# "Agricultural Capital Equipment Segmentation in Argentina"

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## Abstract

In this paper we identify four different segments for agricultural equipment in Argentina: Performance, Balance, Support Services, and Price. Performance is the largest group, relatively young and high brand loyalty. While the balance farmers are less educated with large sales, the support service group is well educated, with low sales and high brand loyalty. Finally, price oriented farmers are the oldest, having low brand loyalty.

Key words: Agricultural machinery, market segmentation, cluster analysis

## Introduction

Agricultural capital equipment markets in Argentina are heterogeneous and interesting markets in a country where agricultural related activities are an important component of the local economy. However, it has not been studied extensively up to now.

The problem we want to study is how Argentine farmers buy their agricultural capital equipment, such as tractors, combines, and seeding equipment. We will restrict the study to Argentine farmers in the geographic area of the 'humid pampas' (which is equivalent to the US Corn Belt) that produce more than 750 tons of soybeans a year. In order to understand the framers purchasing behavior for agricultural inputs, we will try to identify different producers segments with different buying profiles.

The main goal of this paper is to identify distinctive market segments for argentine agricultural capital equipment. The idea is to segment farmers into buying characteristics according to their purchasing behavior.

In this way we will be able to answer the problem of how Argentine producers purchase their agricultural inputs. Marketing segmentation helps firms define particular marketing mix strategies that enable them to target customers with specific profiles and needs in each segment. (Kotler,1997)

### Previous Studies

Although there is previous work segmenting farmers buying agricultural inputs, especially for the US (Alexander, Wilson and Foley, 2005), there is very little for capital equipment. Recently, Roucan et al. (2011) have studied capital equipment segmentation in the US.

However, there is very little work done for Argentine agricultural capital equipment markets, in spite of the importance of these markets, as we have explained above. Lavarello et al. (2011) have studied some of the structural characteristics of these markets, in particular related with technological innovation.

Farmers' buying behavior for inputs purchases (such as capital equipment, seed, crop protection, and financial services) is regarded as a problem-solving process, in which emotional and social criteria can also have an important role, and in which formalized procurement procedures would tend to be absent. (Kool, 1994)

This farm purchase has several dimensions. Firstly, the buying process, which is amount of cognitive and behavioral effort the farmer puts into the purchase (Bagozzi, 1986). Secondly, the buying structure, it is the amount of people involved in the purchase decision. The third dimension is the relationship of farmers with suppliers and their loyalty towards them.

Regarding the buying process, the more complex the purchase the more farmers will have to search for more sources of information and evaluate alternatives. The purchase of agricultural machinery would require more information and supplier evaluation than other less expensive inputs, such as fertilizers or crop protection, due to its complexity and larger cost. (Kool, 1997)

Agricultural machinery is not only more expensive but also more important than other inputs. The importance of agricultural machinery farmers is not only financial, but also regarding the end-product and the continuation of the production process. (Moller & Laakossen, 1986)

The information farmers use for purchasing agricultural equipment is of two different sources: personal or impersonal; and of two different types: commercial and non-commercial. Personal and impersonal sources differ in the face-to-face interaction, while commercial and non-commercial differ in terms of whether an information source sponsoring the message benefits or not from a favorable decision of purchasing the good. (Gloy, Akridge, Whipker, 2000; Moriarty and Spekman, 1984)

Combining sources and types we have commercial personal information (local dealers, trades shows, consultants, salespersons, and manufacturers' technical personnel), non-commercial personal information (colleges, friends, and extension services), commercial impersonal information (advertising TV and radio), and non-commercial impersonal (articles farm magazines, agricultural newsletters, university publications).

In terms of the buying structure, several members of a farm family and employees may be involved in the decision making of the purchasing an agricultural equipment. Buying decisions can be made individually or in small decision making units. Sheth (1973, 1974) suggests that product and company specific variables define the type of decision making.

Normally farms have small buying centers, and the decision making for capital equipment purchasing would be made at least by one member with the counsel of another, or it could be made jointly by several members, as it is an expensing item and it can involve financial risks. (Kool, 1994)

Regarding the relationship of farmers with capital equipment suppliers it is influenced by the fact that there are many farmers and few suppliers: The share of sales taken by an individual farmer is normally low while the percentage required purchases of a farmer from one supplier is generally high. In other words, capital equipment suppliers have strong market power over farms. (Kool, 1994)

Because of their weak market position combined with the need of expert counseling in the purchase of a complex and expensive item, farmer would tend to be loyal with capital equipment suppliers but also keep switching costs low. Brand loyalty can be the result of certain attachment to the vendor, but of often times is due a saving-time and risk reduction strategies. Farmers have a limited time to evaluate technological changes that take place in capital equipment and need to rely on the local vendors.(Walley, et al. 2007)

