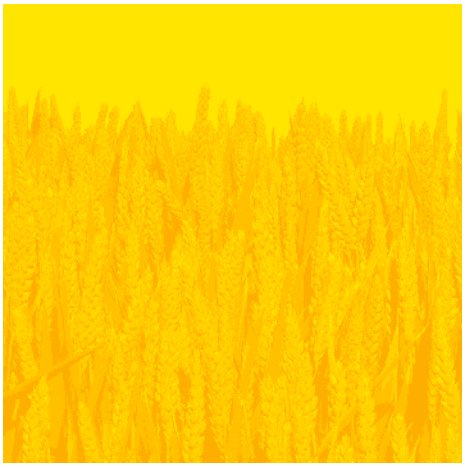
> PUBLICATION
October 2012

HARVEST
2012



Quality of French wheats

FranceAgriMer

ARVALIS
Institut du végétal

EDITORIAL

36.1

million tonnes of wheat harvested in 2012 of which

18.8

million tonnes of superior milling wheat

2012 HARVEST : VOLUME AND QUALITY CONFIRMED

This year, France has gathered in 36.1 million tonnes of wheat, which once more confirms its place as a regular producer and important supplier on the international markets.
Nearly 32 million tonnes are milling wheats, of which approximately 60 % (19 million tonnes) are of superior quality. With a satisfactory protein content, a good level of baking strength and a good and rather homogeneous breadmaking behaviour, these wheats will meet French and international millers' needs.

SUITABLE PROTEIN CONTENT AND GOOD BREADMAKING QUALITY

Protein contents are of 11.4 % on average. 82 % of the wheats exceed the 11 % rate. Following the frequent occurrence of rain during the harvests, specific weights are on average 76.1 kg/hl. Levels vary greatly this year according to the date of harvest. In total, 55 % of the French harvest exceed the commercial threshold of 76 kg/hl.
Despite these unfavourable weather conditions, the Hagberg falling numbers are higher than expected. 72 % of the harvest lies above the commercial threshold of 220 seconds and 92 % of wheats show a falling number greater than 180 seconds.
Harvests having generally been possible following several days of good weather, the wheat moisture level is satisfactory, 13.4 % on average, appropriate for grain conservation in good conditions.

In terms of technological quality, the results are good. Baking strength exceeds an average of 190, with an average P/L of 0.6. Breadmaking quality is generally of a good level and rather homogeneous, with good dough and bread results, improved compared to 2011.

ALMOST 32 MILLION TONNES OF MILLING WHEAT

The French cereals sector has, for many years, strived to offer a high quality of production. 91 % of its surfaces are therefore cultivated with breadmaking wheats resulting from a diversified selection of varieties. In 2012, 31.8 million tonnes are graded milling wheats, of which 18.8 million tonnes of a superior quality, with a protein rate over 11 %, a baking strength above 160 and a Hagberg falling number which exceeds 220 seconds.
This harvest is able to respond to the demands of all clients in France, in the domestic European market and also for export to third countries.

.

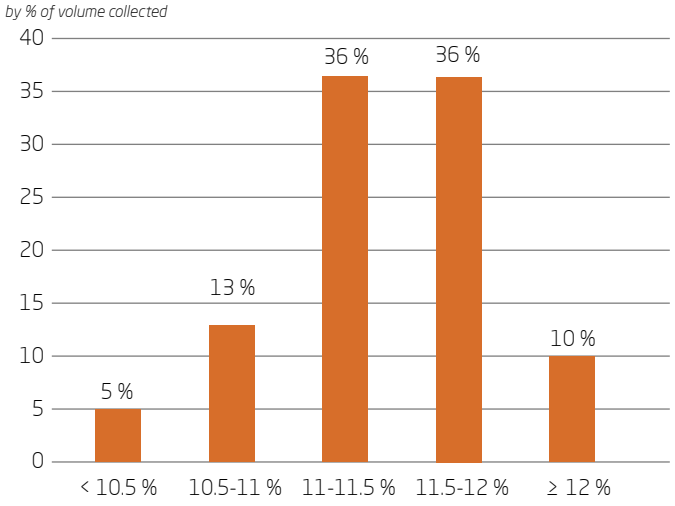
INLAND SILOS SURVEY

INLAND SILOS SURVEY

In order to evaluate the quality of the crop, two distinct but complementary investigations are conducted by FranceAgriMer and ARVALIS - Institut du végétal. The first survey is conducted with collectors to evaluate the batches of wheat which they have blended. Samples taken during the harvest correspond to categories already existing in collection silos. These are isolated varieties or, more frequently, mixes of varieties whose technological characteristics vary according to the specific distribution network sought by each storage agency. The results presented in this chapter were obtained through this survey.

An average protein content of 11.4 %

• The protein content value reaches 11.4 % on average and regional averages range from 11 % to 13 %. The results are rather homogeneous, with 72 % of wheats ranging between 11 % and 12 % protein. 82 % of wheats show a rate of protein over 11 % and almost 50 % show a rate over 11.5 %.



