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What Smallholders Want: Effective Strategies for Rural Poverty Reduction

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Abstract: Since poverty is particularly concentrated amongst smallholder farmers, development programs intend to support rural livelihoods and agricultural entrepreneurship. The final impact of these programs remains, however, rather limited due to insufficient understanding of key challenges that smallholder families are facing. Many well-intended initiatives for reinforcing smallholder production systems and for strengthening their commercial relationships meet conceptual and practical limitations that reduce their effectiveness. Smallholder livelihoods are most constrained because behavioural drivers for adopting innovations and for upgrading value-chain relationships are not well understood and are frequently overlooked. This article discusses the analytical linkages between the key causes of smallholder poverty, the constraints that limit the effectiveness of ongoing rural development initiatives, and the prospects for alternative strategies to support behavioural change. A better understanding of what smallholders want and need may lead to fundamentally new policy propositions. It is argued that technological change in smallholder production or integration into market systems will only take place if embedded in behavioural change mechanisms that are complemented by appropriate institutions and governance regimes. This asks for coordinated structural reforms in farm and community organisation, value chain integration and more effective public-private cooperation.

Keywords: rural poverty; smallholders; Innovation; empowerment; impact; behavioural change

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1. Introduction

There is an ongoing and lively debate on the most appropriate strategies for improving the position of smallholders in tropical commodity chains in Sub-Sahara Africa [1–3]. While many studies focus on opportunities for increasing yields or improving prices, far less attention is usually given to opportunities for reducing risk or strengthening trust in tropical value chains. This divergence is largely due to the fact that the behavioural drivers for smallholder decision-making are little understood, and, therefore, many well-intended initiatives that try to reinforce smallholders' incomes and livelihoods meet major constraints that limit their effectiveness [4].

In this article, we outline an analytical framework to better understand the key objectives that smallholder farmers pursue. Our analysis is grounded in the systematic analysis of empirical field studies on smallholder behaviour, complemented by longstanding expertise in farm-household production, consumption and marketing decisions [5,6]. This provides the basis for a further analysis of different strategic initiatives for improving smallholder welfare, such as fair trade certification and living income benchmarks. We show that many of these market-based interventions were rather ineffective due to the limited consideration given to the required changes in the behavioural drivers for the adoption of innovations and the engagement in market relationships.

The article relies on a conceptual approach (see Figure 1) that starts with an overview of key constraints that smallholder farm-households have to face, followed by an analysis of why many strategic initiatives for 'making markets work for the poor' are delivering

such limited impact [7]. This paves the way for a further discussion on the possibilities of providing better incentives for behavioural change that enable smallholder livelihoods to respond to key challenges.

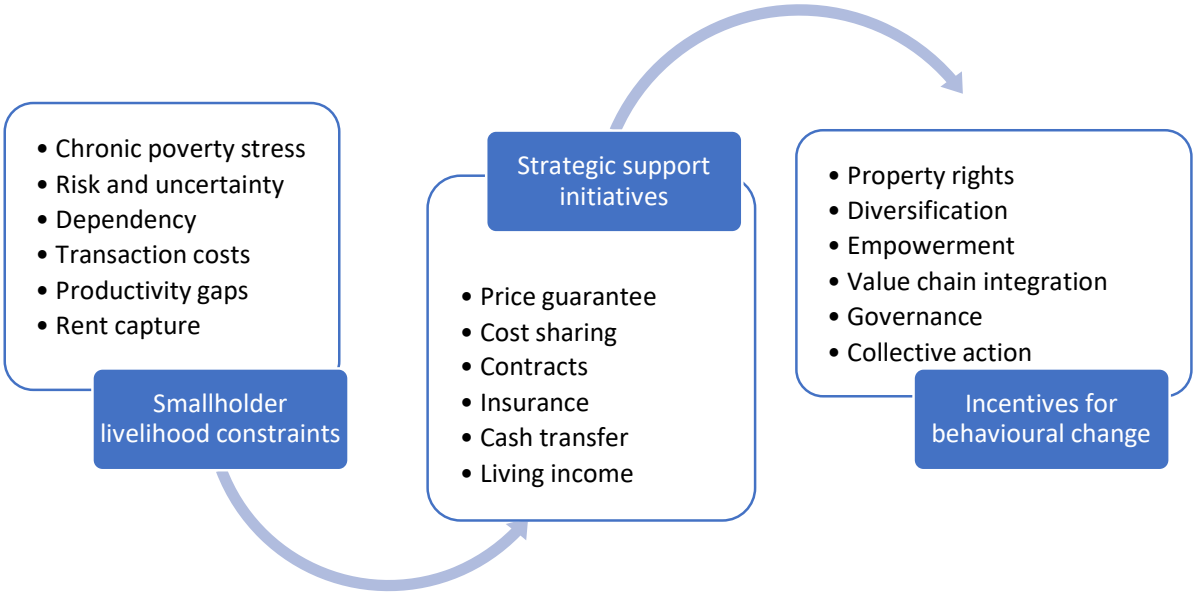


Figure 1. Linkages between smallholder livelihoods, strategic development initiatives, and incentives for behaviour change.

Smallholders are defined as family-operated farms that mainly use family labour for their agricultural activities. They comprise farms up to 2 hectares that make intensive use of scarce land resources and use part of the produce for direct household consumption [8]. Smallholder livelihoods strongly rely on agriculture, usually a mixture of cash crops, livestock rearing and subsistence farming. In addition, they engage in off-farm work and non-farm (self)employment to diversify their household income. Part of the rural labour is moving out of agriculture and absorbed into low-productivity services and informal urban activities, such as retail trade, transportation, food preparation, etc. Smallholders still depend for essential necessities on community exchange networks that provide access to water, food, feed, shelter and services.