Brand loyalty to capital equipment products/vendors is related with a repeated buying behavior of the farmer for a brand/vendor. This loyalty can be true or spurious: It is true when there is commitment to the brand/vendor, and would be spurious when there would be no commitment and when the farmer would switch to another brand/vendor as a result of a change in the competitive marketing efforts by competitors. (Jarvis and Wilcox 1977; Assael 1987; Wernerfeldt 1991)

In a study made in the UK, brand name for capital equipment products appears to be an important purchasing factor. It is even more important than price, proximity with the dealer, quality of the service and the dealers' experience. Brands for capital equipment are not regarded in a similar way by farmers and are useful to provide customers of capital equipment with trust and confidence. (Walley et al. 2007)

The relationship of a farmer with a vendor can be formal/business related, and personal. In the first case, the relationship is limited to the role the parties play in the purchase of the good, while in a personal relationship there is a bilateral recognition and mutual knowledge. Switching costs become high when a vendor establishes a personal relationship with the farmer, and it is positively related with vendor loyalty. The buyer-seller relationship in a complex and expensive purchase, such as capital equipment, tend to be stronger than in other less expensive one. (Kool, 1997)

Roucan-Kane et al. (2011) identified four segments of purchasers of capital equipment in the US, with different attitudes towards information, their decision-making process, and loyalty and relationship with local dealers and manufacturers: The Balance, Convenience, Price and Performance segments.

The Balance segment is the largest, and they specially value the information that comes from local dealers and farm shows. In the decision-making process, the Balance segment farmers are less likely to make decisions regarding the purchase of capital equipment autonomously: these decisions are made by the owner or by the person responsible for the item after extensive discussions with family members or employees.

They are loyal to the brands of capital items and their local dealer, and prefer to buy their capital equipment from one supplier. (Roucan-Kane et al.,2011)

The Convenience segment is relatively small, and has low sales. These farmers value the information that comes from local dealers and general farm publications, although less than the average farmer. Regarding the decision-making process, the Convenience farmers tend to make their decisions more autonomously. As the Balance segment, the Convenience farmers tend to be loyal to their local supplier of capital items and prefer to buy these goods from one supplier.

The Price and Performance segments tend to be large, and these farmers are young and well educated. These farmers especially value the information from manufacturer salespeople and technical specialists, and from agricultural websites. They tend not to be as loyal to local dealers as the Balance and Convenience farmers. Performance farmers are the ones that most disagree that the purchase their capital items at a lowest price. (Roucan-Kane et al., 2011)

## Data

The data we use to segment the farmers' input markets is based on the survey on "The Need of Argentine Farmers", done in the second half of the year 2009 by the Center for Food and Agribusiness of the Austral University in Argentina, with the partnership of the University of Purdue in the US[1], and the help of the Rosario Stock Exchange of Argentina. This survey was done between August 17th and September 17th 2009, through personal interviews in the farms, surveying 502 producers.

The universe under study were the farmers in the main agricultural area of Argentina ("Humid Pampa") which produce 750 or more annual tons in soybeans. This covers the provinces of Santa Fe, Córdoba y Buenos Aires. It includes the counties in which the sown area represents more than 10% of the total surface. The total universe was formed by 7,400 producers, which produce 70% of the total soybean in the main crop area of Argentina. The sample was formed by502 farmers (producing soybeans, corn and wheat) responsible of farms with owned or rented land, with a degree of statistical confidence of 95%.

Surveyed farmers were heads of farms (owned or leased properties) located in selected departments of the Provinces of Buenos Aires, Santa Fe and Córdoba with a production greater than 750 tons of soybeans per annum (year 2008); 70% of their income came from soybean and the rest (30%) from other crops.

According to the area farmed, these farmers that produced more than 750 tons of soybeans per annum were divided into medium size farmers (between 250 and 500

[1]They did a similar work "Serving Producers in Volatile Times" (2008), on which the Argentine survey is based.

hectares), commercial size (between 601 and 1840 hectares) and large (more than 1840 hectares).

## Procedures

Following previous papers in the field (Gloy and Akridge (1999), Alexander, Wilson and Foley (2005), and Roucan et al. (2011)), we use cluster analysis to segment the agricultural input markets. In a cluster-based segmentation we first have to identify the key variables that ought to characterize the purchasing behavior. In this case, our variables are price, performance, convenience and location, personal factors, customer services, and support services for agricultural inputs. Next, the data on these variables is processed in order to place respondents with similar answers in the same segment. The idea is that through cluster analysis we can group observations in a way that there will be a high level of natural association between group members than those that are not.