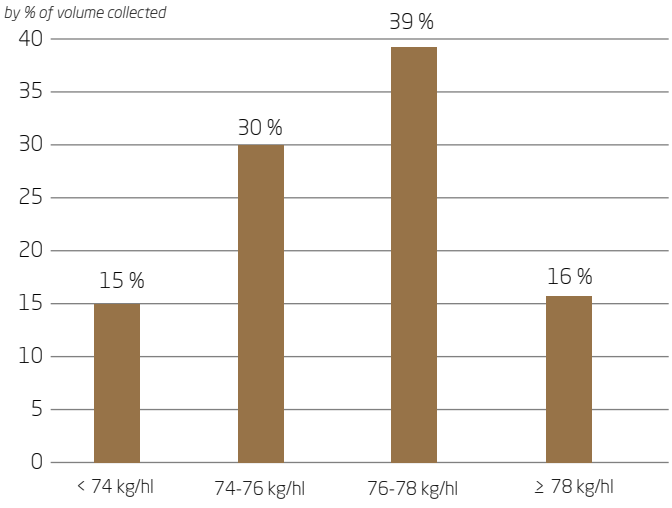
Source : FranceAgriMer / Inland silos survey 2012

Source : FranceAgriMer / Inland silos survey 2012

82 % of the harvest higher than **11%**

Specific weight : 76.1 kg/hl on average

• Following the frequent periods of rainfall during the harvest, the national average specific weight stands at 76.1 kg/hl. Regional averages range from 74.3 kg/hl to 79.4 kg/hl, levels varying within a region in relation to harvest dates. 55% of the French harvest exceeds the commercial threshold of 76 kg/hl.



Source : FranceAgriMer / Inland silos survey 2012

Source : FranceAgriMer / Inland silos survey 2012

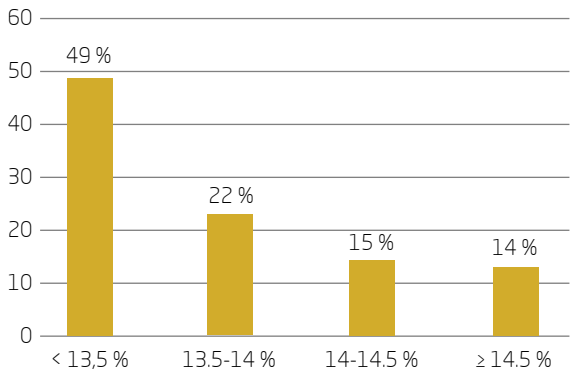
55 % of wheats over **76 kg/hl**

INLAND SILOS SURVEY

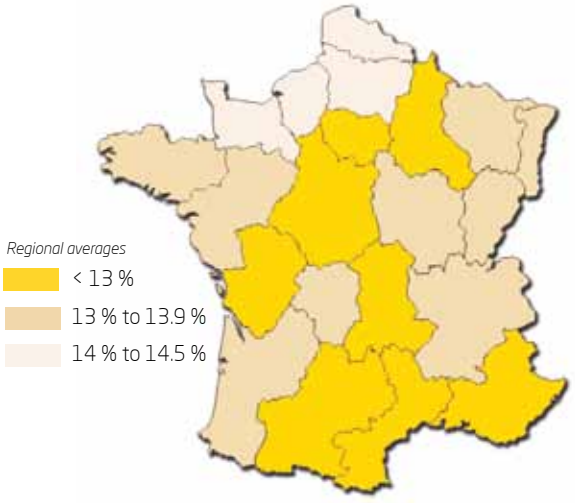
Water content adequate for good storage

• As harvests generally could be conducted after several days of dry weather, water content of grains was on average 13.4 % at the time of delivery to collection silos. The water content is generally lower in the South (with a minimum of 10.5 %) and higher in the North (with a maximum average of 14.5 %). 71 % of the wheats display a water content lower than 14 %.

by % of volume collected



Source : FranceAgriMer / Inland silos survey 2012

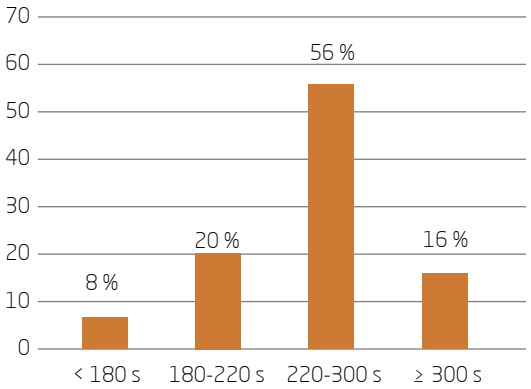


Source : FranceAgriMer / Inland silos survey 2012

Rather high Hagberg numbers

• Most varieties grown in France have a low sensitivity to or are tolerant to the degradation of the Hagberg falling number. Thus the level of the French harvest is rather high, despite rainy periods which occurred in July. 72 % of tonnage therefore exceeds 220 seconds. Only 8 % of the volume collected shows falling numbers below 180 seconds.