Smallholder farmers represent an important segment of global agrifood systems where a significant part of rural poverty is still concentrated. Of the 570 million farms worldwide—83% of which are in sub-Saharan Africa (9%) and Asia (74%)—475 million are smallholder farms (<2 hectares). These farms operate about 24% of the world's agricultural land and provide around 30–34% of the food supply [9]. Some 400 million rural people live in extreme poverty, of which 76% are in sub-Saharan Africa. Yet, many of these poor farmers are systematically neglected in agricultural and rural development programs.

After several decades of gradual reduction of rural poverty, it started to increase again with the COVID-19 pandemic. Currently, around 680 million people (=8.5% of the world population) still face (extreme) poverty. Two out of three people experiencing poverty live in rural areas and much of this poverty is concentrated in sub-Saharan Africa. Rural poverty is most strongly affecting families living in conflict regions and/or facing the effects of climate change [10]. Especially women and children suffer from the consequences of rural poverty in terms of malnutrition, stunting and wasting [11], as well as the negative educational and psychosocial effects.

The current literature on smallholder engagement in tropical value chains shows important limitations. Most studies mention a range of practical challenges that need to be addressed to improve farming systems and household revenues and identify some actions to overcome these problems [12,13]. However, they fail to outline the key drivers and mechanisms to modify this situation. This article argues that—instead of just com-

bining different actions for strengthening the smallholder sector—it is important to better understand the underlying drivers of rural household behaviour for adjusting their livelihoods and engaging in any of these strategies. Therefore, we need to identify which issues shape prospects for adopting innovations into smallholder livelihoods and how they can become engaged in strategies for improved resource management and better governance of agrifood value chains.

These issues are especially important in tropical commodity chains of cocoa, coffee, tea and cotton. Bymolt et al. [14] assess the opportunities for poverty reduction in the cocoa sector in Ghana and Ivory Coast—looking at the role of land tenancy, production systems and marketing regimes—and conclude that more fundamental institutional and market reforms are required for improving farmer' welfare and living wages and to overcome existing structural bottlenecks. In a similar vein, Waarts and Kiewisch [15] study on cocoa farmers in West Africa shows that neither increases in yields nor better farm-gate prices offer sustainable alternatives for reaching minimum living income. The authors, therefore, make a plea to support the poorest cocoa farmers towards income diversification and engagement in non/off-farm and self-employment. Taher [16] reaches a similar conclusion for Indonesian cocoa farmers, showing that adoption of improved production technologies is only possible if appropriate risk management practices are in place. Therefore, major emphasis should be given to better market linkages and improved governance to enable farmers to achieve a decent living standard.

Recent studies on value chains for coffee and cotton also provide evidence that initiatives for improving yields and prices through (fairtrade or organic) certification of cropping systems and upgrading of agro-processing facilities focus too much on the supply-side facilities (credit and technical assistance services, etc). They generally neglect the high investment costs and the intensive labour demands that make adoption less attractive to many smallholders and underestimate the marketing and governance constraints (such as price fluctuations, weak cooperatives, over-certification, etc.) that limit their feasibility [17].

Value chains for staple food crops (maise, wheat, rice) report similar constraints for the adoption of improved practices and the involvement of relevant stakeholders, particularly women. Jain et al. [18] show that promising strategies for sustainable intensification of smallholder farms—such as water harvesting and the system of rice Intensification—have considerable potential to scale to reach more than 50% of smallholder farmers who plant staple crops, but significant barriers to adoption remain related to limited access to land and water, labour shortages and market constraints. Adoption of climate-smart agricultural practices is especially limited due to high risks and insecure revenue streams [19].

Whereas all studies seem to agree on the idea that there is '*no one size fits all*' solution, they tend to disagree on the concrete priorities and policy pathways for implementing a combined set of measures for strengthening farmers' livelihoods. In essence, this is due to their reliance on partial and strictly operational approaches that make rather limited use of systems transformation thinking [20]. Current literature shows a preponderance of studies focussing on the adoption of new technologies for (semi-)commercial farmers but is notably scarce in generating knowledge on adaptive livelihood change in a smallholder context. This is partly due to the fact that behavioural change processes are far more complex, face more resistance and, thus, require a longer time period, which is why structural bottlenecks are identified earlier than institutional constraints. This article intends to fill this gap by focussing on the drivers of smallholder behaviour and identifying policy alternatives to support rural poverty reduction.

2. Key Challenges That Smallholders Face

Agricultural and rural development programs in the global South tend to focus strongly on strategies for improving yields since smallholders only operate small plots of land and are therefore considered to be better off if returns to land improve [21]. While land is certainly scarce and land ownership remains insecure in many settings, livelihood

strategies of poor rural households also include a number of other objectives that are equally important—albeit more difficult—to pursue.

Even while local livelihood realities are substantially different between farmers and locations, the empirical literature on smallholder preferences, needs and priorities points towards a coherent set of farm-household objectives that are considered of primary importance to guarantee their resilience and survival and eventually enable them to raise their living standards beyond poverty [11,22,23].

Based on a thorough review of the literature on the determinants of income and revenues for smallholder farmers and the structural causes of poverty amongst rural households, we identify six main challenges that notably influence smallholder behaviour and need to be addressed for combatting rural poverty (see Figure 2).

