

A CONCEPT OF MULTIFUNCTIONALITY AND ITS DISSEMINATION TO SOME NEW UNDEFINED AREAS

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ABSTRACT

The paper attempts to challenge aspects of multifunctionality in its 'conventional' and furthermore in its broader and deeper sense. A work is based on existing literature review with some recent research project statements, additionally. The paper introduces us with some basic theoretical foundation of multifunctional agriculture, frequently used methodological approaches and finally, a new wider concept of multifunctionality is presented. The paper also discusses the merits and potential problems of empirical work dealing with less tangible aspects of multifunctionality.

1 INTRODUCTION

There is a growing consensus within the international community that, apart from its primary role of producing food and fibre, agriculture has also other roles and functions/non-commodity outputs [8]. The most commonly roles and functions attributed to agriculture relate to: (i) impact on agricultural landscape and land conservation, (ii) impact on natural source conservation and agri-biological diversity, (iii) contribution to food security, (iv) animal welfare care and (v) contribution to cultural and historical tradition conservation. All these functions are most frequently described with the term "multifunctional agriculture" – MFA.

These various functions are in line with the OECD »working« definition of multifunctionality, which considers production as multifunctional if i) multiple commodity and non-commodity outputs are jointly produced by agriculture; and if ii) (at least some of) the non-commodity outputs exhibit the characteristics of externalities or public goods, with the result that markets for these goods do not exist or function poorly.

In spite of this general consensus, various countries validate the importance of functions and services provided by multifunctional agriculture differently. This is also reflected in a varying importance given to these aspects through agricultural policy mechanisms.

The concept of multifunctionality appears to be deeply rooted in policy mechanisms of the European Union. Traditionally, only agricultural non-commodities appear as a starting-point of discussions on attributes of multifunctionality. However, with the emerging accent given to more integrated policy concepts, such as rural development policy, there is a growing need to broaden also the concept of multifunctionality. There are a number of different non-commodity outputs that can be covered in a wider concept of the role of agriculture in rural development, such as rural viability, (particularly agricultural) employment, landscapes, environmental quality and food security.

In practice, however, most research until now has been focused on a rather narrow perception of multifunctionality, typically taking into account mainly the public goods such as landscapes or other environmental features [10]. Empirical work until now has with a few exceptions largely ignored the other functions of multifunctionality.

2 "Conventional" concept of MFA

2.1. Theoretical foundation of multifunctional agriculture

In discourse on agricultural commodity and non-commodity outputs it should be aware of their appearance within one single production system. Although some of these outputs may also be produced independently of agriculture (e.g. settlement, rural employment), we cannot imagine an agricultural production that does not have multifunctional (commodity and non-commodity) outputs.

These interacting linkages between different inputs and outputs in agricultural production systems are schematically illustrated in Figure 1, summarized upon [15].

The figure above distinguishes between production inputs that are (easily) traded (x_1) and those that are not (x_2). The latter resources are typically local and have some attributes of public goods (such as water and air). Also land is included in the category of non-traded goods. Arguments assisting this classification are in favour of the fact that decision on alternative land resources is often making within agricultural households without trade taking place.

Inputs are combined in different production processes. Out of this production can be again sets of outputs in the form of tradable goods (y) or not and can be treated as (positive or negative) externalities or public goods.

Outputs may be joint, complementary or competing. Jointness implies that when an enterprise produces more than one output (private or public), inputs cannot be assigned specifically to each output. In the case of complementarity, the production of one good contributes an element of production, which is joint with the first good and required in the making of a second good. Complementarity occurs normally within certain ranges, beyond these ranges the two outputs compete over the common input of production.

