive account of local motivations.

The West African field coordinator articulated a complementary insight that bears directly on participation:

> *We learned that when we go to the local people directly, they are usually not really interested. Everyone promises a little, feels a little obligated. They say: "They need our money now because we have to pay membership fees." There are so many organisations that have done this in every country, where farmers paid money and never saw any use of it, and so they doubt. But when they come to us, that means they have seen the benefit of using the machines, or they want to work with us. That is what we have really learned on the ground. (E7)*

The shift from outreach to demand-driven engagement, from a push to a pull dynamic, recurs across the interviews. It is also one of the more concrete operational lessons of the case. Where machinery-sharing services have stabilised, project actors describe a transition from convincing communities to enrol towards communities approaching the project of their own accord. Whether this transition occurs is, in this material, a stronger predictor of viability than nominal membership figures.

4.4 Active density matters more than nominal reach

Physical service requires physical proximity. Across the interviews, an effective service radius of roughly 10 to 30 kilometres recurs as a working assumption, with 50 kilometres treated as an outer limit beyond which equipment transport and operator travel become impractical. The West African field coordinator described how this constraint reshaped local Maschinenring boundaries:

> *We saw, when we acquired the machines, that the distances mattered. Villages are 10 to 30 and sometimes 50 kilometres apart, and they cannot use the machines at the same time. So we said: each village where we have at least 100 to 150 farmers gets its own Maschinenring, even if they had originally formed a joint one. We also had cases the other way round: in one village, with 300 members in a single local Maschinenring, we had to split. (E7)*

Two operational thresholds recur in the interviews: a minimum of approximately 100 active members per local unit for service viability, and an upper bound of approximately 300 members at which splitting becomes preferable. These are practitioner estimates rather than externally validated thresholds. They reflect a reading of how many active users a local service can absorb before quality and identification suffer, and how few it can support before fixed costs make service provision unaffordable. Respondents converged around these numbers; they did not derive them from a formula.

Two further density observations are practically important. First, scaling that works in this case is clustered rather than dispersed. The Kenya country coordinator described the rationale for selecting new locations adjacent to existing Maschinenringe rather than in unrelated regions: proximity to working units accelerates founding, shortens learning loops, and creates peer-comparison among local managers. The density logic also creates trade-offs, however: concentrating effort in regional clusters means that other areas remain underserved for longer. Second, scaling at the level of the implementing organisation follows the same logic. In the

interview accounts, founding two or three Maschinenringe in a country was not viable, because the organisational overhead is largely fixed; ten to twenty units within a region produced the conditions in which a country office could operate. The case suggests that machinery-sharing initiatives limited to very small pilot footprints may struggle to become self-sustaining, regardless of the quality of those pilots.

Time is the other dimension of density that matters. The strategic architect of the internationalisation described the underlying ambition as the goal of working oneself out of the country:

> *Our basic logic is different. We want to make ourselves redundant. Our goal is that after five years we can leave a country and say: "It all stands. The system runs on its own." Many organisations are built so that they always need follow-up projects, because they never become "finished." That is explicitly not what we want. (E5)*

The same respondent and others repeatedly emphasised that this horizon is incompatible with two- to three-year donor cycles. Five to seven years emerged as the working estimate of the time required to move a country engagement from initial pilots to a network of locally credible Maschinenringe with degressive subsidy needs. The Senegal case reportedly reached approximately 40 per cent self-financing at the end of a four- to five-year period, while Kenya remained around 10 per cent over a comparable horizon. These figures are interview-derived practitioner estimates and should be read with the caution noted in Section 3. The substantive point is consistent across all interviews: in the implementation-side accounts, services cannot be built on project timelines.

4.5 Simplicity helps only when paired with accountability

A final pattern concerns the kind of organisational complexity that is useful in these settings, and the kind that is not. Across the interviews, simple coordination routines, paper records, telephone-based communication, locally legible rules, are described as advantages rather than as deficits relative to digitally sophisticated alternatives. Several interviewees framed this simplicity as a portability advantage in resource-constrained settings, where complex management technology is unavailable, unfamiliar or expensive to maintain.

