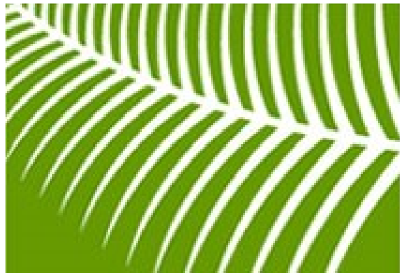

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Profits and Risk: Fitting an Old Framework to a New Agriculture

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Profits and Risk: Fitting an Old Framework to a New Agriculture

ABSTRACT

Textbooks in agricultural economics characterize resources used in production agriculture into four categories; land, labor, capital and management. Profit is presented as earned in the process of management. This traditional list of resources is respecified. Management becomes a specialized type of labor and two additional resources, information and the willingness and ability to bear risk, are added. It is argued that profits accrue not to management but to those willing and able to bear the risk inherent in production agriculture. The strategy of equity diversification is presented as a means for farmers to provide this resource and thus earn economic profits. Producer education and the repeal or amendment of legislation restricting the ability of farmers to diversify their equity investment are needed.

1. Introduction

Structural and other changes continue to redefine the agricultural sector. This evolution has been well documented and includes, for example, increasing farm size and specialization, decreasing farm numbers, increasing use of production contracts, and evolving markets for specialty crops and with those with otherwise unique characteristics (e.g., organic). The causes, nature, extent, and results of these changes have been and continue to be widely discussed and debated throughout both the popular and academic literature. In general, the changes suggest that the pendulum is swinging from the long-held characterization of production agriculture as a near perfectly competitive industry to one increasingly characterized as imperfectly competitive.

Textbooks in agricultural economics characterize the resources used in production agriculture into four categories: land, capital, labor, and entrepreneurial ability (management) (Figure 1). Land defines the soil and the environment within which it is contained. Capital includes resources that are tangible and depreciable such as farm machinery, buildings, and brood cows, as well as equity. Labor is considered strictly the physical act of performing a task while management defines the process of controlling the other resources. Decision making, innovation, gaining access to and use of information, and risk management have all traditionally been considered functions of the management resource. Although managers are motivated by a variety of influencers (*e.g.*, profit, quality of life, risk aversion), within the narrow confines of textbook neoclassic economics, they seek only to maximize profit.

When considered a perfectly competitive market, the assumptions defining production agriculture are strict. In this market, there exist a large number of buyers and sellers, none of whom individually influence price, homogeneous products, free entry and exit and, information that is readily available for and accessible by all market participants (Rhodus, Baldwin, and Henderson). The assumption of free entry and exit defines all resources as instantaneously and freely mobile[1]. Free entry and exit, perfect information, and the notion that the behavior of rational market participants striving to maximize profits can be predicted with certainty, result in a risk free environment.

Within this environment, our textbooks identify fair return to the use of the resources of land, capital, labor, and management to be rent, interest, wages, and profit. In *Agricultural Economics and Agribusiness*, Cramer, Jensen and Southgate (1997, p.79) state "This grouping accords with the view of resource earnings held by firm operators, with the payment to *land* called "rent", the earnings of *labor* its "wage", the earnings of *capital* its "interest", and rewards to *management* being "profit".

We suggest it is time to revisit the traditional classification of resources used in production agriculture. Doing so will facilitate identification of the source(s) of profits in the sector and definition of alternatives for its profit-seeking participants. This is the purpose of this paper. Specifically, we will argue that the characterization of resources be respecified to combine labor and management into a single resource category and to add two resource categories, information and the willingness and capacity to bear risk. We begin with brief discussion supporting reclassifying the management resource as labor and the specification of a resource called information. In doing so we re-emphasize a fundamental economic principal, profits are not generated if resources earn only the value of their contribution to an economic activity. We then argue for an additional resource category, risk bearing. We contend that a willingness and ability to bear risk can be a source of economic profits. In making this argument, we discuss the wide array of risk *management* tools available to farmers and their effectiveness in *shifting* risk. We emphasize that the cost of using these tools can negate economic profits. Thereafter, we explain how bearing risk can generate profits. An alternative which can increase the risk *bearing* ability of farmers and thus allow them to earn economic profits is then presented. We conclude by discussing the impact of policies that prohibit or restrict the use of this alternative, diversification of equity investment.

