

Scaling agricultural mechanization world-wide, the case of the 2-wheel tractor 2WT

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Abstract: Smallholders in the tropics increasingly look to agricultural mechanization to speed farm operations, reduce drudgery, and to respond to mounting labor shortages. Questions however remain as how to most efficiently scale what is typically-capital intensive agricultural machinery. Based on North American and European farm models, numerous development programs have popularized four-wheel tractors, though with little sustained success. Two-wheel hand tractors 2WTs are arguably more appropriate to the small field sizes and limited investment capacities that characterize smallholder agriculture. Relatively inexpensive, light-weight and easy to repair, a wide range of equipment can be attached to 2WTs, including precise seed and fertilizer applicators, harvesters, and irrigation pumps. These options offer users a broad and integrated set of services, and can increase the timeliness of farm operations. 2WT owners can also act as scale catalysts reaching many additional fields and farmers beyond their own by offering farmers mechanized land preparation, seeding, irrigation, and harvesting on an affordable fee-for-service basis. This case study reviews experiences in Latin America, Sub-Saharan Africa, and South Asia in scaling-out 2WT-based farm machinery services to benefit smallholder farmers livelihoods. We review crucial considerations in small-scale farm mechanization with particular emphasis on multiple farm services provision, adaptable business models, and the facilitation of value chain and private sector push and pull to catalyze adoption. The ways in which government subsidies can support or work for or against machinery scaling, and the role of policy and technology targeting in avoiding labor displacement, will be reviewed.