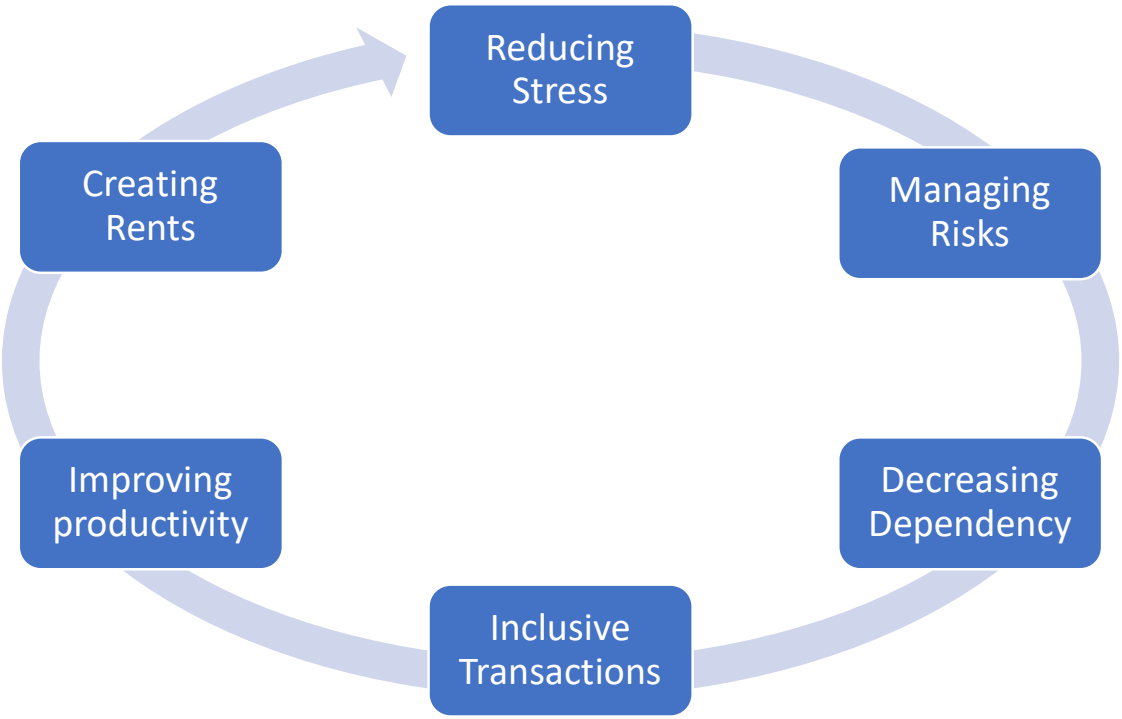


Figure 2. Key livelihood challenges for poverty reduction by smallholder producers.

2.1. Reducing Stress

Smallholder farmers are poor, and this poverty tends to become a chronic feature (that is intergenerationally transmitted) due to the high variability and low predictability of income streams. Consequently, they regularly face critical shortfalls in basic consumption that lead to a context of stress, where mental and physical disparities limit opportunities for coping. Uncertainty about future income streams is further enhanced by strong variations in prices and limited prospects for improving resource productivity.

There is wide evidence that higher incomes do not automatically lead to better nutrition and health [24]. Even while most investments for improving production or trade are controlled by men, income streams steered by women have substantially stronger effects on household food security, child nutrition and the life course of the family.

Considering rural farm households as a unit of production and consumption implies that they are not merely interested in higher net farm incomes but especially in '*consumption smoothing*' through stable revenue streams with small fluctuations [25]. Incomes that are less variable and more predictable are appreciated more than just higher incomes. Stable expectations about future income streams enable rural households to invest in education, nutrition, housing and health, in such a way that they can allocate windfall profits to investments in farm household assets. It is therefore advocated to reduce smallholders' stress from the consumer side, using vouchers and cash transfers as incentives for allocating

expenditures to better nutrition. This may lead to higher labour productivity and can be paid off by earnings from the production side of the household.

2.2. Managing Risks

Smallholders continuously face chronic poverty traps that are caused by unexpected income shortfalls due to personal disasters (such as illness, death, fire or theft) or local climatic events (drought, floods, storms, plagues and diseases, etc). The management of such risks asks for the maintenance of substantial reserve stocks (cattle, jewellery, etc.) that may be mobilised for risk-coping purposes, but can also lead to compulsory sales of critical assets (land, house, cattle) for overcoming income shortfalls [26].

Building resilience into smallholder households implies that farmers tend to engage more in low-return activities that enable flexible adjustments, usually at the expense of investments with a higher earning capacity. Poor farmers thus become risk-averse and exhibit a low willingness to invest in potential improvements, a trend that can be reversed by providing insurance, deepening education and/or diversifying income-generating activities. Some of these strategies depend on public support.

2.3. Decreasing Dependency

Smallholder farmers usually face insecure land (ownership or use) rights that inhibit making investments in better resource management. More secure and registered land rights offer opportunities for borrowing (using land as collateral) and enlarge the time horizon for expected returns, thus enabling poor farmers to engage in other income-generating activities. In a similar vein, better access to loans and credit may support farmers to increase their returns to land and labour

Efforts for decreasing smallholder dependency usually focus on activity and income diversification through labour engagement in non- and off-farm employment and farm investments for upgrading (financed from off-farm income and remittances), thus creating important spillovers between different activities within the household [27]. Moreover, diversification of household revenues reduces dependence on a single crop and improves farmer's capacity to adapt to shocks and their ability to invest in household nutrition. Simultaneous engagement of farmers with midstream traders in different markets is also helpful in diversifying risks [28,29]. Gender-balanced decision-making on priorities for household resource allocation in production, consumption and trading requires that women's empowerment is reinforced in such a way that lifetime perspectives of livelihoods for all household members are adequately considered.