2. Redefining the Resources of Production Agriculture

Changes in production agriculture warrant a reconsideration of the economic framework used to describe the forces shaping it. Specifically, the profession should re-evaluate how well our models explain and predict decisions made by, interactions between, and the varying levels of success of, its participants. Our traditional economic framework does not explain satisfactorily what we observe. Why do some farms earn a profit while other farms with comparable resources do not? Why do some sectors of the agricultural marketing channel earn profits while others do not?

Throughout the academic literature and the popular press, we find hypotheses and associated empirical support for a variety of economic models that attempt to explain these phenomenon. For example, differential market power between participants within the marketing channel has been proposed to explain differences in profitability. It is argued that profits accrue to those participants comprising the concentrated industries selling inputs to, and buying products from, the farms that comprise a less concentrated sector. Economies of size has been used to explain why some farms are profitable and others are not. Production and market efficiencies, it is argued, allow larger farms to earn greater returns than their smaller counterparts.

While sometimes compelling evidence is presented, we yet lack a theory that well explains and predicts which participants in the agricultural sector will earn economic profits.

Our point of departure in this continued search for a valid and reliable model is to respecify the resources of production agriculture. First, we argue that management is not a profit generating resource, but rather is simply a specialized type of labor which earns a wage in return for the value it provides. Therefore, the labor and management resources should be considered as one. We then argue for the explicit inclusion of two additional resource categories, information and the ability and willingness to bear risk. Each of the proposed alterations to our traditional model is discussed in some detail in the following sections. Figure 2 shows the resulting proposed framework defining the resources of production agriculture.

2.1. Management and Labor

We have noted that our traditional model identifies fair return to the use of the resources of land, capital, labor, and management as rent, interest, wages, and profit. It shows that the existence of or potential to generate economic profits can be attributed to the innovation, decision making, or other skills "owned" by the management resource. As the industry evolves and profit margins continue to tighten, the level of skill with which its productive enterprises must be managed increases. The skills required to, for example, identify and develop niche markets and produce products appropriate for them are different than those necessary to produce and market an agricultural commodity. Although management tasks have changed, our consideration of such within the traditional economic framework has not. The abilities of management to direct farm resources to their best value use have continued to be identified as the source of profits. That is, we continue to conclude that good managers should earn a profit.

Alternatively, it is our contention that management should be more simply viewed as a specialized type of labor. We concur with the traditional model in that, to successfully bid for their use in a particular enterprise, resources, including management, must be paid a return equivalent to their value in generating net income. When resources are mobile, this is the return offered from their next best alternative use. Within a perfectly competitive framework, if a resource can earn more elsewhere, its price is bid up by profit seeking producers to a level at which it earns no economic profits. We emphasize that this holds true for the management resource. Innovativeness, decision making, and other skills defining management simply make it more valuable and, accordingly, it demands a higher wage. This is demonstrated in the marketplace by differences in wages paid to managers at various levels within a firm or to managers in equivalent positions at different firms. Under the assumptions of perfect competition, particularly that of resource mobility, management does not earn profit. Whether "labor" or "management", individuals in production agriculture receive a return equivalent to their contribution to the farm. Labor and management do not therefore warrant consideration as unique resource categories.

2.2. Information

Information warrants identification as a unique resource used in production agriculture. Accurate, timely, detailed information is important for good decision making just as an appropriate soil type is important for crop growth. Fortunately there is an extensive array of detailed information available about various agricultural enterprises and the production practices appropriate for use within them, and about agricultural and other markets important to farmers (*e.g.*, financial markets). Historically, much of the information used by farmers and other

participants in the agricultural sector has been provided by public institutions and is therefore publically available (Schroeder *et al*.). The primary public sources of agricultural production and market information are the Agricultural Statistics Service, land grant universities through their Agricultural Experiment Station and Cooperative Extension Service, and the United States Department of Agriculture (USDA)[2].

There are also private sources for information about historic, current, and expected conditions in agricultural markets (*e.g*., Cattle Fax). However, there are compelling arguments for the public collection and dissemination of information (*e.g.,* by Agricultural Marketing Service). Therein exist economies of size. Furthermore, market information is likely to be under-collected privately. Its value is not known until it is used and it is difficult to limit use of the information by others once disseminated.

