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Can an organic market garden without motorization be viable through holistic thinking? The case of a permaculture farm

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Abstract

In industrialized countries, innovative farmers inspired by permaculture holistic principles claim to design market gardens only based on manual labor. We carried out a case study on one of these farms to assess in which extent this approach could make it possible for a commercial organic market garden to be viable without motorization. Our work showed that these market gardeners implemented a wide range of strategies embracing ecological, technical and commercial dimensions to increase their production on a small cultivated area and the added value of such production. On a cultivated acreage of 1061m², they were able to create a monthly net income between 882€ and 2058€ depending on sales and investment levels. These incomes were generated with an average workload of 43h per week. Such economic performances demonstrated that these initiatives can be viable. However, the studied approach excluded growing manually conservation crops such as potatoes. Further investigation should be carried out about the way manual and motorized market gardeners can collaborate to build together a satisfying commercial offer.

INTRODUCTION

The environmental and social costs of using oil resources as well as their increasing scarcity are challenging tomorrow's agriculture to reduce its dependency on fossil energies (Chow et al, 2003). In industrialized countries, innovative market gardens inspired by permaculture principles (Ferguson et Lovell, 2013) claim to address this challenge by promoting manual labor and holistic thinking. Our objective was to assess in which extent a holistic approach could make it possible for a commercial organic market garden to be viable without motorization. We consider here that viability is the capacity of market gardeners to generate a sufficient income to reward themselves while keeping an acceptable workload. Our work was based on the case study of a permaculture farm in Northern France.

MATERIALS AND METHODS

Site and production measurements

The farm we studied was located in the little village of Bec Hellouin, Normandy, France (49°13'24.9"N 0°43'42.5"E). The local climate is temperate under oceanic influence with a high rainfall level (from 700 to 900mm a year) and the soil is alluvium-calcareous. This farm is a high diversified commercial organic market garden and sells its production through short commercial channels (direct selling to consumers and restaurants). The Bec Hellouin farmers claimed that it was possible for a single market gardener to be viable on a small acreage with no motorization using holistic principles inspired by permaculture. To

test this hypothesis, harvest quantities and workload were measured daily by the farmers from 2013 to 2014 on a cultivated surface area of 1061m² (pathways no included). From this surface area, 40% was cultivated on plane beds under a cold greendhouse, 24% on field with plane beds and 36% on field with curved raised beds. On both types of beds, a 30cm deep non-inversive tillage was applied.

Income and global workload estimations

Harvest quantities were multiplied by prices of vegetables to calculate annual gross sales. If the data were available, we used average prices of organic vegetables in direct selling channels in Normandy. Otherwise, we used the farm prices for uncommon vegetables. Following an accounting approach, costs, expenses and taxes were deducted from the sales to evaluate the farmer's income. These data were estimated based on the farm bookkeeping documents and discussions with an expert on market gardening accountancy. We considered two contrasted hypotheses: (LI) low investments in second-hand implements bought without bank loans, (HI) high investments in new implements bought with bank loans but with lower cost of implement maintenance. According to classic references in direct selling market gardening we assigned 50% of the on field measured workload to administrative and commercial tasks. We added production, commercial and administrative workload to assess the global workload of the farmer.

Qualitative approach of farmers' holistic thinking

We carried out semi-structured interviews with the market-gardeners about the different strategies and principles they implemented to fulfill their objective of viability without motorization. Through a qualitative analysis method (Miles and Huberman, 1984), we identified relations among these strategies and represented them using a mind-mapping technique (Buzan, 1995).

RESULTS AND DISCUSSION

Holistic thinking of farmers

The holistic thinking implemented by the market gardeners relied on two main principles: increasing production on a small manual cultivated area and increasing added value of such production. A wide range of strategies stemmed from these 2 principles embracing ecological, technical and commercial dimensions at the farm level (Fig. 1).

Income and workload

Over the three years, 64% of the gross sales (GS) were vegetables produced under the cold greenhouse which covered only 40% of the studied surface area. In average, 76 production types were grown annually in the gardens: 17 aromatic herbs and edible flowers (7% of GS), 16 fruit vegetables (41% of GS), 11 root and bulb vegetables (20% of GS) and 32 leaf vegetables (25% of GS). The vegetables sold to restaurants represented 25% of GS. In 2013, the GS were 32788€ with a global annual workload of 2006 h. This workload (in average 43h per week) was judged acceptable by the market gardeners. In 2014, the GS were 57284€ GS. The better performances of 2014 can be explained through a growing expertise in multi-cropping over the experiment, a higher level of care given to plants and the use of horse manure hotbeds to produce more and sooner in winter. The corresponding global workload was 3026h (in average 58h per week) and market gardeners judged it was not acceptable for a single person. Therefore, in the estimation income based on 2014 sales we considered that the farmer worked the same time as in 2013 and the excess workload (1020h) was assigned to an employee paid 9,9€/h (French minimum wage). With the LI hypothesis the monthly net income was 1290€ in 2013 and 2058€ in 2014 (both judged

acceptable by the farmers). With the HI hypothesis the monthly net income was 882€ in 2013 (not acceptable) and 1642€ in 2014 (acceptable). The LI led to a 46% higher income in 2013 and 25% higher income in 2014 (Table 1). It showed that investment strategies and financial management of the farm are a key point in viability without motorization especially for the lowest level of gross sales.