2.4. Inclusive Transactions

Even while part of smallholder production is likely to be devoted to household food consumption, they also depend on market exchange for generating cash resources to finance non-food expenditures. Farmer's bargaining position in rural markets is heavily affected by high transaction costs that lead to strong price fluctuations and low margins. High transaction costs are caused by low frequency (small trade volumes), limited price information, individual sales and fierce competition.

Smallholder trade transactions on input and output markets are mainly spot exchanges that are characterised by low trust with traders, short-term arrangements and the absence of collective action (cooperative organisation). Many poor farmers operate as net buyers on local markets [30] and are, therefore, more interested in low prices (as consumers) instead of high prices (as producers). This leads to a perverse response to prices and tends to limit opportunities for engaging women in trade as a pathway for supporting changes in intra-household bargaining power.

2.5. Improving Resource Productivity

Smallholder farmers face low and declining crop yields (due to limited input use and progressive land degradation) combined with stagnating labour productivity. Since

smallholders' incomes simultaneously depend on the returns to land, labour and capital, attention should be devoted to raising 'Total Factor Productivity' (TFP). While much emphasis is usually given to technical opportunities for improving returns from agricultural production- either through higher yields (relying on better breeds, fertiliser and irrigation) or through better prices—farmers prefer to increase welfare by adding value from resources that are most scarce to them [31]. The key strategy for strengthening rural livelihoods thus starts with investing in the labour capacity of the household workforce. This particularly includes investment in education and human capital that generate prospects for farm innovation and create opportunities for on- and off-farm income generation.

In the smallholder sector, both land and capital are limited, but (family) labour is especially scarce [32,33]. This may sound strange given the high level of local unemployment, but prospects for sustainable intensification and regenerative agriculture require fairly labour-intensive production systems with peak labour requirements that 'ty up' family labour to the farm. It is, therefore, not sufficient to increase only the availability of resources, but incentives and leverage points need to be identified at the institutional and behavioural levels to generate higher returns to production factors.

2.6. Creating Rents

Much of the income growth by smallholder farmers is based on horizontal extension of cultivated area. Far less progress is made with efforts for increasing (physical) resource productivity (i.e., reducing yield gaps) and improving (financial) returns to resources. The value added created by smallholders remains low due to a lack of vital assets and limited access to complementary resources (electricity, storage, transport, etc.).

Therefore, a large part of agricultural production is sold as raw materials at depressed farm gate prices and most of the value added is captured by midstream stakeholders, such as shopkeepers, traders, processors and exporters [29]. Moreover, access to rents is constrained due to limited infrastructure at the farm and village levels and the control over resources dominated by large landowners and predominantly male household members.

It should be noted that there are critical interlinkages between these challenges that need to be addressed through coordinated strategies. Opportunities for reducing risks are related to policies for decreasing dependency and exclusion, whereas prospects for creating rents are based on strategies for enhancing productivity and strengthening competitive markets. These structural causes of poverty amongst rural households are mutually related and cannot be 'solved' with straightforward strategies for improving livelihoods by broadening access to resources, markets, services and information. Instead, they are linked through behavioural relationships characterised by limited confidence and low trust [34,35] that lead to social exclusion from networks and inequality in bargaining power within and outside households [10]. Breaking the vicious circles of rural poverty, therefore, requires that key attention is given to intra-household organisation (i.e., the gender division of work, assets and incomes) and the external governance relationships with value chain stakeholders as well as public and civic institutions.

3. Why Current Rural Development Initiatives Are So Little Effective?

Most investments for smallholder development are focussed on improving farm production systems, while far less attention is usually given to the backwards linkages between the farm and the household, and the forward linkages between the farm and the value chain. Interventions that take the household as an entry point look at family nutrition as a main outcome (that may, in turn, lead to higher labour productivity or reduced losses of working days to health problems) and also focus on the intra-household division of labour and gender bargaining power differences as underlying causes of poverty and malnutrition. In a similar vein, value chain interventions that try to improve the competitive position of smallholders—through better prices and longer-term contractual arrangements—contribute to higher commercial margins and improved security for sales.

Rural development programs face major constraints if they do not adequately consider these interlinkages between farm, household and value chain dimensions. This is mainly caused by structural inequalities in ownership of land and limited access to capital markets and knowledge and information systems [11,36]. In addition, appropriate institutions for farmer organisation and value-chain bargaining are often not in place. Different incentives and instruments can be used to improve the performance of each of these components (see Figure 3). Especially the timing of smallholder support measures—before/during or after the harvest—matters a lot for the generation of revenue streams at critical moments of the family lifecycle. Widening the perspective on farm-household livelihoods enables to target the focus of poverty alleviation programs from 'Investing in farms' to 'investing in people in poor places' [37].