The basic steps in a cluster analysis are, first of all, to split the sample into half, to provide an additional opportunity to evaluate the number of clusters. It then follows the variable selection process, as explained above. After that we have to choose the algorithm selection, between hierarchical and non-hierarchical. The hierarchical method joins observations until the researcher decides to stop, while non-hierarchical methods require the researcher to define previously the number of clusters. (Gloy and Akridge, 1999)

As previous authors have done (Gloy and Akridge, 1999; Alexander, Wilson and Foley, 2005; Roucan et al. (2011)), we first use a Ward hierarchical clustering method to identify the number of cluster and to get the starting points (seed values) for a second non-hierarchical algorithm procedure, which is the k-means technique. This second algorithm rearranges the results optimally given the previous results about the cluster means. The next steps would be the segmentation validation through tests of significance for group differences, and finally we have the interpretation of the results.

## Results

The key question in our questionnaire asked respondents to weight the influence of six factors farmers may use to choose an agricultural machinery provider. These six selected factors were price, performance, convenience and location, personal factors, customer services, and support services. As in Roucan et al. (2011) customer services/information is understood as responsiveness, follow-up, advice, etc. Support service, on the other hand, is related to whether the local dealer offers delivery, repair, and application services.

*Segments' Characteristics*

The performance segment is the largest segment, with 39% of the total amount of farmers. The second largest group is the Balance segment, with 30%, and then it is

**Table 1**. Agricultural Machinery Segmentation: Mean Percent Importance for Each Purchasing Factor

| | Market Segments | | | |
|---|---|---|---|---|
| Factors | Performance | Balance | Support Service | Price |
| Convenience/Location | 1 | 10 | 1 | 4 |
| Service/Information | 2 | 20 | 17 | 9 |
| Personal factors | 1 | 12 | 1 | 6 |
| Price | 19 | 19 | 14 | 55 |
| Performance | 65 | 20 | 9 | 13 |
| SuportServices | 11 | 12 | 59 | 13 |
| Percent of Sample | 39% | 30% | 8% | 23% |

followed by the Price segment, with 23%, and in the last place Support Service, with 8%. (Table 1)

Members of the Performance segment tend to value performance as the main purchasing factor (65% weight). The Balance farmers would value almost equally service/information, performance, and price as the three main purchasing factors, with a total weight of almost 60%. For the third group, Support Service, support service is the most important purchasing factor with a weight of 59%. Finally, in the Price segment farmers value price as the most important buying factor with a weight of 55%.

*Demographics*

Although there are no statistical differences for age and education as an average, there is for each age bracket. In this way, the Performance segment is the youngest for the less than 35 years cohort, the Price segment would be predominant in the 35-44 years range, Support Service for 45-54 segment, and Price for the 55-64 years range. In terms of education as percentage of college graduates, Support Services would tend to be the most educated and the Balance segment the least (Table 2).

In table 3 we show that the Balance farmer would be the largest in terms of sales volume, while Support Service farmers would be the smallest. On the other hand, the segment with the highest expected future growth (in terms of the amount of land they intend to farm in the next five years) would be Performance, and the one with the smallest expected growth would be the Price segment. There are statistical differences between the sales segments, but not for the expected future growth.

For marketing managers these results have several implications. The Performance segment is the largest and with the highest expected future growth, which makes them a quite attractive group to target. The Balance segment would be the second largest and with individual farmers with relatively high sales, which also makes them attractive. The Support Service and Price segments, on the other hand, seem less attractive as in one case it is a small group and in the other it has price as the major purchasing factor.

**Table 2.** Demographics and Education of Capital Equipment Purchasers
(in percentage values per segment, except average age in years)

| Demographic traits | Market Segments | | | | Prob. of no association |
|---|---|---|---|---|---|
| | Performance | Balance | Support Service | Price | |
| % College Graduate or more | 47 | 44 | 55 | 46 | 0.6610 |
| Age<35 | 19 | 15 | 16 | 5 | 0.0282** |
| Age 35-44 | 32 | 32 | 21 | 41 | 0.0282** |
| Age 45-54 | 23 | 29 | 42 | 21 | 0.0282** |
| Age 55-64 | 18 | 16 | 13 | 24 | 0.0282** |
| Age>64 | 8 | 7 | 8 | 8 | 0.0282** |
| Age (Averague years) | 46.08 | 45.97 | 46.55 | 48.16 | 0.4191 |

Notes: Single, double, and triple asterisks (*) denote statistical significance at the 0.10, 0.05, and 0.01 level respectively

