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► To cite this version:

G. Brunel, Y. Dupre. The perception of the risks surrounding the french research CEA Cadarache site: reconcile the fears with the challenges. WM2019, Mar 2019, Phoenix, United States. hal-02411058

HAL Id: hal-02411058

<https://hal.science/hal-02411058>

Submitted on 15 Dec 2019

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**THE PERCEPTION OF THE RISKS SURROUNDING THE FRENCH RESEARCH
CEA CADARACHE SITE: RECONCILE THE FEARS WITH THE CHALLENGES**

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ABSTRACT

The CEA Cadarache is one of the 10 research centers of the French Alternative Energies and Atomic Energy Commission (CEA). Distributed throughout various research platforms, it focus on nuclear fission, nuclear fusion, new energy technologies (hydrogen, solar, biomass) and fundamental research in the field of vegetal biology. The Government asked nuclear actors to open communication and to give all the information asked by the Local Information Commission (CLI) and the public. In its concern for its image and in a logic of the emergence of transparency in these last few years, the CEA Cadarache decided to bring the population's anxiety in consistency with the actual risks generated by the activities within the site of CEA Cadarache. The Communication and Public Affairs Department tasked with developing a communication strategy in order to reach the objective of affecting surrounding population's perception. First stated that we needed to know what the current perception on the CEA Cadarache is through a population survey. Results shows a better knowledge of the center's activities than anticipated, but still some lacks that could lead to unwanted stress in the event of an incident on the site. We worked on the elaboration of the communication campaign in consultation with psychology experts concerning the survey results. It has been decided to deploy four actions this year, as well as repeating the process of survey every two to three years and the setting up of a lasting structure of exchange with the population in a form yet to be determined. The effects of our communication campaign are measured in regard to the result of this second survey, two years after.

INTRODUCTION

The position of the CEA in the French nuclear sector

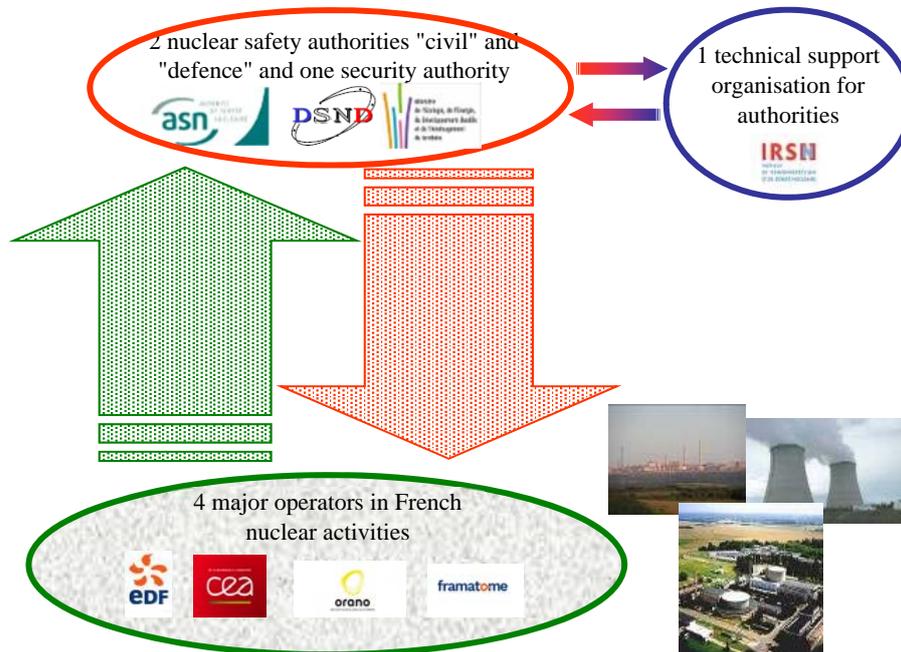


Figure 1. French nuclear organization

The CEA continues to conduct scientific and technical research in the energy, healthcare and national defence sectors, working in close collaboration with other French nuclear operators, such as EDF and ORANO.

Mainly focused on the nuclear industry, EDF is the main electricity production and distribution company in France, while ORANO is involved in the entire range of industrial activities relating to **Figure 1.** French nuclear organization

nuclear energy (nuclear propulsion, processing and recycling, etc.).