Viability without motorization

The gross sales created from a 1061m² acreage without motorization made possible to create a decent income with an acceptable level of annual workload. These sales relied mainly on short cycle crops such as leaf vegetables and fruit crops with a high added value. Storage crops such as potatoes were not grown because they were judged to remain too long in the soil and take up too much space in the gardens while bringing a low added value. However, these types of crops can be strongly expected by the consumers. It is the reason why the vegetables baskets sold by the Bec Hellouin farm were complemented with storage crops produced with motorization by another local organic farmer. These sales were not taken into account in our study but highlighted the importance of considering the dependency on external productions in the viability of small farms without motorization. Although annual income and workload are two major criteria of the viability of farms, other aspects will be further investigated such as workload distribution along the year as well as personal satisfaction and well-being of market gardeners. Nonetheless, the choice of using no motorization is in accordance with personal values of the Bec Hellouin market gardeners. This tends to bring higher satisfaction to farmers (Mzoughi, 2014).

CONCLUSIONS

Our case study on a permaculture farm showed that it was possible to create a monthly net income between 882€ and 2058€ depending on gross sales and investment levels for a direct selling organic market gardener cultivating 76 vegetables types without motorization on a cultivated acreage around 1000m². These incomes were generated with an average workload of 43h per week which was judged acceptable by the farmers. These results were made possible by a holistic way of thinking combining ecological, technical and commercial strategies which stemmed from two main principles: increasing production on a small manual cultivated area and increasing added value of such production. The studied farm focused on growing short cycle and high added value vegetables which excluded conservation crops as potatoes. As these crops are often expected by the consumers, further investigation should be carried out about the way manual and motorized market gardeners can collaborate to build a satisfying commercial offer.

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Tables

Table 1. Net income estimations depending on sales and investment levels (€)

Year	2013		2014	
	Low (LI)	High (HI)	Low (LI)	High (HI)
Investment Hypothesis				
Gross sales*	32 788		57 284	
- Value-added tax (5,5%)	1 709		2 986	
Net Gross sales**	31 079		54 298	
- Seeds and young plants**	4 000		6 500	
- Fertilization, other supplies and small equipment**	1 500		3 000	
- Other purchases and expenses (water, electricity, fuel, equipment maintenance etc.)**	4 000	2 000	4 000	2 000
- Property tax	100			
- Labor cost (employee)	0	0	10 098	
- Holder's personal social security charges and insurance	4 000			
Annual disposable income	17 479	19 579	26 700	28 700
- Interest expenses (bank)	0	5 000	0	5 000
- Depreciation	2 000	4 000	2 000	4 000
Annual net income***	15 479	10 579	24 700	19 700
Monthly net income***	1 290	882	2 058	1 642

*including value-added tax; **excluding value-added tax; *** before personal taxes

Figures

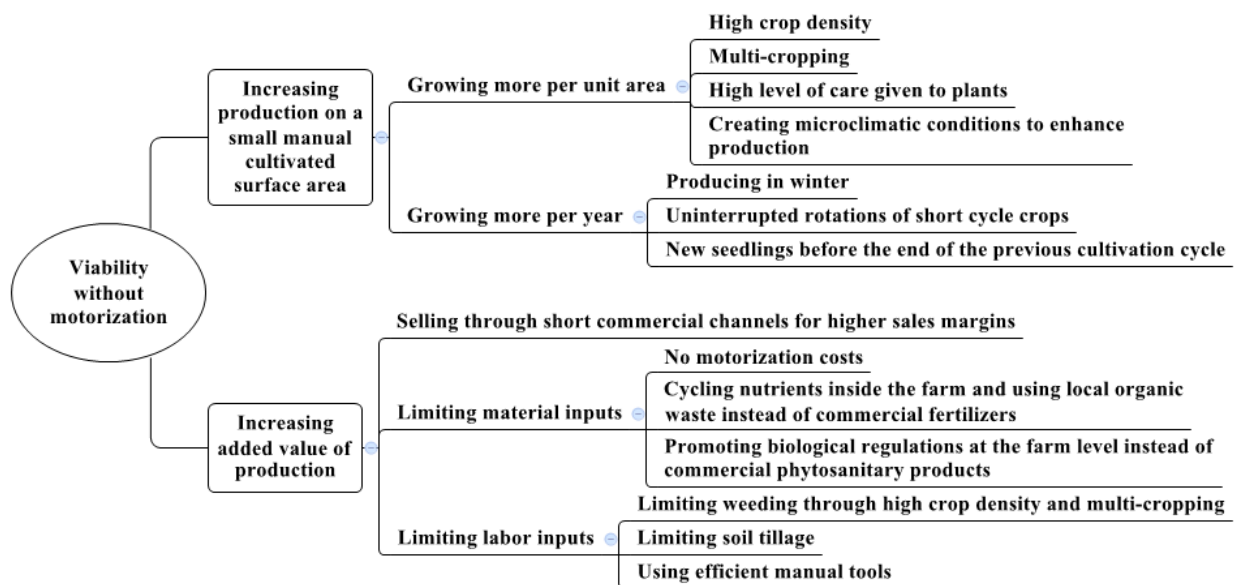


Fig. 1. Mind map of strategies implemented by the studied market gardeners