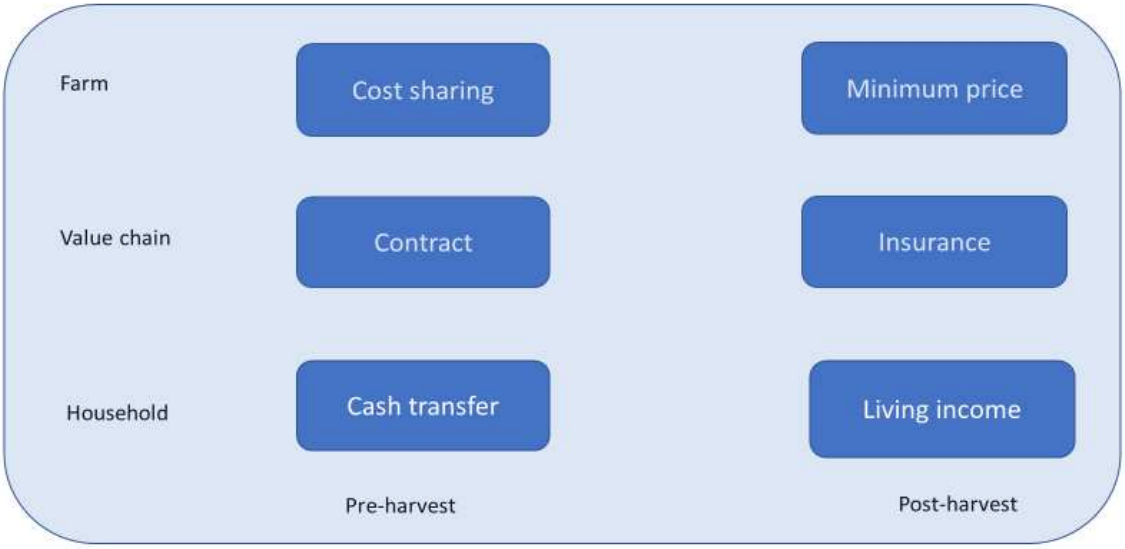


Figure 3. Different instruments for reinforcing smallholder livelihoods.

3.1. Cost Sharing

Cost sharing and Input support programs are used to promote the adoption of Good Agricultural Practices (GAP) that increase the profitability and/or sustainability of farming practices. Most sustainable intensification activities require access to better seed material, (organic) fertilisers and knowledge/training in land- and crop-management practices to enable their adoption by smallholders.

Cost sharing with other upstream partners (input providers, shopkeepers) or with downstream traders and processors is based on pre-finance arrangements that commit part of the harvest as repayment. Even while access to inputs is guaranteed, smallholders might lose a substantial part of their higher productivity by receiving low output prices. Many programs focus on intensification strategies for enhancing smallholder welfare through better resource use efficiency [38,39], but far less attention is usually given to their cost-effectiveness and the increasing labour demands. Therefore, suitable market incentives that support farmers towards the adoption of these practices need to be in place.

3.2. Price Support

Higher and especially more stable (i.e., predictable) farmgate prices are critical to sustaining the minimum livelihoods of many smallholder farmers. Prices will need to rise if 'real costs' are considered and social and environmental externalities are included. Such a true pricing approach enables smallholders to apply more sustainable production practices and to attain household food security [40]. However, consumer's willingness to pay true prices is still unknown.

Minimum prices are the core of several commodity certification programs (such as fair trade, ecological labelling and certificates or origin) that reward smallholders for maintain-

ing certain production standards to gain preferential access to premium markets. Minimum prices can be guaranteed to producers for delivering better and more homogeneous quality or for supporting the use of more sustainable production methods.

In practice, however, minimum prices are only slightly higher than regular prices. They are difficult to enforce and can be easily circumvented. Due to heavy over-certification, farmers can only sell a minor share of their production under premium conditions, and need to pay high costs to obtain the certificate and verify compliance [41].

3.3. Contracts

Contracts between farmers and traders are meant to provide a reliable commitment to deliver inputs or collect output at pre-established conditions. Contracts that include price guarantees still face the risk of non-compliance. Traders sometimes do not honour their obligation of buying the full harvest and smallholders frequently face delayed payments. Otherwise, farmers are tempted by side sales, if market prices become higher than the earlier-agreed price [42,43].

In practice, many contracts are rather 'incomplete' (i.e., do not fully define all price, delivery and quality requirements) and fail to include adequate conflict resolution procedures. Contracts give limited attention to the distribution of value added. Currently, smallholders receive a tiny share of total value added that only represents 4–6% of the final consumer price. More than 80% of the value added is realised in processing, transport and retail activities, often dominated by foreign firms. Local taxes take away another part of the value added. When contracts become more inclusive and embrace stakeholders throughout the value chain, the perspective may eventually be widened from 'fair prices' towards 'fair chain'.

3.4. Insurance

Insurance against the risk of crop losses due to unforeseen weather conditions or natural disasters is an important ex-post device for smallholders' engagement in sustainable intensification [44]. Given their limited internal reserve capacity, farmers cannot afford to take too much risk and, therefore, may prefer to rely on low-input low-productivity production methods. Insurance can offer an alternative that enables smallholders to build resilience and rely on productivity-enhancing external inputs while committing a larger share of production to market exchange.

New inclusive insurance products, such as weather Index-based insurance and health insurance, may also contain a savings component, which can help smallholder farmers build a financial base that can serve multiple purposes. Insurance could also be offered as part of a wider set of business services that support smallholders. Group-based and community-centred rotating savings and borrowing schemes (such as the well-known Savings and Credit Cooperative Societies or SACCOS)—mainly with female members—are particularly effective in enhancing financial inclusion and reducing chronic poverty and malnutrition [45]. Digital and mobile platforms nowadays offer innovative opportunities for widening access to credit and insurance.

3.5. Living Income

Living income benchmarks define a net annual income required for a household in a particular place to afford a decent standard of living for all its members. Some trade arrangements with international companies may include price- or wage criteria that allow farmers and workers to cover minimum living standards and guarantee healthy diets. Living income thus represents the wider dimension of rural livelihoods and connect input- and output markets as well as pre- and post-harvest aspects.

Empirical studies on living income in the cocoa value chain from West Africa, Waarts and Kiewisch [15] show that neither increases in yields nor better farm-gate prices offer sufficient guarantees for reaching the minimum living income benchmark. In a similar

vein, Cordes et al. [46] show that most coffee-sourcing programs of roasters and retailers fail to close the living income gap.

