



It is considered here that the performance of a crop depends on its cultural precedent. We will introduce rotations that take into account previous crops. To do this, it is necessary to build a recursive model, where the results of a year depend on the previous year.

« An arable crop farmer that grows special crops (INOSYS Système GC 131 data) in the Centre-Val de Loire region has 110 ha of land. Irrigation and the economic environment of his farm offer him a large range of productions options : soft wheat, durum wheat, spring barley, potato for human consumption, sugar beet and rapeseed. Five of these crop types are irrigated in order to ensure high quality regular production. The farmer has 60 000 m³ of water.

Irrigation needs and economic data are shown in the table below :

Irrigation water needs			
Crops	Vol in m³/ha		
Soft wheat	175		
Durum wheat	350		
Spring barley	700		
Potato for human consumption	1800		
Sugar beet	1750		
Other technico-economic data			
Crops	Yields (qx/ha)	Prices/qx (€)	Total costs (€/ha)
Soft wheat	85	16	460
Durum wheat	71	28	565
Spring barley	70	17.5	470
Potato for human consumption	495	14	4210
Sugar beet	950	2.6	1082
Rapeseed	40	38	490

Source : from the Système GC 131 of the INOSYS network of agricultural chambers in the Centre Val de Loire region. 2016

Crop yields depend on previous crops (a zero means that it is not possible to cultivate a given crop with that previous crop) :

Crops	Previous crops					
	Soft wheat	Durum wheat	Sugar beet	Rapeseed	Potato for human consumption	Barley
Soft wheat	0	80	85	85	85	80
Durum wheat	65	0	70	70	70	65
Sugar beet	950	950	0	0	0	950
Rapeseed	40	40	0	0	0	40
Potato for human consumption	495	4954	0	0	0	495
Barley	70	60	70	70	70	0

The initial cropping pattern is as follows : 10 ha of soft wheat, 20 ha of durum wheat, 30 ha of sugar beet, 0 ha of rapeseed, 40 ha of potato and 10 ha of barley.

The farmer maximizes his profit every year. »