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Coping with the work constraints in crop-livestock farming systems

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ABSTRACT

This research aims to characterize the ways crop-livestock farms adapt themselves to work constraints. A follow-up of work activities was achieved in a sample of 14 family farms. Work times in each agricultural activity (livestock and crops) were quantified, distinguishing the contributions of family members and that of the off-farm workers. Results showed that the annual working time averaged 1030 days per year per farm. It increased with multiple activities within farms. Work devoted to livestock averaged 581 days a year, mainly achieved by family members, while crops necessitated 449 days of work, mostly assumed by off farm workers. Farms with limited arable land devoted significant time to livestock. The results also revealed that the gross incomes from one day of work in livestock were almost 50-times less than those from the same duration in cash crops. Altogether, the results confirm the necessity to consider work as a crucial variable determining farming systems' performances and the use efficiency of this input. As a consequence, in many developing countries, the assumption of plenty of family workers availability may not be valid anymore to justify agricultural policies mainly based on intense on-farm work uses.

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Introduction

The global agricultural sector will have to face acute challenges to ensure the supply of food to a fast growing population. In order to avoid social unrest and troubles related to food crisis (Bellemare, 2015), urgent measures have to be taken to promote a sustainable agricultural production. In fact, numerous research results demonstrate the multiple advantages of mixed crop-livestock systems, particularly in developed countries, with regard to their sustainability in comparison to specialized farming activities (Ryschawy et al., 2013). However, such systems imply increasing numbers of activities and tasks, which necessitate a significant involvement of work. It has therefore been showed that family members are often participating in seasonal wage labour, to avoid the fees associated with a surge of activities in farming systems (Darpeix et al., 2014). In developing countries, even if these diversification strategies are widely adopted by family farming units, they have to confront several constraints: lack of land, limited level of education, few available means to get extra inputs (feed, fertilizers, etc.) to enhance crop and livestock productivity, etc. (Schiere et al., 2002). Moreover, to ensure farming systems' resilience and to improve the livelihoods in African rural households, a necessary improve-

ment in work productivity has to occur (Tittonell, 2014). In fact, focusing on smallholder farms to increase feed and food output in Africa is a necessary measure, but it might not be sufficient unless the work productivity is significantly improved, particularly through a decrease of the population active in the agricultural sector (Collier and Dercon, 2014). In addition, smallholder farms are also widely advocated as both providing opportunities for food security and also as being more appropriate for the implementation of ecologically friendly practices (Woodhouse, 2010).

Generally, work productivity through farming activities remains very limited, because too many workers are trying to get paid from agriculture (Sraïri, 2005). This has already generated in many situations of economic transition (the shift from cultivation to industry) a relative decrease in the numbers of workers which remain within the agricultural sector, as they prefer to move to other activities, generally with better and more steady wages (Tamura, 2002). These elements underline that there are growing tensions in the work market dedicated to farming activities, as questions related to work load and wages are emerging globally. Given these facts, work has become a growing concern for farming activities, particularly those with livestock (Dedieu and Servièrè, 2012), as it represents a heavy burden which has to be correctly remunerated and shared between farmers, the members of their families and the off farm manpower. The study of work organization and payment in mixed crop-livestock farming systems is hence emerging as a priority research topic in many areas worldwide,

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as it may help understanding the performances of farms and enhancing their sustainability (Lemaire et al., 2014). As a consequence, in the present paper a similar focus on work and its management throughout a whole agricultural campaign will be adopted in a sample mainly made of smallholder family farms facing constraints: reduced agricultural land, lack of capital and water scarcity. The study of work load and the gross incomes it allows from diverse crops and livestock activities will enable analyzing farms' strategies and priorities. The hypothesis behind such an analysis of farms' incomes in relation to their strategic choices is that work, in its numerous kinds (family members, off farm employees, seasonal activities, etc.), may represent an opportunity to cope with constraints, particularly limited land and capital, volatile prices, but also growing wages in agriculture.

Material and methods

Presentation of the study region

The study was undertaken in the Gharb large scale irrigation scheme, located in the North Western part of Morocco (Fig. 1). This is a vast plain of almost 8805 km², of which some 338,000 ha of agricultural land. The Gharb large scale irrigation scheme is certainly one of the most favourable agricultural area of Morocco, given its mild climate, its fertile soils and its wide water availability in a country which is mainly arid to semi-arid (Schilling et al., 2012). Given these natural resources, the Gharb plain is an important supply basin of staple food, like cereals and horticultural crops. The livestock sector is also well represented in the region, as it allows an annual production of 290,000 tons of milk from 114,300 cattle, of which 82% are of purebred Holstein or crossbred (Local strains × Holstein cattle) cows. The animal wealth also consists in a flock of 937,700 and 24,100 sheep and goats (ORMVAG, 2011) allowing an annual output of 13,600 tons of red meat.