by % of volume collected



Source : FranceAgriMer / Inland silos survey 2012

INLAND SILOS SURVEY

Baking strength at a good level

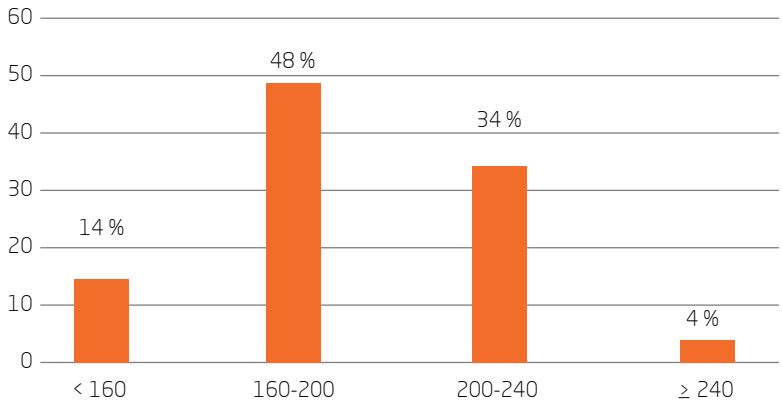
• The baking strength (W) is at a good level, over 190 on average.
86 % of wheats exceed 160 of W, thus meeting the needs of millers in France and abroad.

86%

have a

W above 160

by % of volume collected



Source : FranceAgriMer / Inland silos survey 2012

P/L adapted to needs

• The wheats are shown to have an average P/L of 0.62. Almost the entire harvest shows a P/L lower than 1. Three fourths of the wheats have a P/L of between 0.4 and 0.8, well adapted to French and foreign millers who will thus easily find appropriate parcels to meet their needs.

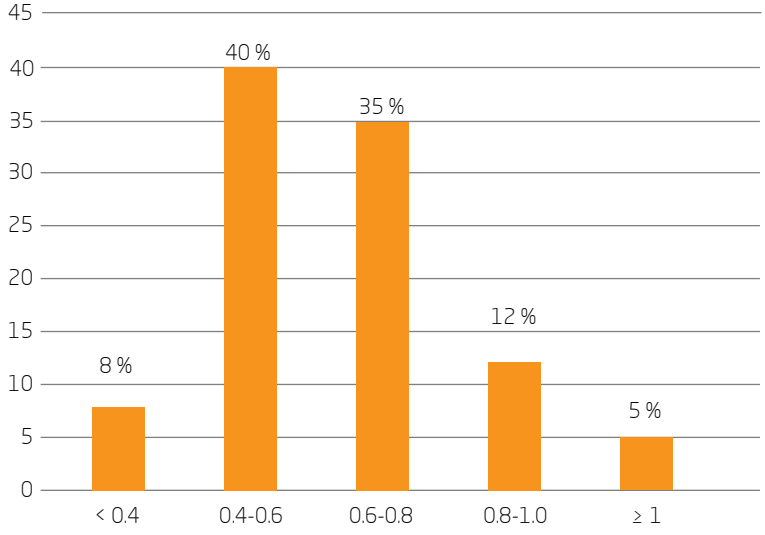
3/4

of wheats have a P/L

between 0.4 and 0.8

Chopin alveograph measurements were taken on wheats with at least 10.5 % protein and 180 seconds of Hagberg Falling Number value.