The same simplicity, however, is not self-sufficient. Where Maschinenringe have stabilised, simplicity is paired with a small set of accountability instruments that make local management visible. A bank account in the name of the local Maschinenring, a record-keeping book maintained by a paid local manager, transparent fee schedules, and a service log accessible to

the regional office are recurring elements. The Kenya country coordinator described how digital tools support this transparency without replacing it:

> *Payment works very well via M-Pesa, comparable to PayPal. The whole money logistics runs professionally inside the Maschinenringe. I get my controlling reports as Excel files. We use WhatsApp groups for everyday coordination. But the central thing is that controlling data leave the local Maschinenring on a regular basis, so somebody outside the village can see what is happening. (E4)*

Without such instruments, simplicity risks collapsing into informality. With them, it becomes a service governance system that can absorb local idiosyncrasies while remaining accountable upwards. The same logic applies to people. Where neither contracts nor reputational sanctions can reliably enforce service quality, locally credible managers substitute for both. Several respondents emphasised that recruitment criteria therefore privileged local origin, practical agricultural experience and willingness to take operational responsibility over formal qualifications. The Kenya country coordinator captured the underlying point from the other direction:

> *The foreign expert can talk as much as he wants. He will leave at some point. And then the next one comes, and they listen to him too. So it is decisive to identify those local people who have understood it and want to do it themselves, and to keep working with them. (E4)*

Local management capacity, in this material, is not a variable to be measured but a recruitment, training and trust-building process that runs in parallel to machinery acquisition. Without it, simple routines lack the accountability they require. With it, simplicity can become a design strength.

5. Discussion: Lessons for development practice

The case examined here is small in empirical scope and limited in perspective. Read carefully, however, it offers a coherent set of lessons for the design of machinery-sharing initiatives in smallholder development contexts. The lessons cohere around a shift in framing: the relevant unit of intervention is not the machine but the local service governance system that organises, finances, maintains and gives meaning to its use. The general claim that assets require institutions is not new to development practice; the contribution of this case is to specify what it means for cooperative machinery-sharing services, where viability depends on local service routines, contribution-based participation, bounded density and accountable management.

5.1 Designing mechanisation as service governance

The first lesson is that mechanisation initiatives should not treat equipment funding as sufficient, but should invest in the local service systems through which machinery use becomes reliable. This includes booking, scheduling and payment routines; maintenance arrangements drawing on accessible spare parts and mechanics; conflict resolution that works in local language and through familiar authority structures; reinvestment provisions; and a local management capacity that can run all of this. The case suggests that where these elements are missing, equipment depreciates faster than it produces value; where they are present, even simple equipment yields cumulative effects. The point connects to the broader literature on appropriate mechanisation (Daum and Birner, 2020; Van Loon et al., 2020), but adds an organisational dimension: in this case, service viability emerged as the constraint that binds, rather than technical readiness.

5.2 Partner architecture and donor-shaped implementation environments

The second lesson concerns partner architecture. Local partners are necessary, but the criteria by which they are selected matter. Reach into communities and political visibility are weaker predictors of useful intermediation than the capacity to manage expectations, stabilise rules, mediate local conflict, bundle communication, and uphold accountability (Brinkerhoff, 2002; Lewis, 2014). Caritas Thiès in this case is an example of partner-based governance capacity rather than simply a successful partnership. At the same time, religiously affiliated intermediaries open some channels and close others; their reach into Catholic networks may not extend equally to other communities. Partner coherence may therefore come at the cost of plural representation. Where multi-stakeholder configurations are unavoidable, an explicit lead-actor structure with clear role separation appears preferable to coalitions that share responsibility for the same farmer groups.

Partner architecture cannot be considered in isolation from the wider donor configuration. Where actors have repeatedly experienced externally funded projects as benefit-providing and temporary, their expectations differ from those embedded in cooperative service models. The interview material in this case interpreted such expectations not as a feature of local actors but as a rational response to the cumulative donor configuration in the region (cf. Eyben, 2010; Mosse, 2005; Wallace, Bornstein and Chapman, 2007). Reading it that way directs attention to design responses that lie partly within the control of donors themselves: avoidance of saturated

regions, coordination across donors, degressive funding logics, and the explicit pricing of service rather than the donation of equipment.

