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Inclusive and adaptive business models for climate-smart value creation

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Climate-smart business models target multiple Sustainable Development Goals by fostering agricultural productivity, supporting farm and farmer livelihood resilience, and encouraging climate mitigation. While many business models (cl) aiming to create climate-smart value already exist both in agricultural development and business practice, little scholarly attention has so far been directed toward their functioning. In this paper, we argue that business models need to be inclusive and adaptive to generate climate-smart value equitably for all stakeholders involved and sustainably over time. Inclusivity involves not only providing the poor at the Bottom-of-the-Pyramid (BoP) with access to resources (e.g. finance, technology, access to markets) in business models but also, according to some scholars, with guaranteeing their representation in decision-making over the use of these resources. Adaptability entails the capacity to smoothly adjust structures and processes of enterprise-BoP partnerships that underlie business models. We suggest that building inclusive and adaptive climate-smart business models is non-trivial work which, in the future, will require rapid cycles of collective experimentation and reflection between decision-makers in climate-smart business models and researchers studying them.

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Business models and the creation of climate-smart value

Business models have emerged as a dominant, private sector-led paradigm of organizing development practice. Companies, governments, and development agencies use business models to promote (i) smallholder farmer participation in value chains, (ii) initiatives to catalyze and de-risk large-scale investments, and (iii) products and services that target the poor [1,2]. These business models are perceived today as essential for meeting the Sustainable Development Goals (SDGs). Perhaps justifiably so. With 1.9 trillion USD in 2017, the flow of foreign direct investment now dwarfs overseas development aid, which amounted to just 163 billion USD in the same year, equivalent to just 8.5% of foreign direct investment [3]. This shift from public to private finance represents a significant change in the scale of investments, and perhaps motivations, affecting development practice.

While research on business models for the SDGs is now flourishing [4], few scientific investigations have explicitly considered business models meant to support Climate-Smart Agriculture (CSA). CSA refers to an approach that aims to sustainably increase productivity, build resilience of farms and farmer livelihoods to climate change and variability, and mitigate emissions of greenhouse gases or sequester carbon in farms and landscapes [5]. As such, CSA directly targets SDG1 (No poverty), SDG2 (Zero Hunger) and SDG13 (Climate Action) and may affect at least five other SDGs [6,7]. CSA initiatives began in 2009 and have seen billions of US Dollars in public and private investment since then [8,9]. In short, business models supporting CSA aim (and claim) to create climate-smart value: improving rural livelihoods and mitigating climate change through a sustainable transition toward more productive, resilient and lower-emission agricultural development. Henceforth, we define them as ‘climate-smart business models’ (Box 1).

However, we contend that the literature on climate-smart business models lags behind practice. Those researchers that have been studying them focus narrowly on farm management practices and technologies. Long *et al.* first examined the barriers to diffusion of farm-level CSA technologies and management practices in Europe [10]. The authors concluded that critical elements of ‘successful’ business models, such as value proposition and customer relations, were typically underdeveloped in the examined

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Box 1 Glossary

Business model: How companies and individuals (e.g. farmers) create, deliver and capture 'value'. Value traditionally refers to economic value and, more broadly, it involves social and ecological values.

Climate-smart value: Value that specifically targets the outcomes of climate-smart agriculture: agricultural productivity, resilience of farms and farmers, as well as climate change mitigation.

Resilience: The ability to withstand or rebound to perturbations and shocks, such as market failures, weather events, and so on.

Base of the Pyramid (BoP) approach: An enterprise that sells to, or sources from, people at the lowest fraction of the economic pyramid.

Inclusive business model: A way of creating, delivering and capturing value that provides access to resources (e.g. finance, technology, market channels) – as well as a space for decision-making over their use – to the BoP.