by % of volume collected



Source : FranceAgriMer / Inland silos survey 2012

INLAND SILOS SURVEY

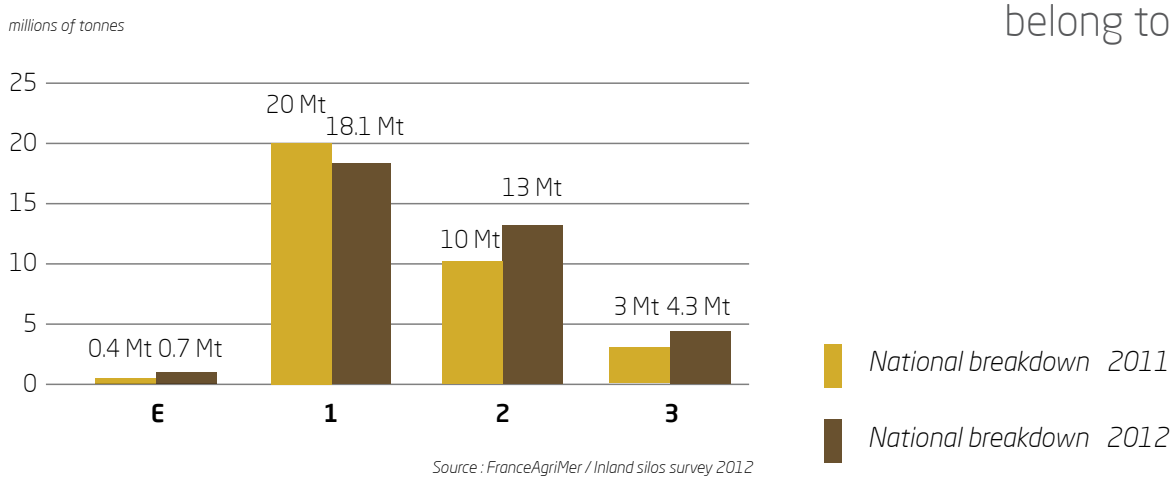
31.8 Mt of milling wheats

• The levels of the three main measurement parameters of wheats, namely protein content, baking strength W and Hagberg falling numbers, allow for a classification of all wheats harvested in France into four categories of quality.

This global assessment of the harvest provides an image of the French "average profile", in addition to the added potential brought by its diversity throughout the country.

In 2012, 31.8 million tonnes are milling wheats, of which 18.8 million tonnes are superior milling wheats, belonging mainly to class 1, with a protein rate higher than 11 %, a baking strength over 160 and a Hagberg falling number exceeding 220 seconds.

18.1 million tonnes belong to **class 1**



Source : FranceAgriMer / Inland silos survey 2012

CLASSIFICATION TABLE

Classes	Protein	(w) Baking strength	Hagberg	2012 Breakdown
E	≥ 12 %	≥ 250	≥ 220	2 %
1	11 - 12.5 %	160 - 250	≥ 220	50 %
2	10.5 - 11.5 %	according to contract specifications	≥ 180	36 %
3	< 10.5 %	not specified	not specified	12 %

Protein : (N x 5.7) % M.S.
W : 10-4 joules/g
Hagberg : seconds

Source : FranceAgriMer / Inland silos survey 2012

VARIETAL SURVEY IN THE FIELD

VARIETAL SURVEY IN THE FIELD

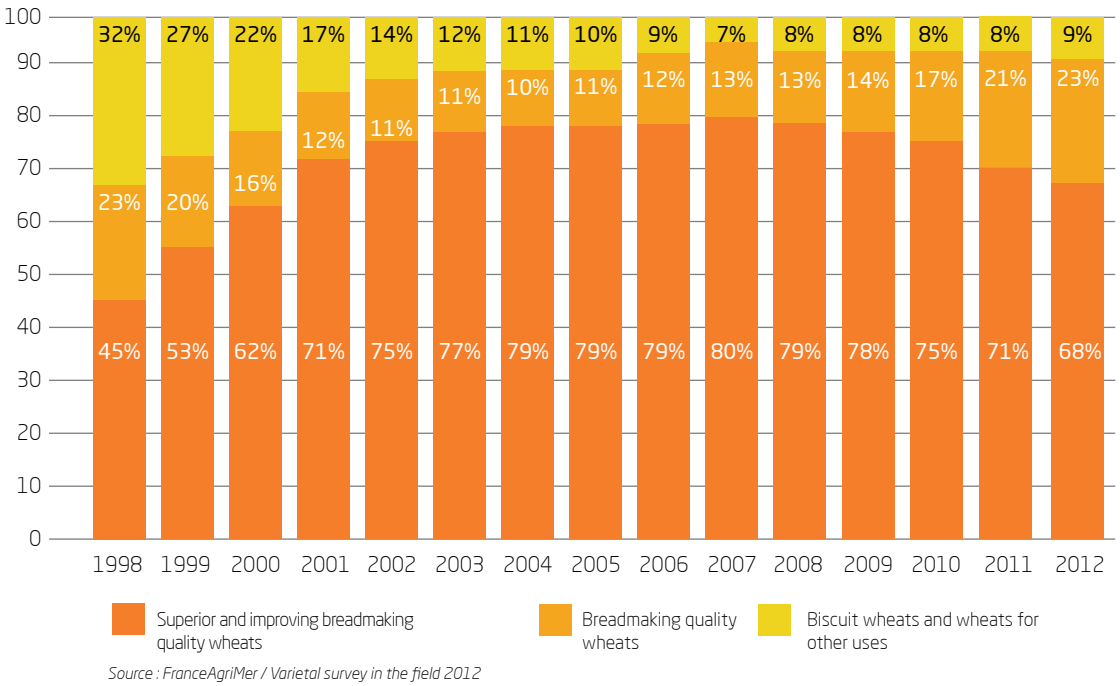
Alongside the collection points survey, a second, complementary survey is conducted in collaboration with the farmers at the time of the harvest. It aims to evaluate the varietal evolution and the quality of cultivated breadmaking varieties by making up varietal blends representative of each region. The results presented in this chapter were obtained through this survey.