The CEA Cadarache research is one of the ten research centres of the French Alternative Energies and Atomic Energy Commission (CEA). It is one of the most important centres for energy-related research and technological development in Europe.

The CEA/Cadarache centre, created on October 14, 1959, is located in Saint-Paul-Lez-Durance (Bouches-du-Rhône, France), some forty kilometres to the north of Aix-en-Provence, on the borders of three other *départements* (Alpes-de-Haute-Provence, Var and Vaucluse).

The activities of the CEA/Cadarache centre are divided between several technological **research and development (R&D) platforms**, mainly focusing on **nuclear energy** (fission and fusion), but also including research into **new energy technologies** and studies of the effects of radiation on plants (plant ecophysiology and microbiology).

To support these R&D activities, the Cadarache centre has a **services platform**, bringing together the resources required to:

- manage nuclear materials, waste and discharges from nuclear facilities, and the general resources required to monitor facilities and the environment, and ensure facilities are safe and secure;

- ensure research facilities function correctly (wastewater treatment networks, water, electricity, etc.).

Nearly **5,000** people work daily in Cadarache.

The Cadarache centre is made up of twenty Basic Nuclear facilities (INB) and forty non-INB Classified Environmental Protection facilities (ICPE), including thirty of a nuclear nature.

In total, more than 400 buildings are spread out over a closed-off area of nearly 900 hectares.

COMMUNICATION WITH THE PUBLIC

Scientific progress, industrial risks, and ethical issues raise questions among citizens and strengthen their resolve to better control progress. If the advances of science and technology are to meet the needs and gain the acceptance of the citizens, quality information must be available along with unhindered access to this culture.

In the last half-century, science and technology have lost much of the aura [1] that had made them the principal values of human progress. After the trauma of the nuclear bombardment of Japan at the end of the Second World War, the major accidents at Three Mile Island in the United States, Chernobyl in Ukraine and Fukushima Daïchi nuclear accident altered the popular perception of commercial nuclear energy and made the general population aware of the danger it entails.

With hindsight it is now clear that the problem was largely compounded—at least in France—by a tradition of communication in which the public is given only partial information destined above all to reassure the population and convince it of the soundness of scientific and technical orientations that are presented as unavoidable. The fears raised by nuclear energy—the risks for workers in the industry, or for those who live near production sites—have thus been supplemented by denunciations of the hazards involved in the transportation and disposal of radioactive waste, even though these activities have been subject to no major accident to date.

Environmental issues are true priorities. These highly complex issues call for major efforts to provide information and scientific education in the face of the legitimate concerns of the population and elected officials.

In a knowledge-based society, democratic governance must provide citizens with the means to participate knowingly in defining the orientations made possible by responsible scientific and technological progress.

In a context where the future of nuclear energy—and in particular radioactive waste—is a subject of nationwide public debate and where the prospect of decommissioning aging power plants is now taking shape, our ambition is to objectively inform the public about nuclear energy and the disposition taken to save uranium resources around the world and to reduce the radio toxicity of industrial nuclear waste.

Communication about the nuclear industry and radioactivity is a difficult undertaking, both conceptually and politically.

It is the reason why, to develop a communication strategy in order to reach the objective of affecting surrounding population perception's, we decided to carry out a survey covering the knowledge of CEA Cadarache research activities, the impact of the site research activities, the alert signals and instructions in case of release of radioactivity.

THE SURVEY

The questionnaire

The questionnaire (Figure 2) is composed with 26 questions : 4 personal questions (man or woman, age, occupation, where do you live), 6 questions on the knowledge of the CEA Cadarache centre, 6 questions on the perception of risk, 5 questions on the emergency procedures and 2 questions on searching for information and expected information materials.

ENQUETE DE NOTORIETE CEA CADARACHE

VOTRE FOYER

Q1. Vous êtes ?

1. Une femme 2. Un homme

Q2. Quel âge avez-vous ?

1. Moins de 18 ans 2. 18 à 29 ans 3. 30 à 39 ans 4. 40 à 49 ans 5. 50 à 59 ans 6. 60 à 69 ans 7. 70 ans et plus

Q3. Vous êtes ?