Regardless of its source, information is and will continue to be a distinct resource used by farm operators for decision making. While we have noted that public information is available to producers and, to some extent, public agents are available to interpret this information in a manner meaningful to individual producers, it is likely this task will increasingly be provided by private entities. As such, the cost of obtaining this resource will shift from society to farmers. The extent and nature of the market for private information will depend on the willingness of farmers and other market participants to provide a fair return to those who provide it. If information continues to be a public good, managers who are more skilled at obtaining, analyzing and using it will demand a higher wage than those less skilled. Alternatively, payment will be accrued by other individuals or entities who provide this resource.

2.3. Willingness and Ability to Bear Risk

Similarly warranting explicit consideration as among the resources used in production agriculture is a willingness and ability to bear risk. The ability to bear risk has long been recognized as important in production agriculture. However, farmers are like others in that they are, in general and in most circumstances, risk adverse. That is, they accept risk because doing so increases expected profits [or provides other, sometimes intangible, benefits].

Alternatively, for a fair return, farm owners can hire external agents to bear risk. However, farmers do not lay claim to economic profits when risks are borne by others. Just as a farm manager must decide whether to use equity financed land in the expectation a fair return will accrue to the equity investment or whether to pay others to provide this resource (*e.g*., cash rent), (s)he must decide whether the farm owner will bear risks or will rather pay others to do so (*e.g.*, an insurance company). Those ultimately bearing the risks inherent in production agriculture do so with the expectation of a fair return. Economic profit can only be earned by those bearing the risk if they can do so at a cost lower than the return provided.

Many of our traditional measures of risk (*e.g*., stand deviation) represent “upside” as well as “downside” risk. However, unless owners are concerned about the potential for tax liability, the relevant risk is “downside” risk, for example that of less than or less timely than expected cash flow or net income[3]. Managing this risk involves anticipating the potential for undesired events or circumstances and, when cost effective, taking measures to avoid them or their consequences. Managing risk can be considered a manager’s responsibility. Bearing risk is not.

The distinction is important and we will later argue that a willingness and ability to bear risk can be a source of profits while managing risk is not. In the following section, the tools available for risk management and the cost of their use is discussed to support our argument that risk management does not contribute to farm profits. Our characterization of the risk bearing resource as a source of profits is then presented. An alternative by which farm owners can provide this resource, diversification of equity investment, is then discussed as are actions which will facilitate its adoption.

2.4. Risk Management

Risks in production agriculture include those associated with production, marketing and financing. Risk management tools available to farmers today by and large help them *manage* but not *bear* risk. Nearly all available risk management strategies, with perhaps the exception of those offered to producers by society[4], have an explicit (*e.g.*, payment of an insurance premium) and/or implicit (*e.g.*, foregone profit) cost associated with their use. These costs tend to negate expected economic profits. A brief review of the tools available to manage production, marketing, and financial risks in production agriculture and the cost of their use is provided in Table 1 and discussed here to demonstrate this point.

There are various means by which farm owners can reduce production risk. Strategies to reduce the likelihood of an undesirable production event have associated costs. For example, increasing the likelihood field work will be timely by carrying excess machinery capacity has an implicit cost, the otherwise expected earnings from the invested capital. Applying chemicals to reduce or eliminate potential weeds and insects and thereby reduce the risk of lower than expected crop yields has an explicit cost, that of purchasing and applying the chemicals. Diversification of the farm operation can reduce production risk by reducing the consequences of an undesired event. A farm can be diversified by increasing the number of enterprises (*e.g.*, crop and livestock enterprises on a single farm) or including in the farm operation geographically separated enterprises or those that use a diversity of resources or production practices (*e.g.*, growing several different varieties of corn). Managing risk through diversification may also provide other advantages such as facilitating the use of labor and other resources (*e.g.*, because the time at which resources are required varies between enterprises) and improving yield (*e.g.*, because of the benefits of crop rotation). In spite of its advantages, because diversification reduces the size of individual enterprises, a cost is generally associated with its use as a risk reduction strategy. This cost may be explicit (*e.g.*, increased production cost) or implicit (*e.g.*, reduced revenues). The cost of another production risk management tool, subsidized crop insurance, is borne as an explicit cost, in part by the farmer through premiums and in part by the taxpayer.

There are also costs associated with managing market and financial risk. The cost of strategies to manage market risk may be explicit (*e.g.*, the premium on an option contract) or implicit. The strategies of spreading sales, forward contracting, or hedging, for example, have an implicit cost, *i.e.*, foregone revenue. That of qualifying or maintaining eligibility for government programs may include administrative and other explicit costs, but may also include foregone revenues. Financial risks are similarly reduced by strategies which pose an explicit cost (*e.g.*, the premium for insurance carried, the interest cost associated with maintaining

borrowed financial reserves) or an implicit cost (*e.g*., foregone revenue or increased cost because capital expenditures to increase production or efficiency were postponed or not made).