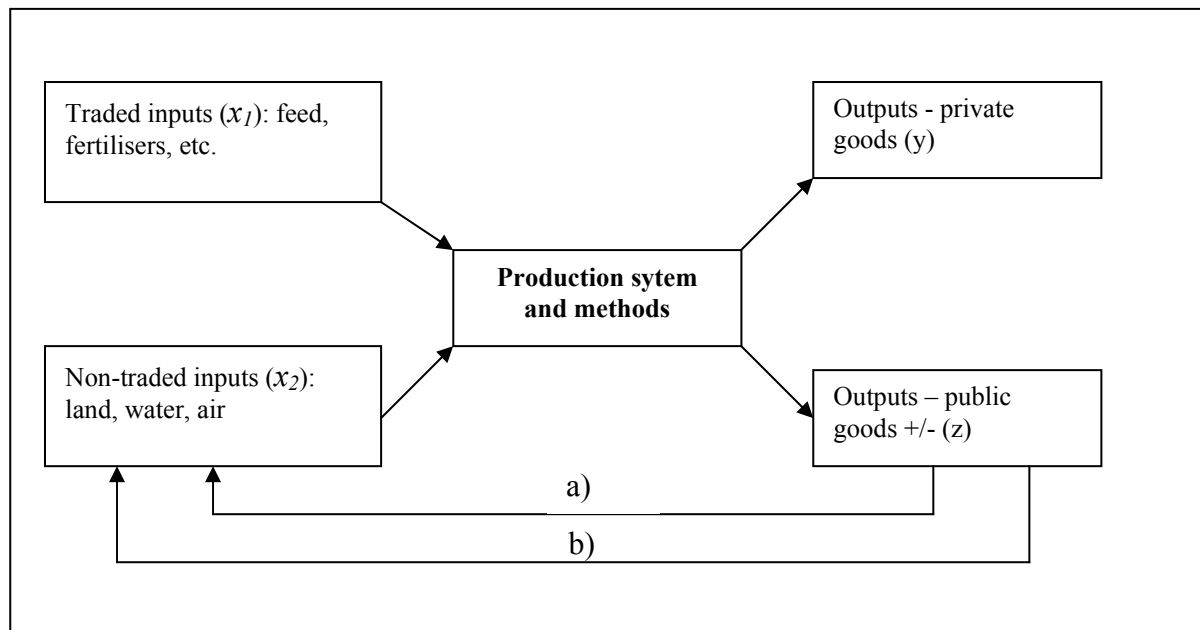


Figure 1: Interacting linkages between different inputs and outputs in agricultural production systems [15]

Recurring relation between outputs and inputs is evident in production effect (positive or negative) on non-traded inputs condition (which is schematically illustrated by the arrows a) and b)).

2.2. Private and public goods

Agricultural production of non-commodity outputs normally (positive or negative) affects on somebody's welfare and can be on this ground taken into account as a production externalities. As long as we have well-defined property rights in the good involving the externality (no matter who holds the property rights), a Pareto efficient allocation of rare resources is achievable. If these rights are not well defined, the practical problems arise [14].

However, there is much confusion regarding the concept of public goods in agriculture [13]. More specifically, there is confusion regarding what classes of goods that are unlikely to be efficiently allocated in markets and those that are not. They prefer to use scales of good on excludability and rivalness, which is schematically presented in Figure 2.

A consumption of numerous agricultural non-commodity outputs is often rival¹ and excludable², which are already attributes of public goods [13].

Dividing goods by the dimensions excludability and rivalry helps resolve the issue of market allocation and efficiency. Figure 2 shows that the more exclusive a good is, the more likely it becomes that the market is able to provide efficient allocations.

2.3. Elements of multifunctional agriculture

Multifunctionality has become a political slogan in the world of agriculture, with widely different interpretation [5]. Like any rapidly developing idea, multifunctionality in agriculture can take on notably different meanings from the mouths of different speakers, and in the ears of different listeners [7].

Due to different approaches in interpretation of the concept of multifunctionality in agriculture and due to diminishing its complexity a simplified framework is needed. We suggest to define non-commodity functions of agriculture in following main groups, which take into consideration the OECD definition of agricultural non-commodity outputs [12].

Following key elements of multifunctional agriculture were put into foreground [5]:

¹A good is rival in consumption when one person's consumption of the good makes it impossible for another person to consume that good.

²A good is excludable in consumption when it is possible for one person to prevent others from enjoying the good, for example by fencing of the good or protecting it so others cannot get access to it.