1. Seul(e) sans enfant 2. Seul(e) avec enfant(s) 3. En couple sans enfant 4. En couple avec enfant(s)

Q4. Combien d'enfants vivent dans votre foyer ?

1. Aucun 2. 1 enfant 3. 2 enfants 4. 3 enfants ou plus

Q5. Quel type de maison avez-vous ?

1. Maison individuelle 2. Appartement 3. Maison de ville 4. Autre

Q6. Dans quelle commune habitez-vous ?

1. Cadarache (54) 2. Manosque (14) 3. Venelles (13) 4. Autres communes du département 5. Hors département 6. Hors France

Q7. Avez-vous des proches qui travaillent sur le site du CEA de Cadarache ?

1. Oui 2. Non

Q8. Comment connaissez-vous le site du CEA de Cadarache ?

1. 15 ans 2. 10 ans 3. 5 ans 4. Moins de 5 ans 5. Ne connais pas

Q9. Selon vous, combien de personnes travaillent sur le site du CEA de Cadarache ?

1. Non pas de recherche 2. Par internet 3. Par les médias 4. Par l'affichage

Q10. Avez-vous déjà entendu parler de l'11 septembre (attentat du World Trade Center) ?

1. Oui 2. Non

Q11. A quel degré de connaissance êtes-vous des activités du CEA de Cadarache ?

1. Très faible 2. Faible 3. Moyenne 4. Bonne 5. Très bonne

Q12. Le 11 septembre est un plan d'organisation des secours et moyens de secours dans un périmètre déterminé autour du centre et des installations. Pensez-vous que votre commune dispose d'un plan de secours PPI ?

1. Oui 2. Non

VOTRE PERCEPTION DES RISQUES

Q15. Au cours de la dernière semaine, combien de fois avez-vous pensé à l'impact des activités du CEA de Cadarache sur votre santé ? (Plusieurs réponses possibles)

0 1 2 3 4 5 6 7 8 9 10

Q16. Au quotidien, quels sont selon vous les impacts des activités du CEA de Cadarache ? (Plusieurs réponses possibles)

1. Impact environnemental sur la faune et la flore 2. Maladies génétiques 3. Appréhension de maladies (Cancer, Leucémie...) 4. Pollution chimique de l'air 5. Pollution chimique de l'eau 6. Pollution chimique de l'air 7. Aucun

Q17. Si un accident survenait sur le site du CEA de Cadarache, comment évalueriez-vous le risque de votre présence sur une échelle de 0 à 10 ?

0 1 2 3 4 5 6 7 8 9 10

Q18. Si un accident survenait sur le site du CEA de Cadarache, quels types de risques pourriez-vous présenter selon vous ? (Plusieurs réponses possibles)

1. Impact environnemental sur la faune et la flore 2. Maladies génétiques 3. Appréhension de maladies (Cancer, Leucémie...) 4. Pollution chimique de l'air 5. Pollution chimique de l'eau 6. Pollution chimique de l'air 7. Aucun

Q19. Parmi les risques suivants, lesquels vous inquiètent le plus ? (Plusieurs réponses possibles)

1. Cancers 2. Maladies 3. Pollution chimique de l'air 4. Pollution chimique de l'eau 5. Pollution chimique de l'air 6. Pollution chimique de l'eau 7. Aucun

Q20. Comment estimez-vous la sécurité de votre lieu d'habitation par rapport à votre proximité géographique avec le CEA de Cadarache ?

1. Parfaitement sécurisé 2. En sécurité 3. Pas vraiment en sécurité 4. Pas du tout sécurisé

CONDIIONS DE SECURITE

Q21. Comment évaluez-vous les risques d'infirmités ou d'accidents sur le site du CEA de Cadarache ?

1. Une série 2. Une série 3M3 3. Une série 3M3 4. Une série 3M3 5. Non je ne sais pas

Q22. Des essais de sûreté PPI sont réalisés régulièrement. Comment évaluez-vous ces essais ?

1. Tous les 7 jours à 14h 2. Tous les 15 jours à 14h 3. Les jours de chômage 4. Je ne sais pas

Q23. Lors des essais de sûreté PPI, comment réagissez-vous ?