3. Diversification of Equity Investment as a Risk Bearing Strategy

Risk cannot be engineered out of production agriculture[5]. Government programs have thus far dictated that society take on some of the risk. Public monies fund, for example, commodity programs, subsidized crop insurance, and disaster payments. We have noted that other risks have been efficiently spread or transferred away from the farm operation. In effect, this increases the participation by economic agents outside of agriculture who provide the risk bearing resource (Johnson 2000). The remaining risk must either be managed internally or borne by the farm owner.

The extent to which the public will be willing to continue accepting risks inherent in production agriculture is uncertain. Internal resources (*e.g*., owner equity) or external agencies assuming the remaining risk will continue to demand payment for doing so, thus eroding or negating economic profits in production agriculture. Alternatively, in other sectors of the economy, business owners can acquire profits without bearing substantial risk. A well designed business structure can support diversification of equity investment among multiple owners. Because particular organizational structures facilitate diversification of an equity portfolio, they allow business owners to bear risk, that is, to *manage* risk without sacrificing economic profits.

The reason is well understood. As demonstrated by Modigliani and Miller, an asset (*e.g*., a farm enterprise) held as part of a portfolio (*e.g*., of farms or farm enterprises) is usually less risky than this same asset held in isolation. The expected return from a portfolio of assets is the weighted expected return from each asset. The expected riskiness of an investment, however, is its contribution to the riskiness of the portfolio of assets held. The more diversified are the returns from assets held in the portfolio, the greater the risk reduction from holding the assets in a portfolio of assets rather than individually. The advent of mutual funds and other investment alternatives has facilitated the ability of equity investors to diversity risk. In the same way, equity diversification through investment in various assets (*e.g*., machinery, buildings) or business entities (*e.g.*, farms) would allow farmers to *bear* risk. By bearing (rather than shifting) risk, farm owners thus become entitled to accrue profits. However, this basic tool is underutilized in production agriculture, particularly among farms organized as sole proprietorships or partnerships.

Production agriculture appears to be the only sector in our economy that expects owners of small businesses to invest a majority of their assets in a single firm and, in states with anti-corporate farming legislation, requires that the ownership of the business be held by no more than a small group of relatives. The independent nature of farmers and communication difficulties between them and a lack of producer education regarding the benefits of, and alternatives for, equity diversification likely contribute to the lack of the use of this alternative among farmers. Furthermore, policies limiting the organization of farm ownership can greatly impede the adoption of this strategy; one which has the potential to reduce risk without eroding economic profits. Restrictions on the source of equity investment in production agriculture reduce the ability of farm owners to bear risk. [So-called anti-corporate farming laws negate or severely limit equity diversification among farm owners] Alternatively, agribusiness firms and

those in other economic sectors widely use the strategy of diversification of equity investment to allow owners to bear risk, that is to manage risk without sacrificing expected profits.

Opponents to reducing impediments to shared equity investments as a means to improve the risk bearing capacity of farm owners might argue that the cooperative structure already allows producers to share equity. However, the one member/one vote rule of cooperative organization denies producers the ability to share in decision making in proportion to their equity contribution and the amount of risk they hold as a result. Opponents might further argue that value added, so called "new generation" cooperatives, provide producers with a vehicle for diversification. However, membership in such generally requires additional equity rather than diversifies investment of existing equity.

In spite of laws and attitudes which impede its adoption, there is good reason to consider the potential of equity investment as a risk reduction strategy for farmers. Economies of size reduce the number of enterprises in which one farm family can invest. In fact, it is increasingly the case that, to grow or maintain a viable size operation, producers must resort to debt financing; in effect receiving the financier as the outside investor. The difficulty arises in the nature of debt payment, which is designed to be of a specific amount payable at a specific time, versus equity payment, which is by nature responsive to the production and market risk inherent in production agriculture. In effect, by using debt financing to reduce production and market risk through diversification or other means, the producer increases financial risk.

