

BREEDING AND REGISTRATION COSTS OF MEDITERRANEAN CEREAL VARIETIES: THE SPANISH CASE

JUAN ANTONIO CAÑAS - RAFAEL MANUEL FRESNO (*)

The seed sector has been approached most of the times from a phytotechnical and genetic point of view. Here in this paper we propose to focus on that sector from an economical angle.

The lack of such kind of approach is specially notorious in Southern Europe. Although genetic improvement and innovation are quite important, their costs should not be set aside. These costs are studied in this paper, distinguishing the various phases that a variety goes through: breeding, registration and production. The costs that are dealt with in this paper are those of breeding and registration.

BREEDING COSTS

Let us study an example of the cost of a trial belonging to the network of a seed company. We have chosen a case in which we have 200 elemental plots available, with an area of 0.44 Ha. The costs originated by the trial are summarized in **table 1**. These costs are made up of three main parts: direct costs, personnel costs and general costs.

Regarding the direct costs of the trial, the farmer who owns the land has to be compensated by the loss of harvest resulting from leaving aisles without sowing between the plots. The estimated loss is around 30%, and the premium for the owner for letting the land to be used by the seed company is 20%. The economical compensation is based on the average productivity of the area where the trial is placed. In our example, 28600 Ptas. This figure is obtained by multiplying the

ABSTRACT

This article deals with the cost of placing a new variety of cereal (Durum Wheat, Bread Wheat, Barley,...) in the market for a seed company. Firstly, we consider breeding costs: all companies carry out different trials to test new varieties, which constitutes a network of trials. A variety is tested from 5 to 7 years. Once, based on the trials results, the company decides which varieties wants to market, it is necessary to register the variety: this implies some registration costs. Finally, when the variety has been registered, it must be multiplied. In order to do so, the seed company is aided by several farmers. This implies other costs that are going to be treated in further articles.

RÉSUMÉ

Nous traitons dans cet article le coût pour une entreprise de semences de situer au marché une variété nouvelle de céréale (blé dur, blé tendre, orge,...). On a considéré d'abord les coûts de sélection: toutes les entreprises réalisent de différents essais afin d'éprouver les variétés nouvelles, ce qui devient un réseau d'essais. Une variété est testée pendant 5 à 7 ans.

Après que la compagnie, compte tenu des résultats des essais, ait décidé sur les variétés à commercialiser, il faut déposer la variété, ce qui suppose des coûts de registre.

Enfin, on doit multiplier la variété. Pour ainsi faire l'entreprise de semences doit faire recours à plusieurs agriculteurs, ce qui comporte de coûts ajoutés, questions à traiter dans un article postérieur.

trial surface (0.44 Ha.) by the average yield of the region (5000 kg/Ha.), and also, by the estimated price of harvest (26 Ptas. or US \$ 0.17/kg) This quantity must be increased in a 50% (30% for loss of harvest and 20% as premium).

The next cost has to do with sowing: preparation of the seed, tractor driver, labourer and sowing drill. The cost of sowing this trial is estimated in 61200 Ptas (\$ 397.4). When the sowing is finished, the identification of each sown variety is essential, as well as the number of replications (each trial has usually 3 or 4). That is why some sticks placed on each plot for identification are necessary. We include among

the costs, the material and the preparation of sticks (15600 Ptas. or \$ 101.3). The other relevant cost is the one of the harvest, that includes the combined harvester, harvest personnel and transportation of personnel (71200 Ptas. = \$ 462.3). Finally, we include the cost of taking samples for its subsequent study in the laboratory (5600 Ptas., \$ 36.4), since sometimes the quality of grain is as important as the productivity achieved by the new varieties that has been put to the test.

Another group of costs is the personnel-related cost. First of all, we should consider the dedication of the R&D Department to the trials of cereals. Let us assume that the average budget of the R&D Department of a medium mediterranean seed company is 7262000 Ptas. (\$ 47155.8), and let us assume as well that its personnel dedicates 40% of their attention to cereals. If we calculate 40% of 7262000 we obtain 2904800 Ptas (\$ 18862.4). But this figure refers to all the cereal trials that the company carries out throughout the year. To obtain the cost per trial, we use the cost per plot. This way, we divide the annual cost assigned to trials by the average number of plots sown by the company annually. The result is the cost by plot of the R&D Department. There-

(*) Department of Economy, Sociology and Agricultural Policy of the "Escuela Técnica Superior de Ingenieros Agrónomos" of the University of Cordoba (Spain).

Table 1 Cereal trial costs.

Calculation for 200 plots average trial	
Total area: 4400 m ² (0.44 Ha)	
1. Direct cost	
<i>1.1 Compensation for occupation of land</i>	
Harvest loss: 30%	
Trial premium: 20%	
Total: 50% over the average production of the area: 5000 kg/ha	28,600 Pts
Estimated price: 26 Ptas./kg	
<i>1.2 Sowing</i>	T
Sowing drill and tractor driver	20,000 Pts
Transportation of sowing team	30,000 Pts
Preparation of seed	11,200 Pts
<i>1.3. Sticks and bags</i>	
Material: 50 Ptas. per elemental plot	10,000 Pts
Preparation and aisles arrangement	8,600 Pts
<i>1.4. Harvest</i>	
Combined harvester and other equipment	20,000 Pts
Harvest team transportation	40,000 Pts
Harvest personnel	11,200 Pts
<i>1.5. Laboratory samples</i>	5,600 Pts
Total direct costs	185,200 Pts
2. Personnel Costs	
<i>2.1. Research & Development Dept. Costs.</i>	
40% of its attention, dedicated to cereal, from a total budget of 7262000 Ptas. with 4.000 plots	
Total: 726 Ptas./Plot.	145,200 Pts
<i>2.2. Vehicles costs</i>	
" from a total budget of 1570000 Ptas. (157 Ptas./Plot)	
	31,400 Pts
<i>2.3. Transportation costs</i>	
" from a total budget of 1995000 Ptas. (199,5 Ptas./Plot)	
	39,900 Pts
Total of personnel costs	216,500 Pts
3. General costs	
General services + 10% amortization of R&D Department Total: 954000 with 4000 plots	
Cost per plot: 238,5 Ptas.	47,700 Pts
4. Summary	
Total cost of the trial	449,400 Pts
Total cost per plot	2,247 Pts