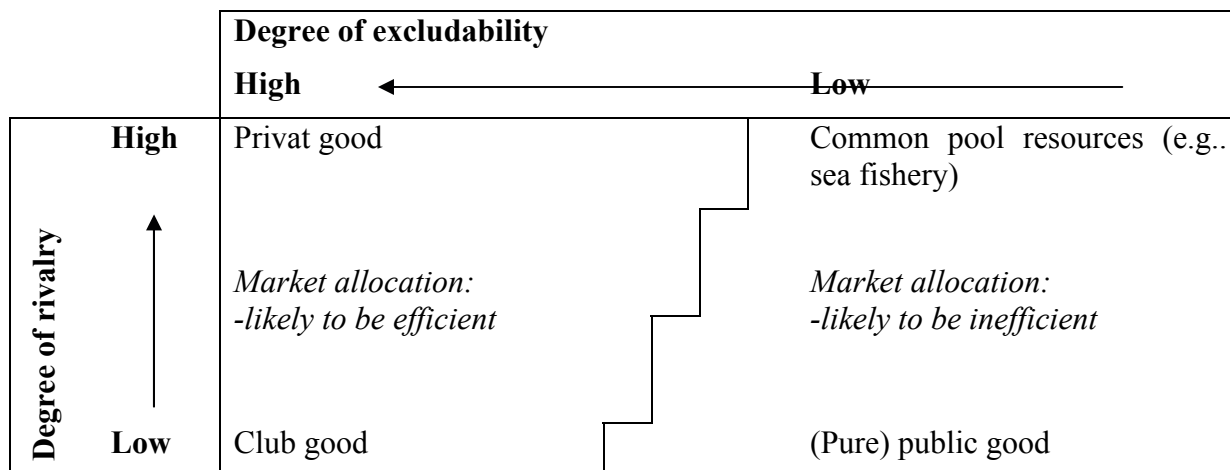


Figure 2: Excludable and rival goods (summarized upon [13]).

Agricultural landscape and cultural heritage values

Landscape is one of the most commonly cited of the multifunctional characteristics of the agricultural sector. It consists of a combination of natural (physical character of the surface, natural vegetation and climate) and man-made features (land use and other interventions to rural landscape, settlement). The impact of agriculture on landscape has not always been positive.

Farm life has evolved like any other way of life and the rural customs and traditions that have entered into the folklore, especially in tourist areas.

Cultural heritage is connected to agricultural practice and covers objects, sites and areas influenced by agricultural activity, as well as experience based knowledge of work, resource utilization and management [6]. In addition, cultural heritage from agriculture is linked to skills and knowledge about management of the natural landscape, buildings, traditions, handicrafts, stories and music [13]. These factors have historic, archaeological, practical, identity and symbolic values, among others.

Environmental benefits

A multiple positive and negative environmental impacts of agriculture are recognised and are strongly linked to land use and farming practices. Complete separability from commodity production and provision of environmental outputs may not be possible. As long as the environmental goods compete with commodity production for farm resources, there will be some degree of jointness in production.

Rural viability and rural employment

In broad terms, rural viability is related to the “attractiveness” of life in rural areas to both rural and urban population. There is no unique way of defining, but important aspects of rural viability include the level income and the possibilities for employment and income creation, the physical infrastructure, the social capital, the quality of environment and rural amenities. Agriculture contributes of rural viability through its employment and income generating effects and through the provision of agricultural landscape and other rural amenities.

Food security

Unlike other elements of multifunctionality, food security is associated with a production of commodity outputs. However, careful consideration is needed of the idea that food security is derived mainly from domestic production. A strategy that combines domestic production with stockholding, imports and re-activation of production potential in times of crisis could be more efficient.

In the context of increasing globalization of agriculture markets, many nations are concerned that they retain a sufficient agricultural base – both in farms and farmers – to avoid excessive dependence on the instability of international agricultural trade [7].

Food quality

A definition of food quality is defined widely and includes the whole life cycle of the product, from producer to consumer. This implies that food contains private, public and ethical attributes. Hence, externalities provided in the process of agricultural production may influence the quality of the product. Food, which usually is perceived a private good, also has characteristics of being a public good. Some of the attributes may be provided perfectly by the market (taste, smell, use quality, etc.), while other attributes with public good or ethical elements, will only partly be efficiently provided by market.

2.4. The valuation of public preferences for non-market goods

Multifunctional agriculture attempts to establish a new balance between traditional commodity support and payment for the production of non-market goods and services that are increasingly demanded by the public [9]. While market signals can guide patterns of commodity production, the nature of public preferences over the range of essentially non-market (public good) outputs is not always identified in markets. There is no clear template or set of indicators that suggest how we might measure what these outputs are and how the public weights them. Clarifying the demand (or consumer) side of public good discourse is important for the development of instruments that have clear objectives and that target any potential public support to the sector.

This paper tries to overview most frequently used techniques in valuating agricultural non-market outputs. By literature review ([13], [2], [1], [11]) a simplified review of quantitative methods with their main characteristics is represented in Table 1. The range of valuation techniques reviewed in this section is considered under two headings that reflects relations in pure non-market techniques. First, techniques that rely on specific relationships existing between the non-market outputs values and goods and services that are marketed, are detailed. These are known as revealed preference techniques because peoples' preferences for non-market outputs are revealed through their actions in related markets. Second, stated preference techniques are described. These are valuation techniques that require people to state the strength of their preferences – and hence reveal the values they enjoy – through structured questionnaires. They do not involve any reliance on market data. Finally, some alternatives to valuation which have increasing interest in use are presented.