3.1. Equity Diversification Alternatives

The potential scope of equity diversification by farmers is large. Producers could diversify, for example, by investing in operations of different types (*e.g.*, a livestock producer investing in one or more crop enterprises), within different geographic locations, or producing for different markets (*e.g.*, grain targeted for a commodity market versus a certified organic operation aimed at a growing niche market). Equity sharing of productive assets or enterprises among agricultural producers may not only reduce risk but production costs as well. Coordinated machinery sharing by producers in regions where machinery is needed at different times will reduce capital investment cost. If the pool of sharing producers is well selected, planned machinery and equipment needs would not overlap. Custom combiners have long capitalized on this notion.

Facilitating entities could serve to help identify potential equity sharing partners, evaluate and compare risk and returns from perspective operations within which to invest, and evaluate the impact of these investments on an individual's portfolio (*i.e.*, expected return and risk). Dramatic advances in communication during recent years (*e.g.*, the Internet) greatly reduce the cost of identifying suitable partners. Because some equity sharing arrangements, if successful, might promote reduced capital expenditures by farmers, those agribusinesses likely to be affected might gain by pro-actively internalizing the benefits. For example, developing a program wherein assets are leased by period of use rather than annually may allow dealers to reduce the cost to participating producers and increase their own revenues.

Options by which the risk borne by farm owners can be reduced through equity diversification are limited only by the imagination and, in nine states, laws which restrict or

prohibit it. Thus, there exists a compelling reason to reexamine how our policies are, first, hindering movement towards the natural risk management mechanism of diversification (one that is of no or low cost to society) and, second, how we are facilitating it. The first step is simply to make it possible by eliminating or rewriting existing legislation.

3.2. Changing State Legislation to Make Equity Diversification Possible.

The most obvious policy to revisit is ironically that which was initially designed and subsequently defended as a means to enhance the ability of small, family farms to survive. We have demonstrated that an important source of profits in production agriculture comes from the willingness and ability of its participants (*i.e.*, farm owners) to bear risk. However, progress in increasing the risk *bearing* ability of farmers through equity diversification is not likely without the repeal or amendment of state laws restricting or prohibiting equity investment in farms by non-family members. There are sometimes compelling arguments for the existence of such laws. However, we argue that the benefits now attributed to legislatively mandated farm structure (*i.e.*, saving the family farm; protecting rural communities and the environment) can be maintained without anti-corporate farming laws. Reasonable alternatives to addressing societal concerns about the impact of farm structure on the community and the environment exist and in many cases are already in place. Furthermore, allowing farmers to share equity, including accepting outside *equity* investment, may increase the chances a so considered "community and environmentally friendly" family farm will survive. Undesired impacts of changes in the equity financing of local farms on society (*e.g.*, reduced local purchasing and community involvement by farmers) can be avoided by amending statues to allow for outside equity to flow into production agriculture while preserving local control. Concerns about the impact of farm structure on the environment are unnecessary when there exist a system of well written laws regarding the production practices of farms and their environmental impacts. With these safeguards in place, producers will be *free, but not compelled*, to improve their risk bearing capacity through diversification of their equity investment. Outside equity will not flow into production agriculture to share risk unless producers allow it and economics encourages it.

4. Conclusion

The present framework within which the resources of production agriculture are considered benefits from the redefinition of management as a specialized type of labor, one which in equilibrium demands a return equivalent to the value it provides. Furthermore, consideration of information and the willingness and ability to bear risk have become important to understanding the forces and interactions in production agriculture and thus warrant explicit consideration as resource categories. Therein lies the value of respecifying the resources available to farm owners.

Production agriculture has changed. Profit margins are tightening and farmers face increasingly concentrated markets both for purchasing inputs and selling outputs. Our nation continues to lose farms. However, by evaluating the industry within our existing framework, we continue to expect that those operating under good management will survive and continue to prosper; Those managers skilled in obtaining and using information and managing risk will continue to generate profits.

Alternatively, we contend and have argued that, no matter how skilled, when managers are rewarded for the value they provide to the farm, no economic profits are earned by the farm owner. Alternative profit sources need to be identified. That considered in detail within this paper is increasing the willingness and ability of the farm owner to bear risk, specifically through diversification of their equity investment. Advances in communication and other technologies have greatly reduced transactions costs, and will facilitate the ability of producers to communicate, evaluate and compare risk and returns from their perspective operations, and, where allowed, reduce their risk through diversification; by investing equity in one another's operations or sharing equity owned assets (*e.g.*, machinery).