**Table 3.** Farm Sales and Future Growth of Capital Equipment Segments
(in percentage values per segment)

| | Market Segments | | | | |
|---|---|---|---|---|---|
| | Performance | Balance | Support Services | Price | Prob. of no association |
| Total Sales < U$S 500.000 | 58 | 51 | 63 | 56 | 0.0111** |
| Total sales > U$S 500.000 | 42 | 49 | 37 | 44 | 0.0111** |
| Future growth (% average) | 40 | 33 | 32 | 22 | 0.6133 |

Notes: Single, double, and triple asterisks (*) denote statistical significance at the 0.10, 0.05, and 0.01 level respectively

*Information Characteristics*

Purchasers of capital equipment tend to use many sources of information and communication media they consider useful in order to minimize risk in the purchase of a complex and expensive good such as capital equipment. They rely on personal and impersonal information sources such as manufacturers' salespeople, local dealers, other farmers, lenders, etc.; and media sources such as general farm publications, agricultural newsletters, agricultural websites, etc. We present all these sources of information in Table 4 in the next page.

**Table 4.** Useful Personal and Communication Media Information Sources (Likert scale from d 1 to 5; 1=Never useful, 5=Always useful)

| Definition/Category | Market Segments | | | | |
|---|---|---|---|---|---|
| | Performance | Balance | Support Services | Price | Prob. of no association |
| Extension service | 2.49 | 2.68 | 2.78 | 2.58 | 0.4298 |
| Manufacturer sales people | 3.42 | 3.24 | 3.13 | 2.59 | < 0.0001*** |
| Manufacturers technical specialists | 2.78 | 2.89 | 2.79 | 2.71 | 0.7464 |
| Independent paid consultants | 2.58 | 2.68 | 2.47 | 2.98 | 0.2034 |
| Local dealers/technicalpeople | 3.44 | 3.69 | 3.82 | 3.32 | 0.0259** |
| Lenders | 2.10 | 2.16 | 2.26 | 2.27 | 0.7448 |
| Other farmers | 3.17 | 2.75 | 3.21 | 2.56 | 0.0004*** |
| General farm publications | 3.03 | 3.14 | 2.97 | 2.75 | 0.0671* |
| Specific publications | 3.23 | 3.31 | 3.53 | 3.05 | 0.1843 |
| Agricultural newspapers | 2.97 | 3.29 | 3.76 | 3.13 | 0.0033*** |
| Agricultural newsletters | 2.81 | 2.51 | 2.61 | 2.34 | 0.0302** |
| Farm shows | 3.38 | 3.55 | 3.37 | 3.00 | 0.0013*** |
| Direct mail | 3.35 | 3.23 | 3.08 | 2.68 | 0.0002*** |
| Meetings with suppliers | 3.13 | 3.07 | 3.42 | 3.04 | 0.2297 |
| Agricultural websites | 3.16 | 3.08 | 2.76 | 2.66 | 0.0047** |
| Field days | 3.38 | 3.55 | 3.37 | 3.00 | 0.0013** |
| Agricultural radio programs | 2.47 | 2.41 | 2.34 | 2.18 | 0.2101 |
| Agricultural TV programs | 2.90 | 2.98 | 2.89 | 2.78 | 0.6232 |
| Telephone Contact | 2.79 | 2.68 | 2.61 | 2.18 | 0.0003*** |

Notes: Single, double, and triple asterisks (*) denote statistical significance at the 0.10, 0.05, and 0.01 level respectively. Values are mean responses.

From Table 4 we can observe that the sources of information most valued by farmers are the local dealer, farm shows, field days, agricultural newspapers, direct mail, meeting with suppliers, manufacturer salespeople, agricultural websites and other farmers. For most of these sources of information the average response value is 3 or more, which means that they consider them at least moderately useful. It is also important to note that most of these sources considered useful by farmers have also significant statistical differences amount segments, except for meeting with suppliers and specific publication.

The Performance segment especially values the information from manufacturer salespeople and direct mail. With the Support Services farmers they are the ones who value the most 'other farmers' and with Balance farmers the 'agricultural websites'. The Balance segment especially values the information from 'farm shows' and 'field days'. Together with the Support Service segment they are the ones who value the most the information from 'local dealers', but do not value 'other farmers' as a useful source of information. The Support Service segment would value information from 'local dealers' and 'agricultural newspapers'. As the Performance segment they value also information from 'farm shows' and 'field days'. Finally, the Price segment would be the one that values least most sources of information such as 'other farmers' and 'manufacturer salespeople', 'telephone contact' or 'radio programs'.