Source: Information supplied by a company of the sector, 1997.

fore, the cost by plot is determined dividing 2904800 by 4000 (total number of plots of all cereal trials), resulting 726 Ptas (\$ 4.7). If we multiply this cost of an individual plot by the number of plots in a particular trial, the result is the personnel cost of that trial. In this case 145200 Ptas (\$ 942.8). Following similar reasoning, vehicles and transportation costs are calculated, being 31400 Ptas (\$ 203.9) the first and 39900 (\$ 259.1) the second. If we sum the R&D Department cost, the vehicles cost and the transportation cost, we obtain the the total personnel cost. In our example, 216500 Ptas (\$ 1405.8). There are some general expenses left, including power, water,

heating, etc., plus a 10% amortization cost applied to R&D Department, totalizing 47700 Ptas (\$ 309.7). Adding up the three different costs (Direct, Personnel and General) we get the total cost of this cereal trial: 449400 Ptas (\$ 2918.2). To refer this cost to a particular plot, let us divide the total cost by the average number of plots of this type of trial: 449000 divided by 200 plots equal to 2250 Ptas (\$14.6).

REGISTRATION COSTS

Next we are going to study the cost of the official trials that are necessary to register the varieties that the companies choose to be placed in the market. There are two types of registration: the one of commercial varieties, that constitutes a system of controlling the production of seeds and seedlings, with the will of protecting the farmers' interests, and the one of protected varieties, whose goal is to protect the rights of the holders of the varieties, and therefore, to encourage the entrepreneurial investments in research to obtain new varieties. We can see the costs of including a cultivar in the commercial varieties registration for a seed company in



Table 2 Official trials cost (US \$ = 154 Ptas.).

Registration of commercial varieties (Annual Costs in Ptas.)						
Species	Identification Trials		Agronomical Value Trials			
Rest of cereals	88,000 Ptas.		165,000 Ptas.			
Corn/Maize	176,000 Ptas.		192,000 Ptas.			
Registration of protected varieties (Annual Costs in Ptas.)						
Concept	Amount	Years				
		1st	2nd	3rd	4th	5th -
1) Procedure for the application of Title of Vegetal Holder	33,000 Ptas. Only payment					
2) Previous trials to Title	88,000 Pts./year					
3) Title of Vegetal Holder	15,638 Ptas. Only payment					
4) Maintenance of Holder's rights		13,031 Ptas.	18,243 Ptas.	26,065 Ptas.	31,275 Ptas.	36,491 Ptas.
5) Cancelled Titles	15,638 Ptas.					
6) Dispatch of copies to Titles and certificates or rejection of Titles	2,606 Ptas.					
Source: Spanish Official Bulletin, Dec. 31st, 1996.						

table 2 (above). The process carried out is made up of some previous trials of varietal identification and others called agronomical value trials. Their costs for cereals per year are summarized as well in the upper part of **table 2**.

Identification trial cost is 88000 Ptas. (\$ 571.4) annually, and Agronomical value trial cost, 165000 (both figures referred to cereals), equivalent to \$ 1071.4.

These trials are to be carried out within the Net of trials of the formerly called National Institute for Seed and Seedlings (INSPV in Spanish, now SGSPV). And the mentioned quantities are the ones that the breeding company has to pay for their varieties to be included in the official trials.

The identification trials try to check if the morphological features of the tested variety match with the information supplied by the company that owns the cultivar.

This is phenotypically controlled.

Other aspects that are also checked are the following: the material must be new, different to the already existing, and stable, with fixed features.

Regarding the agronomical value trials, their goal is to compare the new varieties developed by programs of genetic improvement, with the ones already in the market. The idea is to select the varieties that turn out to be better than the ones already available for growers to use. 'Better' means higher yield, better quality and more resistance and/or tolerance to diseases.

For protected varieties registration, there are a number of taxes according to various concepts. Some of them have to be paid annually. These taxes are shown in the lower part of **table 2**. ●

REFERENCES

- Besnier F. (1989) - Semillas. Biología y Tecnología. Ediciones Mundi-Prensa. Madrid.
- Copeland L.O. (1976) - Principles of Seed Sciences and Technology. Burgess Publishing Co. Minneapolis.
- International Seed Testing Association (1992) - Handbook of variety testing. Zurich.
- Merida J. (1994) Identificación de variedades en plantas de gran cultivo. Agricultura n. 739, Febrero. Madrid.
- Niles G.A. and Feaster C.V. (1984) - Breeding. American Society of Agronomy, n. 24, Wisconsin.
- Rodriguez A. (1994) - Ensayos de Valor Agronómico y Utilización. Agricultura, n. 739, Febrero, Madrid.
- Thompson J.R. (1979) - An introduction to seed technology. Leonard Hill. London.