Our challenge in facilitating producer efforts to increase profitability by increasing risk bearing ability is two fold. First, producers must be educated regarding the advantages of diversifying their equity investments. This process will be facilitated by explicitly specifying the willingness and ability to bear risk as a resource in production agriculture. Second, laws must be changed to allow producers to fully diversify their equity investment. Policy makers and others involved in or influencing production agriculture should consider how those in related business sectors have diversified risk and identify those mechanisms most likely to benefit agricultural producers. Policy makers should carefully and more explicitly consider how adopting new or revising existing (*e.g.*, anti-corporate farming) legislation will affect the ability of farmers to provide the resource of risk bearing to the farm operation.

Endnotes

1. Resource mobility is not defined literally but rather by use. Although it can be altered by capital improvements, the land resource is fixed in its locale. It is mobile in that it can be used in other alternative productive activities.

2. The Agricultural Statistics Service provides state yield and price information (Patrick). Cooperative Extension Services provide a wide array of information about resource use, production practices, and the economic viability of various agricultural enterprises as well as situation and outlook information. The most comprehensive source of price and other market information is the USDA Agricultural Marketing Service (AMS). In fact, most other publically available information about agricultural markets simply summarizes or otherwise revises that provided by AMS.

3. If the risk of less than or less timely than expected cash flow or net income can be absorbed by the operation because excess equity is available, the owners would expect a higher return on their equity investment in return for bearing this risk.

4. Those for which society is bearing the risk without extracting due profits, *e.g.*, subsidization of crop insurance.

5. There is also substantial risk in the agribusiness sector. Agribusiness and others, for example, take on the risk associated with developing technologies in both the input and output markets.

Table 1. Tools for Risk Management in Production Agriculture

Type of Risk	Tool for Risk Management	Potential or Expected Costs	
		Explicit	Implicit
Production	Investment in lower risk enterprises		Foregone revenues
	Diversification of enterprises (e.g., production practices, enterprise type, geographic location)	Increased production cost	Foregone revenues
Marketing	Market information	Cost of obtaining, analyzing, using	Time, management
	Participation in government programs	Increased production, administrative costs (*e.g.*, record keeping, application)	Maintaining eligibility
	Spreading sales; use of forward contracts or other marketing arrangements		Foregone revenues
	Hedging		Foregone revenues
	Options	Premium, brokerage fee	
Financial	Insurance*	Premium	
	Maintaining reserves (inventory, financial)	Increased overhead cost	Foregone revenues
	Deferring or reducing capital investments	Lease or rental expense	Reduced efficiency (increased production cost or foregone revenues)

* Crop and revenue assurance insurance can also be considered tools by which to reduce production and/or marketing risk.