All this has business implications for marketing managers. In the case of farmers in the Performance segment, as they tend to value manufacturers' salespeople information, direct mail and agricultural websites more than the average farmers, these should be the venues where more information resources should be allocated to attract these farmers. Farm shows and field days would be especially suitable to promote the sales of capital equipment to Balance farmers, while for the Supply Service segment the local dealer and agricultural newspaper would be the right venues for reaching these farmers. On the other hand, it would not be worthwhile to invest significant resources for farmers in the Price segment, except for the case of agricultural newspaper, because they do not value them as useful information sources.

*Decision-making Process*

The buying structure is the group of people who make the purchasing decision. In the case of farm, normally there are not many people involved: the owner of the farm, his family, and some employees. The decision to buy an agricultural machine can be made by the owner alone, by him after discussion it with his family and/or employees, by the person responsible for the use of machines in the farm alone, or this person with the advice of the owners´ family member and other employees. It also can be made by a purchasing agent hired by the firm.

The date that we collected, which is presented in Table 5, shows that for farmers in the Performance and Balance segments the decision is made more autonomously by the owner of the farm, while those in the Support Service and Price segments the decision is made by the owner after extensive discussions with the other family members and/or employees. There are statistical significant differences in the date for each segment.

For the Performance and Balance segments 45% of the capital equipment purchasing decisions are made by the owner alone, another 45% by the owner with the advice of family members and/or employees, and 9% by the person responsible for using the machinery with or without advice. On average, less than 1% of the times this decision is made by a purchasing agent hired by the farm.

**Table 5.** Decision making Process for the Purchase of Capital Items
(In Percentage of respondents)

| | Market Segments | | | | |
|---|---|---|---|---|---|
| | Performance | Balance | Support Services | Price | Prob. of no association |
| Made by me with very little input from family members and/or employees | 47.4% | 43.7% | 34.2% | 36.9% | 0.0147** |
| Made by me after extensive discussions with other family members and/or employees | 43.8% | 44.4% | 63.2% | 55.9% | 0.0147** |
| Made by the person responsible for using the item after extensive discussion with others on the farm | 7.3% | 9.2% | 2.6% | 3.6% | 0.0147** |
| Made by the person responsible for theItem with little input from anyone else | 1.6% | 1.4% | 0% | 1.8% | 0.0147** |
| Made by a purchasing agent hired by our farm | 0% | 1.4% | 0% | 1.8% | 0.0147** |

Notes: Single, double, and triple asterisks (*) denote statistical significance at the 0.10, 0.05, and 0.01 level respectively. Values are mean responses.

For the Support Service and Price segments 35% of the agricultural machinery decisions on average are made by the owner alone, between 55 to 60% of the time by the owner after discussions with family and/or employees, 5% by the persona responsible of using the machinery with or without advice, and less than 1% of the times by a external purchasing agent.

From a marketing perspective this would mean that in the case of Performance and Balance segments salespeople should target the farm owner while for the Support Services and Price segments they should target not only the owner but their family and/or employees.

**Table 6.** Producers' Opinions about Price
(Likert scale from d 1 to 5; 1=I strongly disagree , 5=I strongly agree)

| | Performance | Balance | Support Services | Price | Prob. of no Association |
|---|---|---|---|---|---|
| I usually purchase capital items at the lowest price | 1.80 | 1.79 | 1.50 | 2.00 | 0.0706** |
| There are often significant price differences from similar capital items from one supplier to another | 3.57 | 3.43 | 2.97 | 3.55 | 0.0337* |
| **Attitudinal Questions** Percentage of respondents responding with a 4 ("agree") or a 5 ("strongly agree") | | | | | |
| I usually purchase capital items at the lowest price | 9.4% | 6.4% | 5.3% | 13.6% | 0.0206** |
| There are often significant price differences from similar capital items from one supplier to another | 57.6% | 50.4% | 31.6% | 52.7% | 0.0465** |

Notes: Single, double, and triple asterisks (*) denote statistical significance at the 0.10, 0.05, and 0.01 level respectively. Values are mean responses.

*Producers´ Opinion about Price*

As with Roucan et al. (2011) farmer reject buying capital equipment at a lowest price, with statistical significant differences between segments. While the Price segment would mildly reject buying at the lowest price, farmers in the Support Services segment firmly reject it. Asked if they find significant price differences for capital items from one supplier to another, the Performance, Price and Balance segments accepts firmly while Support Services segment does so to a lesser degree.