1. Je n'y fais pas attention 2. Je me ténér de pas 3. Je vérifie la date et l'heure des essais 4. Je m'inquiète

Q24. Connaissez-vous les consignes de sécurité en cas d'alerte ? (Plusieurs réponses possibles)

1. Non pas 2. Non pas 3. Non pas 4. Non pas

Q25. Par quelle(s) source(s) d'information êtes-vous informé(e) sur les risques et les consignes de sécurité ?

1. Internet 2. Médias 3. Affichage 4. Par des brochures 5. Par des brochures 6. Par des brochures 7. Par des brochures 8. Par des brochures 9. Par des brochures 10. Par des brochures

Q26. Quelles sources d'information utilisez-vous pour vous informer sur le site du CEA ?

1. Internet 2. Médias 3. Affichage 4. Par des brochures 5. Par des brochures 6. Par des brochures 7. Par des brochures 8. Par des brochures 9. Par des brochures 10. Par des brochures

Figure 2. The questionnaire sent to the population

Composition of the sample population

It should be pointed out that there was a naturally well-balanced distribution with respect to the main criteria on which the survey (quota method) was based, i.e. sex, age, occupation, and place of residence, when compared with INSEE data. The category 60-years-and-over target audience was, however, slightly over-represented, making up 54.4% of the sample population against about 29% on average in the three departments covered by the survey.

Based on a sample of 1239 respondents out of a reference population of 46,265 inhabitants (the total number of inhabitants in the towns concerned by the specific emergency response plan (ERP) together with Manosque and Venelles (Figure 3), (as recorded in 2007 by INSEE), our margin of error was about 2.75%, which gave us an excellent level of representativeness.

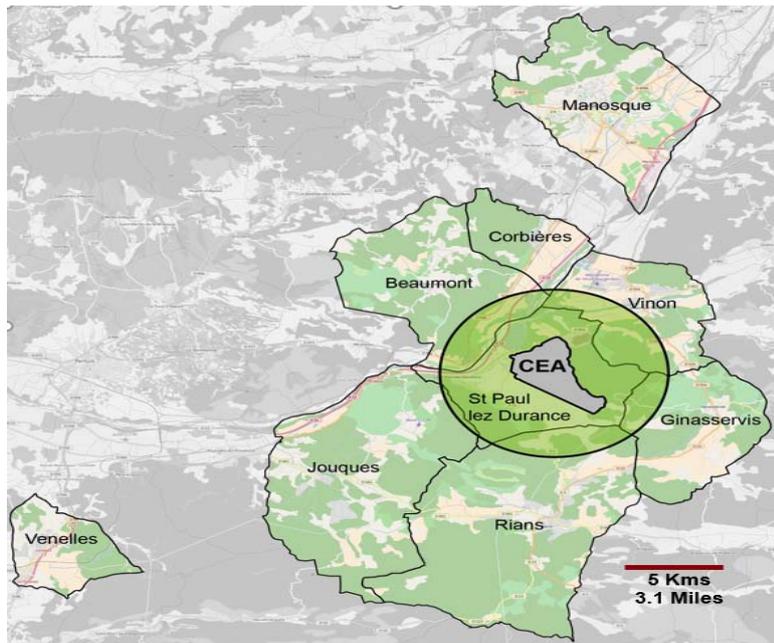


Figure 3. Emergency Response Plan Area

The **response rate** for this survey was **23%**: 6000 letters were sent out and 649 were returned to sender (no longer living at this address), which meant that 5351 were received and 1239 questionnaires were filled in.

Question 7: I work at the CEA Cadarache centre or I know someone who does

The working-age categories obviously tended to know more people working at the CEA Cadarache centre. The percentage of responses "I know no one" for Question 7 was about 29.5% in terms of the frequency distribution, compared with 19% for the 18-39 year-olds, 23% for the 40-59 year-olds, and almost 36% for the 60 year-olds and over.

The cross-tabulation results for towns concerned by a specific emergency response plan (ERP) compared with those towns not concerned (Manosque and Venelles Cities) hardly seem impacted by this indicator, considering that 28.5% of the inhabitants in ERP towns knew no one working at the CEA Cadarache centre, while this represented 31.25% for Venelles and Manosque cities.