Some certification programs deliver periodical lump-sum payments to farmers' cooperatives or rural communities to support investments in collective goods (infrastructure) or social services (education; health care). These investments have a wide coverage and also benefit non-affiliated families. However, local participants are scarcely informed about the governance of these community funds [47] and tend to prefer individual payments instead of collective use of funds [48].

3.6. Cash Transfers

Cash transfers—either through vouchers or as direct payments to smallholders—are increasingly used as a strategy for combatting poverty and supporting a variety of other outcomes. Cash transfers can be made conditional on participation in education or primary health care. They provide social protection to beneficiaries, their households and communities can foster horizontal relationships within communities and vertical relationships with the state through forms of social accountability and citizenship engagement [49].

Cooke et al. [50] show how cash transfers delivered in three (mobile phone) instalments to coffee farmers in Eastern Uganda lead to a significant increase in household welfare (e.g., 40% higher expenditures), as well as improvements in production outcomes (e.g., doubling of coffee revenue, coffee investment). Conditional cash transfers for coffee farmers in Mexico proved to be effective in mitigating the negative effects of falling coffee prices on early childhood development [51]. Similar studies in Zambia find that cash transfers help households cope with agricultural production and price shocks and enable them to substantially increase their food consumption and overall food security [52]. Other experiences with monthly cash transfers to smallholders indicate that engagement of children in hazardous work strongly declines since households are better protected against adverse shocks, such as sickness, bereavement in the family, income fluctuations or loss of agricultural production.

Many studies are available that outline a broad set of policy interventions to support a more inclusive and sustainable smallholder sector. Key strategies include higher output prices, input support, yield improvement, crop diversification, better market linkages and improved value chain governance. Some measures may contradict each other (i.e., improving yields usually requires higher input costs), whereas others lead to perverse results (i.e., higher prices stimulate production; however, additional market supply will exercise downwards pressure on prices and margins). Experts, therefore, agree that a more comprehensive set of measures is needed to support smallholder commodity farmers [12,53]. The 'right' composition of this package and the size and sequence of the related measures are of fundamental importance for being able to influence smallholder behaviour.

4. Strengthening Smallholder Behaviour and Rural Governance

The fundamental weakness of current studies that focus on improving the smallholder position in tropical supply chains is that excessive attention is given to socio-economic conditions (farm size, prices, income) and the possibilities for technical innovations (better inputs and assistance services, options for digitalisation), thus trying to answer the question: *'what can be done to improve smallholder livelihoods?'*. There is, however, a far more relevant question that has to be addressed, namely: *'how to change the dynamics of the smallholder sector?'*. The latter question focuses on the required changes in behaviour and the improvement of the interactions amongst stakeholders in the value chain.

Supporting the dynamics of agricultural system transformation requires thorough insights into what farmers value most and how they can be motivated to make adjustments in the use of their land, labour, knowledge and other production factors. This is not only dependent upon the access and availability of these resources, but also on the underlying motivations for changing the social relationships that determine access to these resources by all household members.

Notwithstanding the importance of promoting a comprehensive set of interventions that make the smallholder sector both inclusive, sustainable and future-proof. Above all, we need better insights into how these interventions can be helpful for improving farmers' responsiveness and strengthening rural governance. Therefore, attention is given to institutional innovations and incentives for behavioural change that create self-enforcing mechanisms for (re)defining the smallholder's relationships with other (public, private and civic) stakeholders within the agricultural sector. Adoption of any of the before-mentioned innovations in land use, input intensity, labour allocation and trade networks will only take place if the underlying behavioural drivers are effectively addressed.

To support our future thinking on these strategic issues, we can derive from the widely available experimental research (based on participatory field labs and Randomized Controlled Trials) six related system interventions for improving smallholder behavioural responses (see Figure 4).

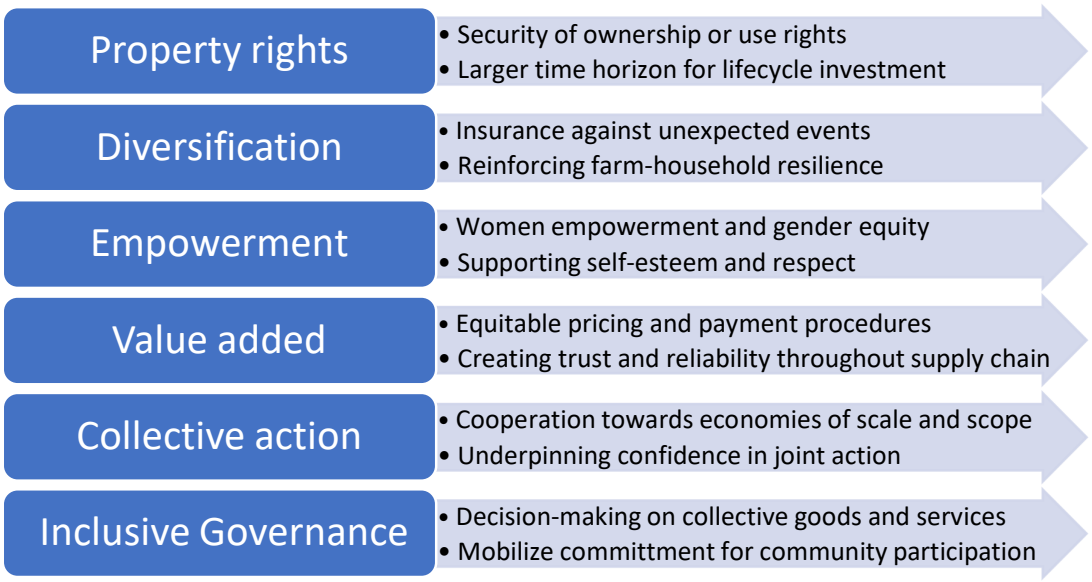


Figure 4. Key system interventions to support smallholder behavioural change.