Only 5% of members of the Support Service segment agrees or strongly agrees to buy at the lowest price, 6% for the Balance segment, 9% for the Performance group, and 13% for the Price segment. On the other hand, more than 50% of the members of the Performance, Balance and Price segments affirm that there are significant price differences for similar capital items from one supplier to another. Only 30% of the members of the Support Service segment accepts this statement.

These results clearly show that Argentine farmers do not buy their capital equipment at the lowest price and that they consider that there are significant price differences between one supplier to another. This result would be weaker in the case of the Price

**Table 7.** Producers Brand Loyalty and Similarity
(Likert scale from d 1 to 5; 1=I strongly disagree , 5=I strongly agree)

| | Performance | Balance | Support Services | Price | Prob. of no association |
|---|---|---|---|---|---|
| **Mean of Attitudinal Questions** | | | | | |
| I consider Brands more or less similar for capital items | 2.35 | 2.37 | 2.05 | 2.64 | 0.0609* |
| I consider myself loyal to the Brand of capital items | 3.55 | 3.50 | 3.82 | 3.23 | 0.0719* |
| **% Attitudinal Questions** (Percentage of respondents responding with a 4 ("agree") or a 5 ("strongly agree")) | | | | | |
| I consider Brands more or less similar for capital items | 24.1% | 20.3% | 15.8% | 28.8 | 0.0921* |
| I consider myself loyal to the Brand of capital items | 57.6% | 53.9% | 68.4 | 50.9 | 0.0297** |

Notes: Single, double, and triple asterisks (*) denote statistical significance at the 0.10, 0.05, and 0.01 level respectively. Values are mean responses.

segment for purchasing at the lowest price, and for price differences in the case of the Support Service group.

*Brand Loyalty*

Farmers consider themselves loyal to capital equipment brands. These results are similar to the ones obtained by Roucan et al. (2011) for American farmers. However, when asked if they agree or strongly agree that they are loyal to capital equipment brands, more than 50% of Argentine farmers responded positively, while for the American farmers this figure was of 50% or less. While brand loyalty for capital equipment is very strong in Argentina, it is even more for the Performance and Support Service segments than for the Balance and the Price groups.

In the same way, farmers reject that brands are more or less similar for capital equipment, only around 20% of the farmers agrees or strongly agrees with this statement. The price segment would be the one with the highest value, 28% of these farmers agree or strongly agrees that the consider brands similar for agricultural machinery. On the other hand only 16% of the Support Service member would agree with this statement.

The marketing implications of the price opinion of farmers and the brand loyalty is that other purchasing factors should be offered to farmers, not price, but at the same time price should not be significantly different than the one offered by other dealers. Also, it is worthwhile investing in a strong brand, as this makes the demand for capital equipment more inelastic, or in other words, less oriented to price and more to other attributes.

*Producer Preferences for Distribution Channels*

Normally farmers are loyal to suppliers of capital equipment in order to reduce risk uncertainty. In a study for Dutch farmers, Kool (1994) found that the average duration of the relationship of the farmer with the capital equipment dealer was more than ten years, and most farmers bought more than one item from the same vendor.

So regarding producers' preferences for distribution channels we asked if they are loyal to local suppliers, if they prefer buying their capital items from one supplier, and if there are significant differences in quality of services and information. We asked also if they want more direct relationship with manufacturers in the next five years. The results are presented in annex I.

Farmers answered that they tend to be loyal to local suppliers, they find significant differences in quality of services and information, and that they want a more direct relationship with manufacturers in the next five years. This is also true regarding their preferences for buying their capital items from only one supplier, but in a lesser degree. However, there are no significant differences among segments in these answers.

We also asked farmers whether they finance their purchases of capital equipment with loans provided by their local dealer or by their traditional lender (banks). More than half of the producers answered that they finance their capital equipment purchase with loans obtained from local dealers, mostly in the range of 1 to 50% of the value of their purchase. Only between 11 to 20% of the purchases were made with loans from local dealers for a value of more than 50% of capital item they were buying. Again, there are no significant differences among segments.

From a marketing perspective, clearly farmers are saying that they prefer buying their capital equipment from multiple suppliers and that more than half of their purchases are made with loans provided by their local dealers. They also say that they tend to be loyal to local dealers and that they perceive significant differences in the quality of information and services from one local supplier to another. Farmers also affirm that they are willing to have a more direct relationship with manufacturers.

*Salesperson Characteristics*

Besides asking about the farmers' loyalty to vendors of capital equipment, we also want to know which are the salespeople's characteristics that farmers value the most. This is shown in Table 8.

Overall farmers in the Performance and Price segments value 'high technical competence' and in second place 'knows my operations well'. Those on the Balance group are more interested in the fact that vendors 'know their operations well', and in second place 'high technical competence'. Finally, Support Service segment farmers value not only 'technical competence' but also 'friendship' and 'honesty'.