KNOWLEDGE OF THE CEA CADARACHE CENTRE

Age of the CEA Cadarache centre

A total of 67% of the respondents knew the correct age of the CEA Cadarache centre, i.e. 56 years. A total of 48% from the 18-39 year-olds responded correctly, 68.5% for the 40-59 year-olds, and 70.5% from the 60 year-olds and over.

Surprisingly, only 66% of respondents from ERP towns answered correctly, while this reached 72% for the towns of Manosque and Venelles.

A total of 78.7% of those either working or with a partner working at the CEA Cadarache centre answered correctly.

Number of people working on the CEA site

With respect to the overall sample population, the responses were divided between an estimate of 2500 people (39.14%) and 5000 people (39.87%). It should be pointed out that 6.38% of the respondents did not answer this question.

The only age category that stood out was the 18-39 year-olds; 51.6% believed that 5000 worked on the site compared with 33% for a total of 2500 people. A total of 42.3% from the 40-59 year-olds voted for

5000 people against 41% for 2500 people, while 36.5% in the 60 year-olds and over voted for 5000 and 39% voted for 2500.

When the data was cross-tabulated, there was no significant difference with respect to ERP towns versus non-ERP towns.

Those either working or with a spouse working on the CEA Cadarache site were nevertheless more than 75% to believe that 2500 people worked on the site, with only 19% choosing 5000.

Activities at the CEA Cadarache centre

The figure 4 shows that the three main activities found to be popular with the overall sample population were:

- Nuclear energy research centre: 86%
- Research centre for other energy sources: 38%
- Radioactive waste disposal: 31%

All in all, 17% of the respondents believed it was a nuclear power plant and more than 8% thought it was a nuclear weapons production plant.

The percentage of respondents from each of the three age categories were practically the same for this question. It should be highlighted that the 18-39 year-olds tended to choose the nuclear activity: 20.6% for a nuclear power plant and almost 12% for nuclear weapons production.

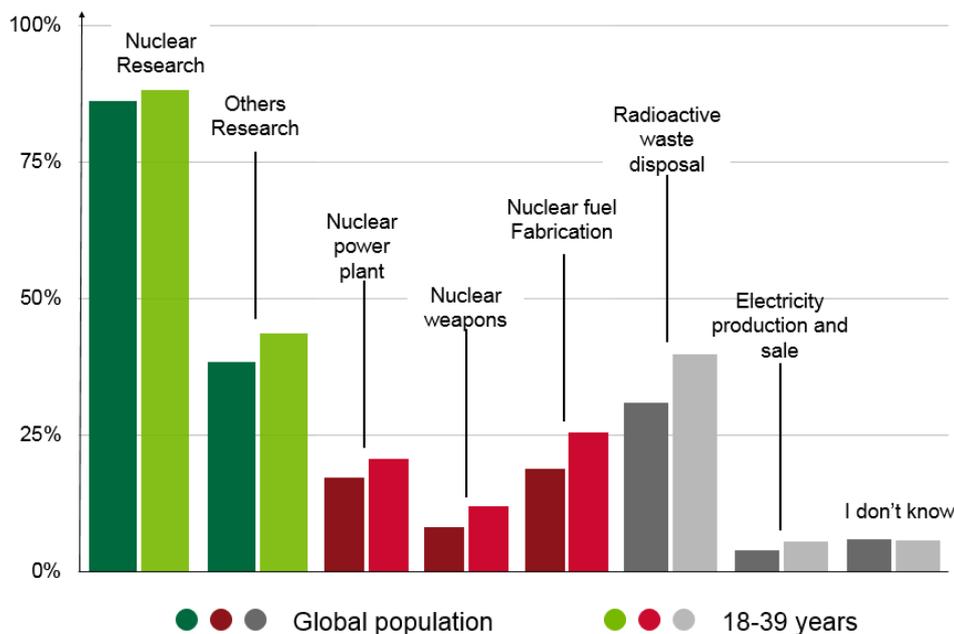


Figure 4. Activities at CEA Cadarache research centre

Those who either work or have a spouse working on the CEA Cadarache site seem to be better informed: 95% chose the nuclear energy research centre, 73% chose the research centre for other energy sources, 56% for radioactive waste disposal, and 35% for nuclear fuel manufacturing. No one chose "I don't know", compared with 6% for the overall sample population.