Breadmaking wheats predominate

• The technological quality of French varieties of soft wheat is evaluated on the basis of several analyses.
The two principal methods used are a breadmaking test, which determines the breadmaking behaviour of each variety, and Chopin alveograph measurements, which evaluate baking strength W as well as the P/L. A biscuit-making test is also conducted for varieties in this category.
Based on the results, the varieties are divided into several categories attributed at the time of their initial registration :
- breadmaking quality wheats (BP- blés panifiables) and superior breadmaking wheats (BPS- blés panifiables supérieurs), of satisfactory baking strength, meeting the demands of the standard French breadmaking test;
- improving or strengthening wheats (BAF - blés améliorants ou de force), rich in protein and with a high baking strength, used in mixtures to improve the behaviour of pure or breadmaking varieties for specific uses;
- biscuit-making wheats (BB - blés biscuitiers), which have a soft kernel, weak baking strength and meet the demands of the biscuit-making test;
- wheats for other uses (BAU - blés pour autres usages), grouping together the varieties which do not correspond to the above categories.
The varietal selection has helped to improve the quality of wheats. The proportion of breadmaking quality wheats has thus regularly grown to reach a stable high level : 91 % in 2012. Superior and improver breadmaking wheats remain by far the majority, with 68 % of national wheat area in 2012. Breadmaking quality wheats (BP) represent 23 % of the national wheat area in 2012, increasing since 2004. Finally, biscuit wheats and wheats for other uses make up 9 % of the national area. BPMF varieties or Wheats for the French Milling Industry (Blés Pour la Meunerie Française), of which the list is established by the National Association of French Flour Producers (Association Nationale de la Meunerie Française) each year, represent 60 % of the area, of which 57 % of varieties are of breadmaking quality and strength and 3 % are biscuit-making wheats.

Breadmaking wheats predominate

By % of national surface area



Source : FranceAgriMer / Varietal survey in the field 2012

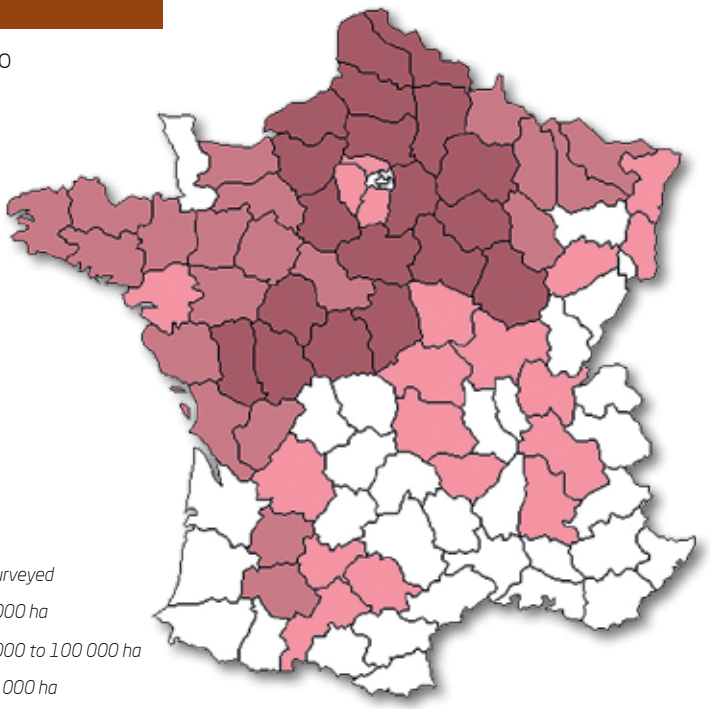
91 %

of surfaces are dedicated to breadmaking wheats

VARIETAL SURVEY IN THE FIELD

Quality of the breadmaking wheats

• The survey dealt with wheats from 58 departments grouped into 17 regions representing 96 % of the national aera of soft wheat. The technological criteria are measured on varietal blends of breadmaking wheats, made up of the principal varieties cultivated in the region as at least four elementary samples whose varietal identity has been controlled, reblended in proportion of their occurence.
In each region, two additional mixes are also made up, combining the remaining breadmaking varieties :
- a mix of 'BPMF' breadmaking varieties
(Blés pour la Meunerie Française or Wheats for the French Milling Industry*)
- a mix of non 'BPMF' breadmaking varieties



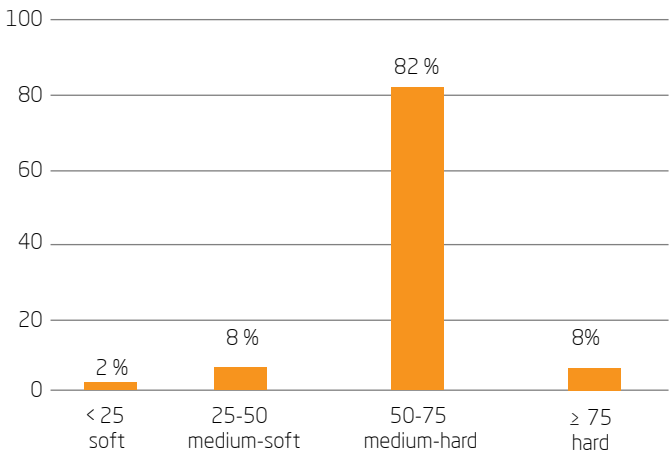
** based on the list established by the National Association of French Flour Producers (Association Nationale de la Meunerie Française)*