Adaptive business model: The structure and processes of the company-BoP partnership underlying the way value is created, delivered and captured change effectively over time in response to internal or external shocks.

enterprises. But those are not the only deficiencies identified in some climate-smart business models so far. Others ignore socio-economic constraints of the poor [11], especially in small and medium enterprises [12]. With only three studies, evidence for climate-smart business models is rather sparse and surprisingly unrelated to the SDGs. This is only compounded by the narrow technological focus of previous investigations, which stands in stark contrast to the diversity of CSA-relevant interventions possible. Hence, importantly, the extant literature fails to clarify *for who* climate-smart value is created and *how* climate-smart value can be sustained over time in contexts of rapid societal and environmental changes [13^{**},14].

Although not conceptualizing them yet as such, the private sector has been already developing and implementing business models that (cl)aim to create climate-smart value either directly or indirectly (Table 1). For example Acre Africa, an insurance intermediary, operating in Kenya and Tanzania, sells index-based insurance products that provide a social safety net to farmers during periods of inclement weather [13^{**}]. Furthermore, companies selling improved cookstoves in rural Africa increase fuel yield of land, reduce emissions of greenhouse gases and thus build households' resilience to shocks [14], due to improved health and additional free time, especially for women and children whom collect firewood [15]. More indirect ways of creating climate-smart value include Mars International who is organizing and training cocoa smallholder farmers to diversify and thus build resilience to climate-related shocks in Cote d'Ivoire [16,17]; or Unilever partnering with small-scale farmers to sustainably harvest *Allenblackia*, a tree nut that

can be used to produce high-quality margarine and support farmers' livelihood resilience [18].

In this paper, we argue that research – since lagging behind practice of climate-smart business models – leaves several important and urgent questions untackled. Do these private-led business models only aim (or claim) to create climate-smart value, or do they actually create it? If they create climate-smart value, do they do so sustainably over time and for all the actors involved? Because of the limited academic attention so far, science currently does not help informing decision-makers on how to design climate-smart business models that effectively target the SDGs. To start closing this knowledge gap, this paper addresses the following question: under which conditions do business models contribute creating climate-smart value? For who is climate-smart value is created, and how can be sustained over time? By combining conceptual arguments and illustrative examples, the rest of this paper discusses two organizational conditions: *inclusivity* and *adaptability* of the business model. We argue that these two conditions are necessary for creating climate-smart value sustainably over time, and equitably for all the actors involved in business models — especially for the Bottom-of-the-Pyramid (BoP) producers and consumers who constitute the most vulnerable to climate-related shocks [19,20].

Inclusive business models for creating climate-smart value

As a first condition for creating climate-smart value, we argue that business models need to be inclusive. First of all, according to many scholars, inclusive business models involve the poor in ways that provide them with *access to resources* — for example, final products to BoP consumers, or finance, technology, knowledge or market opportunities to BoP producers [21^{**}]. In terms of BoP's access to resources, there has been a perceptible shift toward inclusive business, the Multilateral Alliance hosted by United Nations Development Program launched a Business Call to Action with more than 226 companies aiming to align work to meet the SDGs [22]. Since it has been estimated to include 3.2 billion people and was valued at nearly 6.2 trillion USD in 2018, for the private sector the BoP constitutes a market that is difficult to ignore [23]. Interest and focus on these markets are important for residents of developing countries because private sector growth frequently capitalizes their natural resources, for example the mineral resources of cobalt in the Democratic Republic of Congo [24] or the peatlands for oil palm in Indonesia [25]. If private industry engages BoP as producers rather than just consumers, there is potential to share market rewards with them and reduce market risks [26,27]. It is this promise that has many buying into ideas that inclusive business can support sustainable transitions toward the SDGs [28].

Table 1

Select examples of existing inclusive business models that produce climate-smart value. Three categories of business models follow the typology of Dembek et al. [20]