Figure 1. Inputs to Production Agriculture:
Traditonal Framework

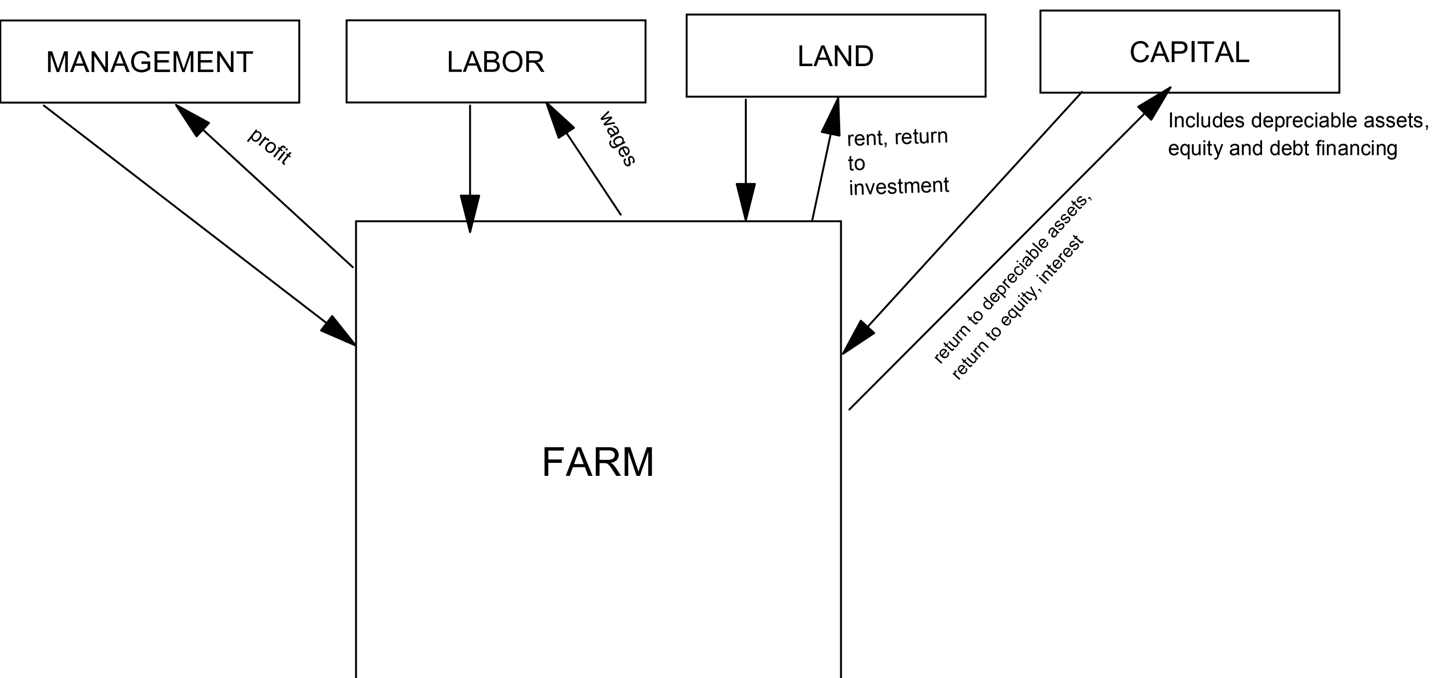
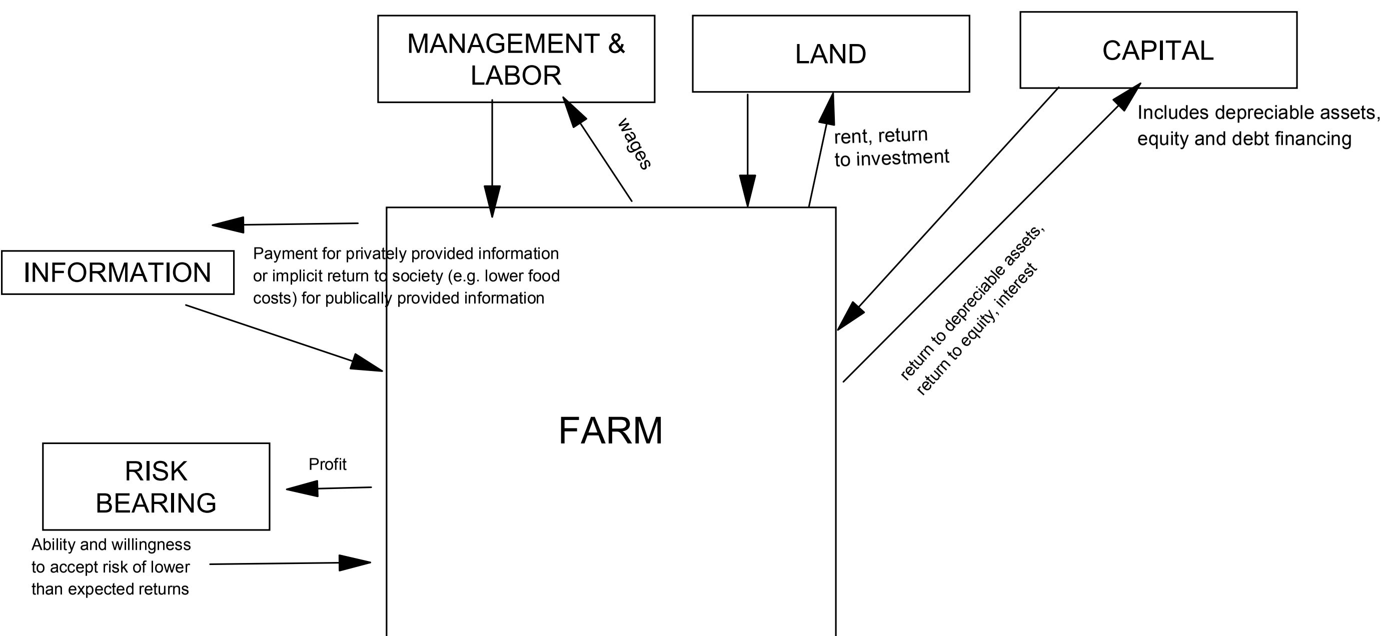


Figure 2. Inputs to Production Agriculture: Revised Framework



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