**Table 8.** Salesperson Characteristics as One of the Three Most Important Characteristics of a Sales Representative by Segment (in percentage)

| | Market Segments | | | | |
|---|---|---|---|---|---|
| | Performance | Balance | Support Services | Price | Prob. of no association |
| Has a very high level of technical competence | 49.0 | 32.4 | 36.8 | 45.9 | 0.0043*** |
| Is honest | 7.3 | 10.8 | 18,4 | 12.6 | 0.0043*** |
| Knows my operations well | 30.7 | 40.5 | 13.2 | 27.0 | 0.0043*** |
| Represents my interests | 2.6 | 2.7 | 10.5 | 3.6 | 0.0043*** |
| Is a Friend | 10.4 | 13.5 | 21.1 | 10.8 | 0.0043*** |

Notes: Single, double, and triple asterisks (*) denote statistical significance at the 0.10, 0.05, and 0.01 level respectively

Vendors of capital equipment have an opportunity to differentiate the services they provide farmers according to what is the salesperson's profile more required by farmers. The Support Services segment would value more 'honestly' and 'friendship', while farmers in the Performance and Price groups will require high technical competence. Finally, the Balance segment would require salespersons to know their operations well. This is not only important from a marketing perspective but also from a human resource view, in terms of the profiles of salespersons recruited by each capital equipment company.

*Technical Adoption and Services Provided and Hired*

An important dimension regarding farmers buying behavior of capital equipment is their tendency to adopt new technological machinery on the one hand, and to provide and hire capital equipment services on the other. The more producers provide and less they hire agricultural machinery, means that they are users of this equipment and would be keener to purchase them. On the other hand, the more a farmer hires capital equipment services and less provides them, it will be most likely that he will not expend much money in capital equipment purchases.

That is why we ask farmer their future usage of precision agriculture in their capital equipment, in the terms of the percentage of capital equipment with precision agricultural tools. It turned out that the Balance and Support Service segments are the ones which intend to use most precision agriculture, with around 86% of their capital equipment purchases with precision agricultural tools, while Performance and Price would intend to use them less. Performance farmers probably do not see in these tools an effective way to improve performance, while Price oriented farmers would not be willing to pay more money for a technically more advanced piece of equipment.

**Table 9.** Use of Precision Agriculture as a proxy for technology adoption, Hired and provided services (in percentages)

| | Performance | Balance | Support Services | Price | Prob. of no association |
|---|---|---|---|---|---|
| **Adoption of Precision Agriculture in 5 years** | | | | | |
| Today | 33.9 | 34.5 | 31.6 | 29.7 | 0.8549 |
| In 5 years | 74.0 | 86.5 | 86.9 | 77.5 | 0.0223** |
| **Hired Services (in percentages)** | | | | | |
| Seeding | 30.7 | 43.9 | 55.3 | 37.8 | 0.0103** |
| Harvesting | 47.4 | 64.2 | 71.1 | 70.3 | 0.0001*** |
| **Provided Services (in percentages)** | | | | | |
| Seeding | 39.6 | 24.3 | 26.3 | 27.9 | 0.0555* |
| Harvesting | 33.9 | 18.9 | 23.7 | 24.3 | 0.0640* |

Notes: Single, double, and triple asterisks (*) denote statistical significance at the 0.10, 0.05, and 0.01 level respectively

On the side of hired and provided services, as we can see in Table 9, farmers in the Performance segment tend to provide more seeding and harvesting services than the other segments, while the Support Service segment hire most of their seeding and harvesting. The implications of these results for marketing managers is that in terms of technology adoption Performance and Support Service segments are the ones which would buy faster more advanced agricultural machinery. However, the performance segment is interesting due to the fact that they will not only use capital equipment for their own farms but also to provide services to other farmers.

## Conclusions

In this paper we found four capital equipment types of purchasers, each one with different characteristics in terms of their segment features, information usage, shared or autonomous decision making, price and brand loyalty orientation, preferred salespeople characteristics, services provided and hired, and technology adoption. No main differences were observed in terms of distribution channels preferences.

We found that from a marketing point of view, there are two more interesting segments, Performance and Balance, and two less interesting, Support Services and Price. The Performance segment was found to be the largest, with young farmers and high expected future growth. The Balance segment is the second largest segment, with the highest sales volume. The Support Service and Price segment were smallest or price oriented, which made them less attractive.