5.3 Measuring viability: active participation and bounded density

The third lesson is one of measurement. Standard project indicators (machines delivered, members registered, groups founded, training events held) capture inputs and superficial outputs but not service viability. Indicators closer to the substance of local service systems include repeated paying use, equipment utilisation rates, member retention after fees are introduced, frequency and resolution of disputes, transition to self-financing, and emerging demand from neighbouring communities. The shift connects to the long-running development debate on participation beyond registration (Cornwall, 2008): what looks like participation in formal terms can be a thin layer over disengagement, while substantive participation shows up in contribution, retention and self-organisation.

A second measurement issue concerns scale. In physical service systems, geographic depth matters more than national breadth. Five to ten Maschinenringe in a contiguous region produce mutual reinforcement, comparison and accelerated learning; the same number of units distributed across an entire country produce isolation. The implication, for this type of service model, is that machinery-sharing initiatives should stabilise a regional cluster before expanding to new areas, and should resist the temptation to cover wide territory at low local density.

5.4 Project timelines and the slow work of institutional construction

A practical implication threads through the previous lessons. In this case, coherent local service governance appeared to require a five- to ten-year horizon rather than the twenty-four to thirty-six months typical of many project cycles. Where donor logics allocate resources in the shorter cycles, systematic pressure builds towards visible outputs at the expense of less visible service viability. This mismatch helps explain why projects may overproduce visible outputs while underinvesting in the routines that make service systems durable. Funders who want machinery-sharing as a service system should align funding cycles with the construction horizon of that system. The implication echoes a broader argument in development practice that project-form intervention can crowd out the slower work of institutional construction (Mosse, 2005; Wallace, Bornstein and Chapman, 2007).

5.5 Power, exclusion and the limits of implementation-side lessons

A reflexive note belongs at the end of these lessons. The case material reads, at first pass, as a story of what an external organisation brings to a transferring context. Read more carefully, it is also a story of what the receiving context already provides. Caritas dioceses, Sunday services, village authorities, agricultural officers, prior FAO-funded farmer groups, and local mechanics and equipment manufacturers all contributed to whatever stabilised in Senegal and Kenya. The Maschinenring model offered a recognisable coordination form, a network identity, and external legitimacy; the local institutional landscape offered the embedded relations through which any of this could acquire meaning (Cleaver, 2002). Recognising both directions of this exchange points future projects towards a different starting question: not what to introduce, but what to combine with what is already there.

Designing machinery-sharing as service governance does not remove questions of power; it relocates them into the rules of access, the structure of pricing, the criteria of local management selection, and the channels through which accountability can be made visible (Walsh, 2016). Who is enrolled, who can afford the fees, who serves on a board, who is hired as manager, and which households gain priority access in peak season are governance questions, not technical ones. The available data do not allow this article to address them empirically, but the design implication is direct: any practical adoption of the lessons proposed here should treat service governance as a setting in which exclusions can either be reduced or reproduced. This applies particularly to gender. Machinery access, landholding, payment capacity and participation in farmer organisations are often gendered in smallholder contexts, and machinery-sharing services can either widen or narrow gender gaps in mechanisation access depending on how the system is built (Othman, Oughton and Garrod, 2020). Future research that combines implementer perspectives with farmer-level data, including across gender lines, would clarify which of the lessons proposed here generalise beyond this organisationally centred account.

6. Conclusion

The transfer of the German Maschinenring model to Senegal and Kenya is a small case with a focused message. The implementation-side evidence analysed here suggests that machinery-sharing initiatives in smallholder development contexts may succeed or fail less through machinery provision itself than through the governance of local service systems. Coherent partner architecture, active rather than nominal participation, bounded service density, simple routines paired with visible accountability, and time horizons that match service-system construction rather than project cycles emerge as conditions that appear central to stabilisation

in this case. The practical implication for development organisations, donors and policy actors is to design machinery-sharing initiatives as service governance from the outset, and to align partner choice, monitoring, scaling logic and funding horizons accordingly.

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