3 Wider concept of MFA

3.1. Theoretical foundation

Most research until now used a narrower definition, namely that multifunctionality is about the simultaneous production of private and public goods, produced alongside the act of farming [10]. Because of this, the focus of research has been mainly on 'environmental goods' such as pleasant landscapes and other environmental features.

However, with the emerging accent given to more integrated policy concepts, such as rural development policy, there is a growing need to broaden also the concept of multifunctionality to wider territorial context. The discourse on multifunctional agriculture (within so called 'New Rural Paradigm') explores the ways in which both the market and non-market 'functions' (e.g. public goods) of agriculture and farm households link with the economic development and quality of life in different geographical territory [4]. Different level (EU, national, regional, local) of policy interest are concerned with the impacts of agricultural non-market 'functions' on the development of rural localities and regions and in particular on rural development and the quality of life.

Practically, nothing is known about the relationship between these public goods/bads and territorial rural development in different European contexts. An EU Research Project TOP-MARD³ attempts to broaden multifunctional concept into some new undefined areas. Research project is designed to increase our knowledge and understanding of the relationships between farming, public goods and territorial development in a range of different regional contexts. The aim is to extend linkages of agricultural elements (private and public goods) with the surrounding geographical context – its economy, quality of life, society and environment. These linkages are schematically represented in Figure 3 [4].

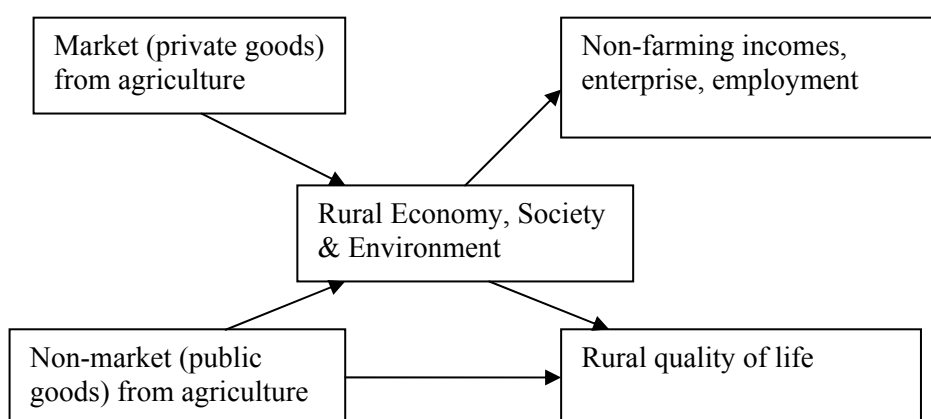


Figure 3: A schematic linkages within broadened concept of multifunctionality

³ TOP-MARD (Towards a Policy Model of Multifunctionality and Rural Development, Contract No. 501749). 3-year Specific Targeted Research Project funded by the European Union's Sixth Framework Programme for Research and Technology Development. <http://www.uhi.ac.uk/policyweb/topmard>