In terms of useful information sources farmer use the capital equipment decision making all farmers tend to value the local dealer, farm shows and field days. However, farmers in the Performance segment especially value the information from manufacturers´ salespeople, direct mail and agricultural Websites. The Balance-oriented

farmers clearly value most farm shows and field days, while those in the Support Service segment value highly local dealers, agricultural newspapers and specific publications. The Price Segment, on the other hand, would value highly any source except local dealer. This information can help marketing managers of capital equipment firms to invest resources in different venues.

Regarding the decision making process we found that in the Performance and Balance segments decisions are made more autonomously, while in the Support Service and Price segments are done after extensive discussions with family members and/or employees. Here too marketing managers can find different approaches to reach these famers in which there are involved different decision making actors and influencers.

In terms of price orientation and brand loyalty Argentine farmers strongly reject that the purchase capital items for the lowest price, and show strong brand loyalty. While brand loyalty is strong for capital equipment in Argentina, it is more so for the Performance and Support Service than for Price and Balance. The marketing implication is that is worthwhile investing in a good brand for capital equipment which would make the demand more inelastic and less price oriented.

It is also important to know the characteristics of salespeople that farmers value the most. In this point we found that Performance and Price oriented farmers value 'high technical competence', the Balance segment 'knows my operations well', while Support Service members 'honestly' and ´friendship'.

Finally, regarding the technological and service orientation of farmers, it was shown that Performance farmers tend to provide seeding and harvesting services, which makes them more likely to be strong agricultural machinery buyers. Balance and Support Service segments, on the other hand, were found to faster technology adopters than Performance and Price segments.

In terms of different distribution channels, no significant differences were found between segments. All tend to say they are loyal to local dealer, there are significant differences in quality of services and information from one dealer to another, and that the want to have a more direct relationship with capital equipment manufacturers.

Compared with the work done by Roucan et al. (2011) for US capital equipment purchases, there are differences in the segments relevance and size. While in Argentina the Performance segment (39%) is the largest and Balance (30%) the second largest, in the US the Balance segment (59%) was found to be the largest, and Price (18%) the second.

Information sources were found to be different for different segments in both countries, and more significant differences among segments were found in the Argentine case. Particularly farm shows and fields days tend to be more useful information sources in Argentina than in the US. The decision making process tends to be made more autonomously in the US than in Argentina. Also Argentine farmers tend to reject even

stronger than American farmers buying capital equipment at the lowest price and tend to be more brand loyal. Regarding producers preferences for distribution channels, the results are more or less similar, except that American farmers tend to be a little bit more loyal to local dealers and Argentine producers are willing to have a more direct relationship with capital equipment manufacturers.

Future research should be done to analyze the reasons why farmers tend to buy their capital equipment in different ways for different countries. This paper makes an initial contribution in comparing capital equipment segmentation of farmers for Argentine and compared with the US. Understanding how firms segment their customers in different countries could be a next step.

**Annex I.** Producer Preferences for Distribution Channels
(Likert scale from d 1 to 5; 1=I strongly disagree , 5=I strongly agree)

| Distribution Characteristics | Performance | Balance | Support Service | Price | Prob. of no association |
|---|---|---|---|---|---|
| I consider myself Loyal to Local Suppliers of Capital Items | 3.28 | 3.21 | 3.34 | 3.34 | 0.4332 |
| I prefer to buy capital items from only one local supplier | 2.64 | 2.50 | 2.79 | 2.85 | 0.1000 |
| There are often significant differences in quality of services from one Local supplier to another | 3.73 | 3.57 | 3.76 | 3.83 | 0.3344 |
| There are often significant differences in quality of information from one Local supplier to another | 3.46 | 3.59 | 3.61 | 3.64 | 0.5921 |
| In the next 5 years I want a more direct relationship with manufacturers | 3.46 | 3.38 | 3.47 | 3.41 | 0.8295 |

*On Average, what percentage of your total financing needs are met through the financing options provided by your dealer/supplier versus a traditional lender (Bank or others)?*

| Percentage of FinancialNeeds | Performance | Balance | SupportService | Price | Prob. of no association |
|---|---|---|---|---|---|
| 0 | 46.1% | 43.9 | 39.5% | 47.8% | 0.6374 |
| 1-25 | 22.0% | 21.0% | 15.8% | 18.0% | 0.6374 |
| 26-50 | 19.9% | 19.6% | 23.7% | 17.1% | 0.6374 |
| 51-75 | 7.9% | 5.4% | 10.5% | 11.7% | 0.6374 |
| 76-100 | 4.2% | 9.5% | 10.5% | 5.4% | 0.6374 |

Notes: Single, double, and triple asterisks (*) denote statistical significance at the 0.10, 0.05, and 0.01 level respectivelyValue are mean responses.

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