Business model	Example enterprises	Example CSA interventions	How does the business model (c)laim to generate climate-smart value?			Additional sources of info.
			Productivity	Resilience	Mitigation	
Deliver products and services						
Sells climate information and derived products to governments, farmers or intermediaries	F3Life, Acre Africa, aWhere, Sprout	Weather advisory services, insurance	X	X		[46–48]
Provision of agricultural information, advice and training	Lima, One Acre Fund, Brookside	Rural advisory services	X	X	X	[49,50]
Deliver financial services including credit, savings, and so on	Mpesa	Savings and loans groups, banking	X	X	X	[51]
Sells seeds and inputs	Zimbabwe Super Seeds, Syngenta	Drought-tolerant seeds	X	X		
Source products and services						
Linking farmers to markets, mobile-based agricultural information	Digital Green Loop, M-farm	IT-based advisory services	X	X		–
Aggregate products from dairy smallholders	Malawi Dairies, Kenya Creameries	Improved fodder, milk bulking groups	X	X		
Reorganize ways in which communities operate						
Organizes community into groups for selling to makers	Wildlife Works	Financing carbon sequestration	X		X	[31]

Nevertheless, one research strand questions whether inclusive business models meant as shared access to resources with BoP producers or consumers [20] ultimately contributes to poverty alleviation and thus farmers' resilience to climate [29,30]. These scholars contend that, even in business models claimed to be inclusive, the private sector inherently aims to maximize profits, leaving the poorest and most vulnerable to climate risks. Even when targeting the BoP, private companies often have to develop services targeting also the non-BoP segments to financially sustain themselves [19]. Coordination and transaction costs further preclude, *de facto*, BoP participation in business models [20,31]. Consequently, business models – while claiming to be inclusive because granting BoP access to strategic resources – potentially (and often unwittingly) reinforce social inequities and environmental injustice [13]. To prevent this drift from claimed inclusiveness to *de facto* exclusion of the BoP, these scholars suggest that 'truly' inclusive business models should also involve and enact BoP representation in decision-making processes [29].

In line with the former view on what inclusiveness involve [29,30], two examples illustrate how business models supporting BoP *representation in decision-making processes* generate climate-smart value for the multiple stakeholders involved. First, Wildlife Works, a for-profit conservation enterprise in Kenya, provides a platform to generate economic benefits for farmer communities while selling carbon credits incentivizing sequestering carbon in landscapes and mitigation of climate change [32]. In

this platform, Wildlife Works supports the representation of local carbon committees and community-based organizations, thus seeking to give voice – not only access to resources – to BoP producers on how to manage the platform itself to engage in climate mitigation processes [32]. A second example of business model seeking to give representation in decision-making processes in BoP producers involves Zimbabwe Super Seeds ZSS, an indigenous medium-size enterprise processing and selling an average of 1400 MT/year of maize, sorghum and legume drought-tolerant seeds [33]. ZSS' business models entails partnering with 1500 farmers, organized in seed growers' associations, to multiply, store and pack seeds which are then processed in ZSS' central facilities. Seed growers' representation through committees helps generating climate-smart value within this business model, as they discuss with ZSS staff on the local agroecological challenges of seed multiplication and thus support their productivity and climate resilience [33]. In these two cases, frequent deliberation and shared decision-making ensures that the involved stakeholders benefit from the climate-smart value creation processes.

Adaptive business models for creating climate-smart value

We argue that a second condition for business models to create climate-smart value entails their *adaptability*. A vast literature suggests that business models are continually confronted with the challenge of sustaining value – climate-smart or otherwise – over time [34]. Yet, value creation may be jeopardized suddenly because of shocks

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occurring outside business models, for example with a cyclone [35], pest outbreaks [36] or new trade policy, for example involving export/import bans or quotas [37^{*}]. Shocks can also originate from within the business models themselves in the form of slowly developing concerns that emerge into crises, for example the informal side-selling of products [38], the rise of a counterfeit certified seed market [39] or even from rising socio-economic disparities at village level [40]. Whether exogenous or endogenous, shocks will almost inevitably arise with the potential to disrupt the social, ecological and market conditions on which the delivery of climate-smart value depends. Hence, climate-smart business models must be adaptive or, in other words, be ready to change their structure as to 'expect the unexpected' [40].