Hardness: return to a usual level, medium-hard

• The hardness of French wheats has strongly increased for 15 years to reach a stable level of about 62. Previously medium-soft, wheats have, for several years, been medium-hard and hard. Following a sharp two-year increase, the hardness of the wheats returns to usual values of 61 on average. 82 % of the harvest falls into the medium-hard category, a characteristic feature of French wheats.

82 % of wheats between **50** and **75** hardness

by % of surface analysed



Source: FranceAgriMer / Arvalis - Institut du végétal / Varietal survey in the field 2012

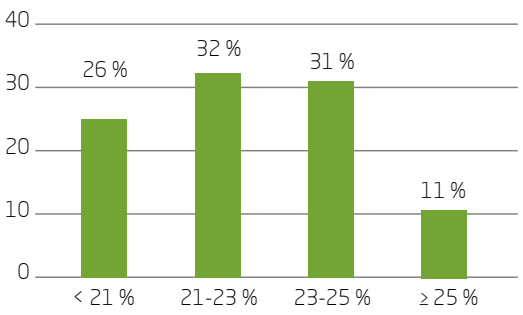
VARIETAL SURVEY IN THE FIELD

Good quality gluten

• The wet gluten content of the wheats averages out at 22.6 %. The majority of wheats range from 21 % to 25 % of wet gluten and over 40 % exceed a content of 23 %. The gluten Index of the wheats is high, with an average of 81. Over 60 % of the harvest shows a gluten Index over 80, demonstrating the good viscoelastic quality of the gluten.

Wet gluten (ICC 155)

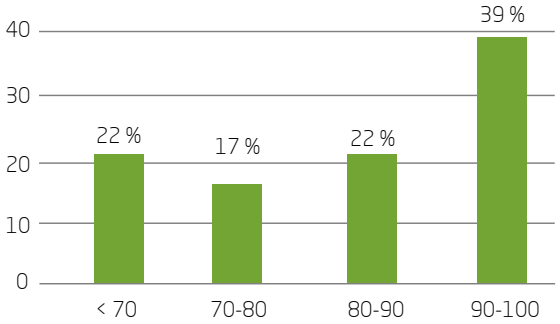
by % of surface analysed



Source : FranceAgriMer / Arvalis - Institut du végétal / Varietal survey in the field 2012

Gluten Index (ICC 155)

by % of surface analysed

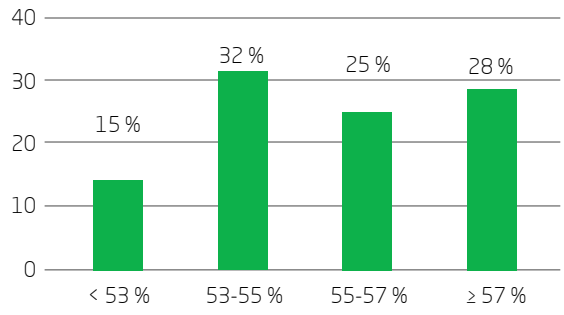


Source : FranceAgriMer / Arvalis - Institut du végétal / Varietal survey in the field 2012

Satisfactory water absorption during kneading

Water absorption (NF V03-765)

by % of surface analysed



Source: FranceAgriMer / Arvalis - Institut du végétal / Varietal survey in the field 2012

• In the Mixolab®, water absorption of water during kneading is at a good level. Almost 60 % of wheats show between 53 % and 57 % and over half of the harvest hydrates to over 55 %.

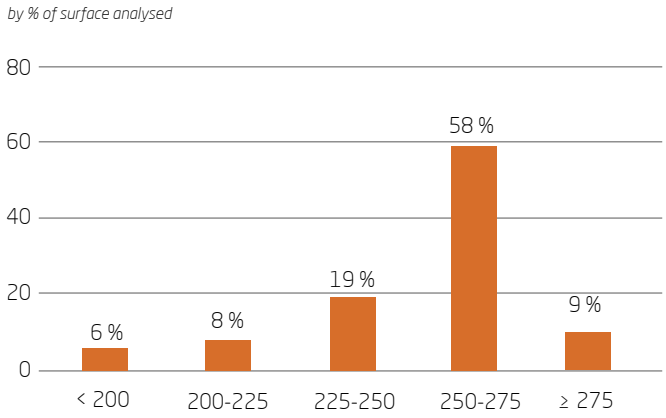
Analysis of the wet gluten content and the gluten Index, conducted by the Pôles Analytiques d'ARVALIS, are covered by Cofrac accreditation n°1-0741. Available on www.cofrac.fr.
Reports produced by the Pôles are available on request.