Table 1: Valuation techniques for non-market outputs

	Main characteristics
Revealed preference techniques	<ul style="list-style-type: none"> - actual behaviour to infer values for good of interest is used - limited range of “values” can be determined, ex-post valuation
<ul style="list-style-type: none"> ▪ <i>Household production function approach (HPF)</i> 	<ul style="list-style-type: none"> - a resource that is impacted by a change in non-market output must be an input into the production of a marketed good - production function can be used to infer values for the inputs even they are not marketed - a good defined production function is required before the economic relationships between inputs and outputs can be estimated
<ul style="list-style-type: none"> ▪ <i>Travel cost method</i> 	<ul style="list-style-type: none"> - by investigating of people’s willingness to pay to get to non-market site the value they enjoy from being at the site can be inferred (demand curve for non-market recreational/tourist asset is derived)
<ul style="list-style-type: none"> ▪ <i>Averting Costs</i> 	<ul style="list-style-type: none"> - observation of behaviour/the purchase of people when non-market output benefits are threatened - values are inferred from people’s willingness to spend to avoid the consequences of output loss
<ul style="list-style-type: none"> ▪ <i>Replacements costs</i> 	<ul style="list-style-type: none"> - estimation of how much it would cost to replace the lost output benefit with a substitute
<ul style="list-style-type: none"> ▪ <i>Hedonic price analysis</i> 	<ul style="list-style-type: none"> - relationship between the price of m marketed good⁷service and an non-market output related factor that is used to derive estimates of the value of a change in non-market output
Stated preference techniques	<ul style="list-style-type: none"> - evaluation of policy scenarios using hypothetical markets - wider range of “values” can be determined, ex-ante and ex-post valuation
<ul style="list-style-type: none"> ▪ <i>Contingent Valuation Method (CVM)</i> 	<ul style="list-style-type: none"> - widely used to value non-market outputs – esp. environmental - contingent market used to elicit willingness to pay (WTP) or accept (WTA) from target population - can be inflexible to different elements of good/policy (i.e. multi-functional outputs), does not indicate the relative preferences and values for these elements (there may be trade-offs in policy delivery)
<ul style="list-style-type: none"> ▪ <i>Choice Experiments (CE)</i> 	<ul style="list-style-type: none"> - recognise multi-attribute nature of policy/public goods - elicits relative preferences and values - estimation of marginal values
Alternatives to valuation	<ul style="list-style-type: none"> - valuation can be costly and time consuming to undertake - often “political” problems with putting a money value on some non-market outputs - still need to understand public preferences
<ul style="list-style-type: none"> ▪ <i>Multicriteria analysis (MCA)</i> 	<ul style="list-style-type: none"> - policy trade-offs can be made although not tempered by cost implications
<ul style="list-style-type: none"> ▪ <i>Analytical Hierarchy Process (AHP)</i> 	<ul style="list-style-type: none"> - combination of qualitative and quantitative - offers flexibility in permitting a mix of attributes at different level - it asks respondents to make pairwise comparisons between attributes and within attributes between their levels (qualities), e.g. environmental vs. social - allows attribute depth - pairwise methodology is not constrained by the strict design criteria of choice modelling (including monetary values) - have weaker theoretical foundation (than CEs) - can be cognitively challenging for respondents

3.2. Elements of multifunctional agriculture

The different components shape the development of rural areas. They all influence on each other and cannot be understood in isolation. These include components such as activities created by farmers, local entrepreneurs, local organizations and local populations and the effects on landscape, culture, history and rural social life, and also formal and informal institutions, governance and policies of the place are important components. The main functions provided by agriculture are represented in Table 2 and may be considered as an attempt to broaden a framework of a new attributes to multifunctionality.

Table 2: Identified functions of farming ()

Local functions (outputs) of agriculture/farm households (so far identified in TOP-MARD)	Predominant market or non-market aspects of functions
Processed products	Market
Farm household accommodation	Market
Farm household labour to the local economy	Market
On-farm tourism & recreation	Market
Public access to countryside	Non-market
Landscape 'quality'	Non-market
Water (quantity and quality)	Non-market
Soil quality	Non-market
Air quality	Non-market
Wildlife (biodiversity)	Non-market
Greenhouse gases/ carbon sequestration/ renewable energy	Partly-market
Archaeology/history	Mainly non-market
Culture bearing	Non-market
Entrepreneurial capital	Market/ Non-market
Social Cohesion	Non-market
Food Security	Non-market
Food Quality	Non-market
Animal Welfare	Non-market
Employment	Market/ Non-market
Incomes	Market/ Non-market
Wealth	Market/Non-market

4 CONCLUSION

Different discourses on spreading the concept of multifunctionality indicate the importance of setting agricultural multifunctionality specific local and regional contexts if we want to understand its role and impact on rural areas and the quality of life of their inhabitants.

There are a number of different agricultural non-commodity outputs that can be covered in this wider concept. A review of quantitative methods introduce us commonly used evaluation techniques in assessing agricultural non-market outputs. However, all these methods give us economic values, which are related just to agri-environmental and spatial attributes of the multifunctional concept. But, from methodological point of view, a question about use of proper valuation method to assess new attributes of multifunctionality appeared to be open.

As most applicable seems to be AHP method. Arguments in favour of this lies in the possibility of including qualitative approaches. The research project TOP-MARD attempts to confront with this issue. However, so far experiences suggest that only macroeconomic indicators would be methodologically investigated, while in other parts the survey results should be taken into account. In favour of result's evaluation and their interacting comparison appear to explore explanations and appropriate approaches in others fields (such as sociological sciences).

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