The study sample and its characteristics

The study sample consists in 14 farms disseminated throughout the irrigation scheme, and chosen in order to reflect a wide diver-

sity of farming situations: mainly smallholding units but also larger ones. The main condition was the presence of a herd within the farm. The study sample represents situations illustrating the most important types of farming systems in the irrigation scheme, with a vast majority of farms with an arable area not exceeding 5 ha (ORMVAG, 2011) and considering the variability in crops (rain-fed and/or irrigated) and the work they needed. The work force available in the 14 studied farms was also variable, as some of them relied only on family members, whereas others had to recruit off farm workers. The average agricultural land per farm was 25.5 ha, as it fluctuated from 2.0 to 80.0 ha. Nine farms had an agricultural land not exceeding 20 ha. Irrigation is adopted in 8 farms, on an area representing 22% of the total agricultural land. Water sources may differ from a collective network managed by a State run office which sells water to farmers, to direct pumping from the Sebou river or private wells. At the exception of one farm which relies on fallow to feed its herd, all the farms have forage plots. In addition to fodder, farmers cultivate a vast array of crops, such as cereals (soft and hard wheat, rice), sugar cane and sugar beet, leguminous crops (Faba bean), proteaginous crops (mainly sunflower) and horticultural crops such as potato, water melon, and banana (Table 1).

Livestock mainly consists of cattle, as only two farms have a flock of sheep. The herd is made of purebred Holstein cows and their crosses with local breeds (namely Brown Atlas and Oulmès Zaër strains). Cows represent 66.7% of total Livestock Units - LU - (defined as a standard animal of 400 kg of live weight), and the average milk yield delivered to collection centres is 2700 L per cow per year. The herds' feeding is mainly based on fodder, supplemented with concentrates. The quantities of feed concentrates are generally increased during summer, as throughout the Gharb region fodder availability dramatically drops (Sraïri et al., 2015) which induces a sharp decrease in animal performances. Nine of the farms adopt a "zero grazing" strategy during the whole year because of limited land, which therefore implies either regular fodder cuts or the use of conserved fodder (cereals' straw, oat hay or maize silage). The remaining five farms adopt, in addition to the feed resources from their fodder plots, grazing for their herds,

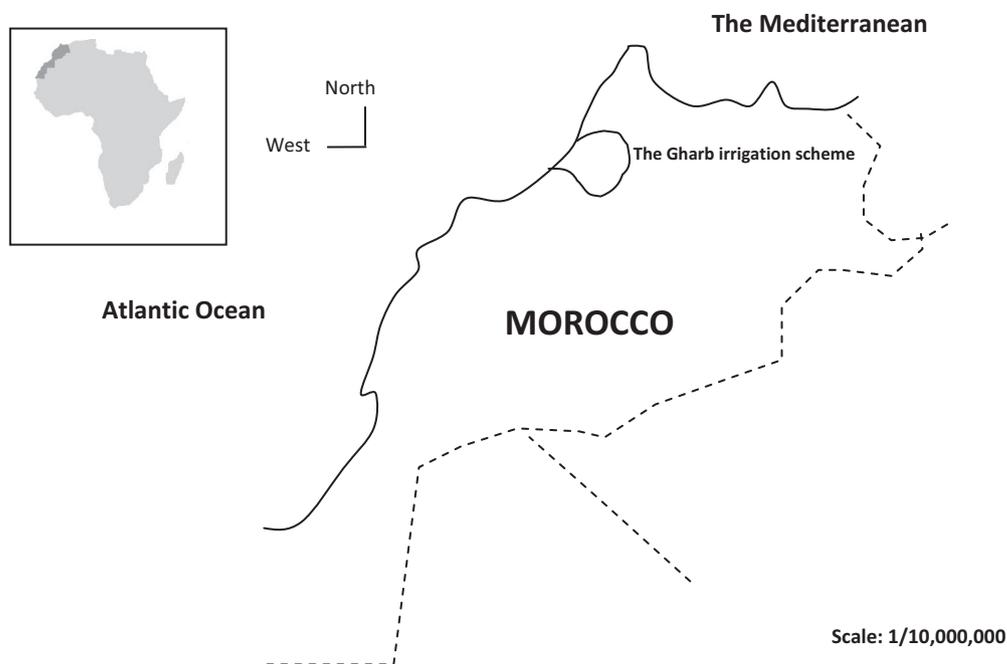


Fig. 1. Localization of the study region: the Gharb large scale irrigation scheme.

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