VARIETAL SURVEY IN THE FIELD

Good breadmaking quality

• For the standard French breadmaking test, total results are generally of a good level and rather homogeneous, with almost 60 % of wheats showing a result between 250 and 275 (out of a maximum of 300), demonstrating good breadmaking behaviour. 9 % of wheats are even excellent, with results over 275. The general average is 251.

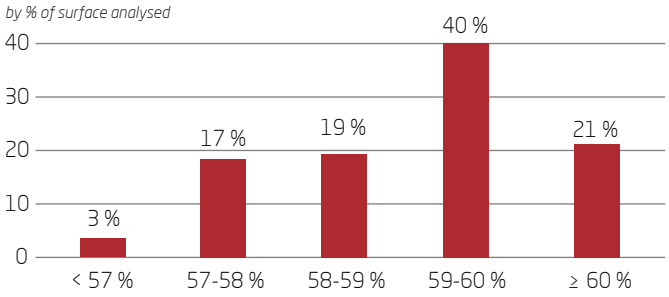
Total breadmaking note (max. 300) (NF V03-716)



Source : FranceAgriMer / Arvalis - Institut du végétal / Varietal survey in the field 2012

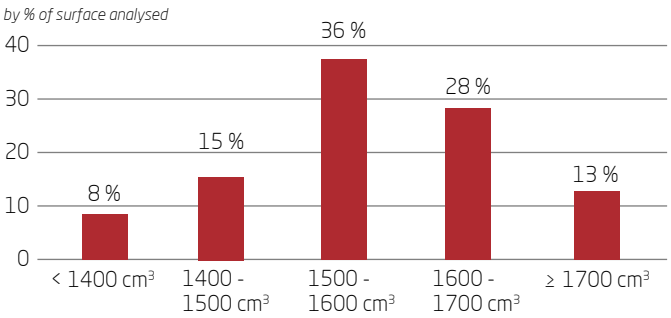
Breadmaking characteristics

Water absorption (NF V03-716)



Source : FranceAgriMer / Arvalis - Institut du végétal / Varietal survey in the field 2012

Volumes (NF V03-716)



Source : FranceAgriMer / Arvalis - Institut du végétal / Varietal survey in the field 2012

• During the breadmaking test, the doughs hydrate rather well during kneading, with an average of 59 %.
Over 60 % of the wheats show a hydration level which exceeds 59 %. The doughs generally are not sticky during kneading.

Overall, the doughs are balanced during shaping : neither too extensible nor too elastic. The shape is preserved when the dough piece is put in the oven, which leads to good dough grades.

Bread results are also at a good level, with well developed blade marks. Volumes are equally highly satisfactory, around 1570 cm³ on average.

The varietal diversity, meaning that wheats of complementary characteristics can be combined, and the qualitative level of the year will ensure that milling blends will reach a good level.

The standard French breadmaking test, conducted by the Pôles Analytiques d'ARVALIS, is covered by Cofrac accreditation n°1-0741. Available on www.cofrac.fr
Reports produced by the Pôles are available on request.

A TWO-FOLD SURVEY

Two distinct but complementary surveys are conducted by FranceAgriMer and by ARVALIS - Institut du végétal, with the support of Intercéréales, of the Association Nationale de la Meunerie Française (ANMF) or the National Association of French Flour Producers and of the Groupement National Interprofessionnel des Semences et des Plants (GNIS) or the National Multi-Professional Group for Seeds and Plants.

• Varietal survey in the field

A postal survey conducted by FranceAgriMer with 40 000 farmers, chosen at random in 67 departments, throughout the months of May and June 2012, was used to assess the breakdown of pure varieties by department and by region. Based on these elements, a population of representative farmers was selected at random, from whom approximately 1 300 samples of pure wheat varieties were taken at the time of harvest by the regional services of FranceAgriMer. Regional varietal mixes were then reblended by the Pôles Analytiques d'ARVALIS according to the principal regional varieties percentages. These mixes were created by grouping at least four pure samples of which the varietal identity was controlled by PCR. In each region, complementary mixes were also created by grouping the remaining breadmaking varieties. All the mixes were then analysed by the Pôles Analytiques d'ARVALIS.

• Collection points survey

The network of the collection points survey is made up of 200 silos belonging to cooperatives or merchants. At the time of the harvest, approximately 500 samples were taken by FranceAgriMer agents during delivery to silos, and sent to the FranceAgriMer laboratory for analysis. These samples represent the actual cells contents as arranged by each of the accredited collectors.

Analytical methods

• Protein content

The protein content is measured on whole grains by near infra-red spectroscopy. It is calculated by using coefficient 5.7 and refers to dry matter (DM) (MS - matière sèche).