Effective rural development interventions should trigger these behavioural change principles in order to guarantee that smallholders engage in—and respond to—the incentives provided by public, private or civic promotion policies or outreach programs. Realising structural change in smallholder behaviour should be based on adjustments in the agrifood system conditions that simultaneously influence smallholder production, exchange and reproduction (consumption) decisions. As outlined in Section 2, structural factors like stress, risk, dependency, distrust and exclusion represent critical constraints that need to be overcome before smallholder livelihoods can be improved. This also requires that due attention is given to the underlying beliefs, traditions and governance mechanisms that determine the scope for behavioural change. Therefore, interventions at the system level need to be identified that influence these coordination mechanisms. We briefly outline the importance of six structural drivers of behavioural change:

4.1. Property Rights for Extending the Time Horizon

Registered and acknowledged (ownership or use) rights over land (+water and trees) provide security for investments and strengthen the time perspective for improving rural household livelihoods [54]. Property rights are important as collateral to borrowing, both for access to (bank) credit as well as for loans from informal moneylenders (mainly delivered as advance payments). They also provide a sense of 'identity' to smallholder farmers who depend on nature for their survival. Land is not only a productive resource but also serves as an old-age pension.

Farmers need a larger time horizon to be able to engage in long-term in-depth investment decisions (such as tree renovation or the purchase of machinery) that deliver revenues after several years. In addition to ownership rights also information on future prices and longer-term delivery contracts are important to enlarge the time horizon. On the other hand, frequent weather changes and immanent trends of climate change tend to reduce the time horizon and can only be mitigated through reliable weather information systems, eventually combined with complex index insurance packages.

Land rights are thus conceived as an Incentive for Investment in agricultural intensification. Land rights registration may be cumbersome as it is usually heavily biased against women and in many cases disregards inheritance rules. Land fragmentation and compulsory land sales strongly reduce household income. Loans based on land collateral are perceived as risky but easily lead to forced land sales if debt payments cannot be made in time [55].

4.2. Diversification for Insurance

Major constraints for reinforcing rural livelihood and enabling sustainable intensification are related to market inefficiencies and uncertainties on future returns. This may be due to several factors: deficient input and seed quality, untimely access to input markets, price variation on output markets, low yields due to drought or excessive rainfall, etc. Some parts of these risks are idiosyncratic or personal (diseases, fire, theft), while other risks are stochastic and faced by many farmers at the same time (climate, market prices, political upheaval, etc.).

Interestingly enough, farmers can only insure themselves against the idiosyncratic risks and look for such insurance through the diversification of activities (e.g., 'putting their eggs in different baskets'). Whereas diversification enables better access to different income streams (thus also managing seasonal variation in prices) and usually improves dietary diversity, it may go at the expense of lower revenues due to the loss of specialisation advantages [56]. More formal insurance devices are costly and, therefore, only affordable to better-off farmers.

4.3. Women Entitlement for Empowerment

Recognition and anchoring of women's rights on land, products and revenues is a key strategy towards more balanced household decision-making. Gender equity is important for decisions on production and diets, as well as for reproductive health, housing and schooling. There is wide evidence that investments in women's capacity-building and empowerment deliver high payoffs in terms of labour productivity, sense of security and physical integrity [57]. Efforts for improving rural livelihoods should therefore start with giving a voice to women in the decision-making processes on key farm, family, household and community issues.

Strengthening women's rights on income, assets and family affairs requires substantial improvements in their bargaining power on livelihood strategies [58]. This implies their involvement in key production and trade activities, as well as the recognition of self-determination rights in family and community affairs. Empowerment of rural women can be supported through their engagement in self-help groups that provide better access to credit, education and information [59].

4.4. Value Chain Trust and Reliability

Linkages between farmers, traders and input providers are subject to large inefficiencies, partly due to unequal competition. This is caused by the small volume of transactions, but is also related to insecurities regarding sales and purchase transactions. Farmers are not always considered as 'reliable' by traders (e.g., when side sales occur against earlier agreements), whereas traders are equally mistrusted by farmers because of the manipulation of weights, delayed payments or untransparent quality grading practices [36].

Investments in mutual trust, reliable and enforceable (longer-term) contracts and reputation are therefore considered critical for improving the efficiency and traceability of transactions in the agrifood supply chain. Such higher efficiency—or lower transaction costs—might enable an improvement in trade margins and a redistribution of value-added shares in favour of upstream segments of the supply chain. There is an urgent need to support 'fair chain' practices based on transparency and a substantial redistribution of revenues between supply chain parties. A tiny 1% reduction in the retail share could be easily translated into a 10% increase in farmer's income [15].

4.5. Cooperation for Collective Action

Individual smallholders are usually weak partners in negotiations with traders and input providers. They therefore need some sort of collective organisation that creates economies of scale and improves their bargaining power. Willingness to cooperate does not emerge automatically and requires some sort of confidence in each other capacities. Moreover, a legal framework for establishing cooperatives needs to be in place. Ostrom [60] outlines that clear access boundaries, open exchange of information and transparent rules and sanctions for conflict resolution are key conditions for successful collective action.