Being prepared for an uncertain future is a persistent challenge facing business models seeking to generate climate-smart value. One way to be adaptive is for decision-makers to design the business model to be embedded and responsive to the structure of the surrounding market system [41]. For example, between 2010 and 2016, the Agricultural Commodity Exchange (ACE) in Malawi progressively identified blind spots in the market system that became visible over time (i.e. maize price volatility, transaction costs for farmers gauging credit, information asymmetries) and rapidly adjusted the business model activities accordingly (e.g. developing farmer knowledge acceleration programs) [37^{*}]. Business model adaptation, such in the case of ACE, often revolves around the change in one or more components of the business models' architecture, which may be novel to the organization(s) but not necessarily new to the industry [41]. These adaptations are in response to, or in anticipation of, changes in the external environment, for example the value chain or even beyond [31^{*}]. Business model adaptation may not only take place to anticipate or respond to shocks, but also with the intention to disrupt the industry by focusing on a specific novel component (e.g. new target market similar to the case of FairTrade product certifications) or a whole business model (e.g. Mpesa changing the banking sector with mobile financial services).

To remain inclusive while adapting over time, a business model needs to be designed to stimulate their participants, such as those living at the BoP, to develop entrepreneurial mindsets and behavior [33^{**}]. Participants in a business model with an entrepreneurial mindset and behavior are those that actively engage in combining and recombining resources innovatively to create value, in this case climate-smart value, and sustain it over time. The distributed capacity of participants to recombine resources innovatively when facing a shock is critical for the adaptability of a business model. In a situation of external or internal shock, the business model will be able to rely on an extended network of collaborating members

able to cope and absorb it [42,43]. Where entrepreneurship is not supported, instead, the process of business model adaptation seriously risks to disrupt trust or even generate conflict among participants [44^{*}]. Whereas, the development of their entrepreneurial mindsets and behaviors may generate the opposite, creating ripple effects in their lives and their surrounding environment beyond the business model itself [45], thus creating climate-smart value over time and supporting transitions towards the SDGs.

Conclusion

A number of private enterprises are, through their business models, (cl)aiming to create a productive, resilient and low-emission value in agriculture to support global goals of climate adaptation and mitigation. However, there is still a dearth of scientific knowledge on when and how their business models are effective in creating 'climate-smart value', and thus contribute to the SDGs. Thus, as the recent literature points out [13^{**},14], the concept of 'climate-smart value' per se fails to specify *for who* value is created and *how* value can be sustained over time. To address these important concerns, we contended that inclusivity and adaptability of the business models are key conditions to generate climate-smart value equitably and sustainably over time. By providing access to resources and a space for representation in decision-making to the BoP, inclusive business models create value by giving voice to the poor in increasing productivity, sustaining resilience and mitigating climate change. Moreover, by designing partnership structures and processes that drive organizational changes and distributed learning, adaptive business models are more likely to absorb external and internal shocks, thus sustaining resilience over time.

Bringing the focus on inclusive and adaptive business models for creating climate-smart value leads to an important follow-up question, which is: how can decision-makers, and in particular private enterprises, design or enact their business models to be inclusive and adaptive? Evidence from the recent literature discussed above [32,33^{**},37^{*}] suggests that making and maintaining a business models inclusive and adaptive over time do not constitute a trivial task. It requires the private sector to give up, to a certain extent, some level of agency and control in business models in favour of their BoP partners; something that companies are oftentimes unaccustomed and hesitant to do [46]. Nevertheless, from the BoP perspective, gaining voice and agency over the use of their resources [47] is essential to truly assess the benefits and costs of CSA for the multiple stakeholders involved, as well as how these may change over time. Conversely, private-led business models that miss understanding the socio-cultural dimension where they operate risk to generate negative unintended consequences [48], and even destroy climate-smart value [13^{**}]. Hence, pursuing and

seizing win–win opportunities between private companies and BoP through inclusive and adaptive business models require context-specific work and more cross-case learning in future research. Given the inherent complexity of the landscapes where climate-smart business models operate [31*], and their level of ambition in reaching the SDGs, we recommend decision-makers in climate-smart business models – and researchers studying them – to engage in rapid cycles of experimentation and reflection [49]. Through this collective work of connecting science and practice, further evidence can be generated on which approaches to inclusivity and adaptability work where, when and how – and which do not – toward the creation of equitable and long-lasting climate-smart value.

Conflict of interest statement

Nothing declared.

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