• Mass per hectolitre or specific weight (NF EN ISO 7971-3)

It is obtained with a Niléma-litre and is expressed in kg/hl on the sample as is. From 1 July 2012, the results obtained are then corrected by means of the following equation: corrected mass per hectolitre = (0.9078 x mass per hectolitre read) + 6.6025. According to their level, the values of mass per hectolitre of this survey are thus not directly comparable with those of previous years. For further details see the FranceAgriMer / Arvalis Institut du végétal briefing note: "Raccordement des instruments de mesure de la masse à l'hectolitre en service (Correlating mass per hectolitre measurement instruments in use)" (May 2012).

• Hagberg-Perten falling number value (NF EN ISO 3093)

This indirectly measures the level of alpha-amylase activity, which can become excessive due to the presence of grain which has germinated or is in the process of germinating. The falling numbers value is expressed in seconds. It corresponds to the time which a stylet takes to reach the bottom of a tube containing a mixture of milled wheat and water, immersed in a bath of boiling water. A short duration means high amylase activity and therefore a lower quality.

• Water content (NF EN ISO 712)

This is equivalent to the loss of mass after drying at a temperature of 130-133°C and is expressed as a percentage.

• Hardness Index (AACC 3970.A)

The hardness, or state of cohesion of the grain, is measured by near infra-red reflectance spectroscopy. The different classes of hardness (extra-soft, soft, medium-soft, medium-hard, hard and extra-hard) are expressed by an index on a continuous scale graduated from 0 to 100. By general standards, index 25 corresponds to the average value of soft wheats and index 75 corresponds to hard wheats.

• Wet gluten content and gluten Index (ICC 155)

These values are used to assess :

- the quantity of gluten extracted by mechanically kneading and washing a mixture of milled wheat and salted water,
- the viscoelastic quality of gluten by centrifugation through a sieve; the higher the index, the more tenacious the gluten

• Measurement of the rate of water absorption of flours and rheological characteristics of dough during kneading with Mixolab® (NF V03-765)

The principle of Mixolab® consists in measuring the torque exerted by the dough between two mixing arms rotating in opposite directions. This measure of consistency of the dough is used for evaluating the absorption strength of the flours as well as their behaviour during kneading.

Four main parameters are assessed :

- **hydration, or water absorption** : expressed in % of a flour with 14% water content, this indicates the quantity of water to be added to a flour for making a dough with a given consistency (1.1 Nm) ;
- **time of development** : expressed in minutes, it shows the time needed for the flour to develop into a dough, from the beginning to its optimal stage ;
- **stability** : expressed in minutes, indicates the amount of time during which the developed consistency does not change ;
- **dough weakening** : expressed in Nm and measured at the end of the development, it indicates the loss of consistency of the dough after a given time of kneading.

• The CHOPIN alveograph test (NF EN ISO 27971)

The alveograph test is performed on flour taken from a milled wheat sample. The measure is based on the recording of rheological behaviour of a disc of dough undergoing deformation in the form of a bubble. Four main parameters are assessed: W, G, P and P/L. W represents the deformation of the dough. It gives a good indication of the baking strength. G (gonflement), or rising index, represents the extensibility of the dough. P relates to the tenacity of the dough. The P/L ratio provides a measurement of the balance between tenacity and extensibility. Finally, the 'ie' parameter expresses the elasticity of the dough.

• Standard French breadmaking test (NF V03-716)

The breadmaking test is carried out with flour from a milled wheat sample. It is conducted in five stages: kneading, first fermentation, shaping, second fermentation and finally baking of the breads. Breadmaking quality is assessed at each stage of the breadmaking and leads to a grade out of 300. It summarises 30 intermediary notations established by the baker for evaluating the characteristics of the dough, the bread as a whole and its soft centre. A breadmaking grade which is lower than 200 indicates that the wheat is poorly adapted to French breadmaking. On the other hand, a grade higher than 250 testifies to the dough's good breadmaking quality.

FranceAgriMer
12 rue Henri Rol-Tanguy / TSA 20002 / 93555 Montreuil-sous-Bois / France / www.franceagrimer.fr

ARVALIS - Institut du végétal
3 rue Joseph et Marie Hackin / 75116 Paris / France / www.arvalisinstitutduvegetal.fr

Association nationale de la meunerie française (ANMF)
66 rue La Boétie / 75008 Paris / France / www.meuneriefrancaise.com

Groupement national interprofessionnel des semences et plants (Gnis)
44 rue du Louvre / 75001 Paris / France / www.gnis.fr

With the support of Intercéréales and France Export Céréales

Photos : Nicole Cornec, Charles Baudart, Bernard Minie / ARVALIS - Institut du végétal ; Frédéric Joffre / FranceAgriMer ; DR

ISSN : 1777-1277

FranceAgriMer
ÉTABLISSEMENT NATIONAL
DES PRODUITS DE L'AGRICULTURE ET DE LA MER

ARVALIS
Institut du végétal

Association nationale de la meunerie française

gnis
groupement national interprofessionnel des semences et plants

Ministère de l'Agriculture de l'Agroalimentaire et de la Forêt