Farmer's groups frequently fail if members have similar properties and problems (the so-called '*coalition of the poor*') and therefore need some degree of heterogeneity where also midsize and larger farmers join the marketing cooperative. In addition, due attention needs to be given to transparent internal decision-making procedures that guarantee compliance with commitments and to equitable decision-making procedures that avoid coercive dominance by a few members.

4.6. Inclusive Governance

Public investments in physical and commercial infrastructure and services are required to guarantee smallholder's access to markets and information and to support more equal exchange conditions. Smallholder participation in public governance institutions is usually limited to the local or sub-regional level, whereas national policies still strongly rely on clientelism. Smallholder's bargaining position in outgrower schemes still heavily depends on the priorities of international firms.

Local communities need to be engaged in decision-making before committing to major investments. Public levies for land, water and trees as well as market fees easily become a disincentive for further investments in value chain integration. Current taxation regimes hinder functional upgrading and tend to discourage local processing [36]. Most indirect taxes on inputs, consumer goods and processed commodities are already strongly anti-poor. A key role for public policy is therefore related to the enforcement of better quality grading practices, more responsive technical assistance schemes and the support for more transparent market governance mechanisms.

Supporting changes in each of these institutional conditions for smallholder development is likely to create opportunities for overcoming the structural livelihood challenges (as outlined in Section 2). Instead of just reducing external constraints, these actions intend to support adaptive smallholder behaviour, enabling a more constructive response to different types of incentives (that are discussed in Section 3). While each of these system interventions is relevant for reinforcing the smallholder decision-making environment, it is even more important to put into action an interactive framework that combines public interventions (e.g., land right registration; taxation; public investments) with private sector activities (credit and insurance facilities; market transparency) and civic engagement (community-led organisation; women's groups; accountability mechanisms).

5. Conclusions and Outlook

Rural development programs and agricultural development policies have devoted much attention to strategic actions aimed either at providing better access to social and collective services or at investments for improving productivity or raising incomes. Much

of these efforts meet major constraints in low-income economies, where high land fragmentation and limited value chain coordination tend to limit prospects for structural change. Whereas structural reforms are certainly important and relevant, we still face insufficient insights into the behavioural drivers for engaging smallholder farmers, families and communities into these transition pathways. This may be the reason why many well-intended initiatives turn out to have little effectiveness in strengthening smallholder livelihoods.

We, therefore, developed an analytical framework that could be helpful in overcoming these challenges and may contribute to more responsive and inclusive smallholder-oriented policies and programs. This is mainly based on a systematic analysis of secondary information sources that provide insights into major trends and patterns in smallholder decision-making strategies and outline possible leverage points for pathways for agrifood system transformation. This analysis provides comprehensive insights into the intrinsic driving forces for smallholder behaviour (Section 2) and explains the disappointing impact of many current agricultural development programs for rural poverty alleviation (see Section 3). We, therefore, highlighted (in Section 4) some alternative strategies for more inclusive and sustainable pathways towards agrifood system transformation that more adequately capture the possibilities and needs of smallholder producers.

Such an approach requires that due attention is given to the behavioural constraints that define the reactions of resource-poor households to different kinds of external incentives. In addition, the focus of interventions on farm-level, household-level or value chain-level activities and their adequate timing throughout the lifecycle matters a lot for the effective uptake of transformative livelihood strategies. Finally, some fundamental institutional changes are necessary to enable smallholder farmers to take advantage of the range of rural development incentives.

The analysis and examples presented in this article point to a few underestimated complexities in the dynamics and performance of smallholder livelihoods. First, scarcity in resource endowments is subject to much confusion. Whereas smallholder farmers—by definition—meet major land constraints, on many occasions—along the season and the lifecycle—family labour is the most limiting factor (especially for land preparation and harvesting activities). Promotion of labour-intensive sustainable innovations of agricultural production systems—such as agroforestry or conservation agriculture—therefore frequently fails.

Second, intra-household relationships and decision-making arrangements are hardly addressed. Many studies still rely implicitly on a unitary farm-household approach that overlooks the specific interests of women and children in innovations that render results in terms of nutrition (instead of only production) and in terms of professional careers (instead of just education services). Gender equity is frequently the stepping stone towards more inclusive smallholder development.

Third, linkages of farm-households with external governance networks are of critical importance for creating trust and confidence in durable and sustainable development pathways. Both horizontal (spatial) cooperation and vertical (value chain) linkages can contribute to the engagement and commitment of smallholders with rural development initiatives, and provide longer-term perspectives for rural transformation programs. Structural changes in the governance framework for agricultural development programs should therefore precede any other—more focussed—incentives that are aimed at the reduction of poverty and malnutrition in rural areas.

Finally, two important issues still deserve attention. First, there is considerable variation amongst different types of smallholder farmers, both in terms of farm size and the degree of specialisation, as well as in terms of resource-use intensity, labour productivity and crop yields. This implies that agrarian policies and rural development programs need to be differentiated to consider the demands and opportunities of different types of farmers. Second, for the selection of the appropriate set of policies and incentives, we need identify the key constraints for improving farm-household income, revenues and welfare (the so-called 'most limiting factor'). Policy-making is based on the selection of instruments

and it is inefficient just to combine many different incentives without fully understanding their mutual relationships. Making choices is an intrinsic part of policy making!

In summary, the structural transformation of smallholder livelihoods is pursued, priority attention should be given to the reform of governance mechanisms, institutional innovation and reinforcement of ownership structures. This may pave the way to support behavioural responses by smallholder farmers. We need 'clever incentives' to enable smallholders to escape from poverty. Hopefully future discussions are based on careful listening to what drives smallholder resource use decisions and thus may support more fundamental changes in their behaviour.

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