Impression of being informed (Question 11)

Only 26.4% said they felt informed or very informed, and this figure remained stable across all three age categories. Respondents from ERP towns felt either informed or very informed in 27.5% of cases, compared with 23.7% for non-ERP towns. For those either working or with a spouse working on the CEA Cadarache site, 62.7% said they felt informed or very informed.

Searching for information on the CEA Cadarache activities (Figure 5)

In the overall sample population, 42% said they had never searched for information on the CEA Cadarache activities despite feeling they lacked information with respect to Question 11 (71% said they were hardly informed or not at all informed).

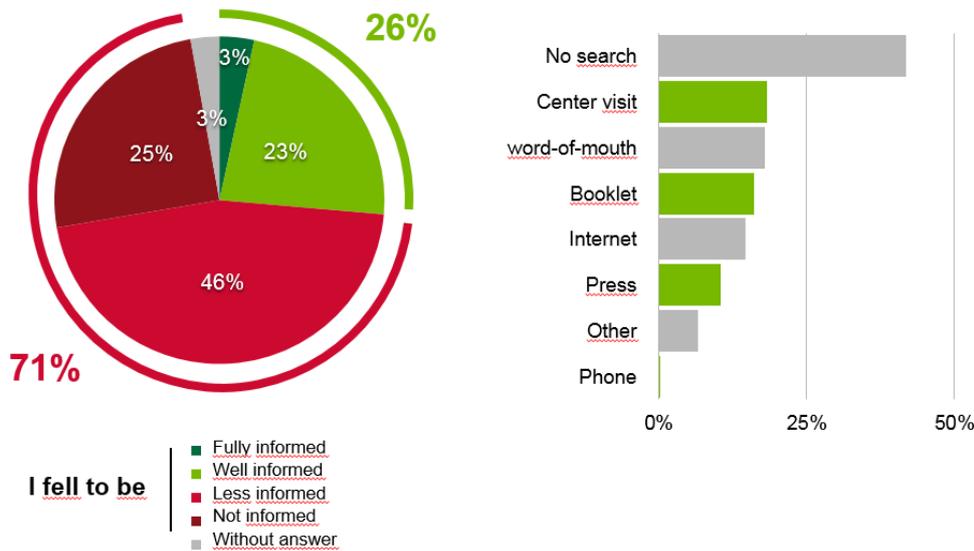


Figure 5. Searching information on the CEA Cadarache activities

For those having looked for information on the centre, the most frequently used means were word of mouth (18%) and CEA site visits (18.3%), followed by information brochures (16%) and internet (14.7%).

Almost 48.5% of the 18-39 year-olds said they had not done any research, though the means used when they did were mainly internet (around 28%) followed by word of mouth (25.4%).

Near to 45% of the 40-59 year-olds said they had not done any research, though the means used were word of mouth (19%), site visits (17.8%), internet (17.5%) and information brochures (around 16%).

In the group of 60 year-olds and over, 39% had not done any research, though the means used when they did were site visits (19.6%), information brochures (17.5%) and word of mouth (15.7%).

For the ERP towns, 41.8% had not done any research compared with 42% for non-ERP towns. The means for gaining information were mainly brochures (17.6%), site visits (17.5%), word of mouth (16.8%) and internet (13.7%). For the towns of Manosque and Venelles, however, site visits and word of mouth (21% for both) were the preferred means of gaining information, followed by internet (18.7%) and brochures (12%).

Out of the CEA Cadarache employees or those with a spouse working there, only 24% said they had not looked for information. All others looked for information either via a site visit (39.3%), internet (29.3%), brochures (25.3%) or word of mouth (14.7%). It should be pointed out that 14% of respondents cited other means of finding information. It is reasonable to presume that these means could have been internal communications tools made available to them.

Knowledge of specific emergency response plans (ERP)

Based on the overall sample population, 53.3% said they had already heard of the specific emergency response plan.

The 40-59 year-olds stood out slightly from the rest on this question as 58% said they had heard of the ERP, whereas it was only 49% among the 18-39 year-olds and 52% in the 60 year-olds and over.

In ERP towns, 58.7% said they had already heard of the plan compared with 41.8% for the non-ERP towns of Manosque and Venelles.

After providing the definition of the specific emergency response plan, 83.9% of the overall sample population said they believed they fell within the perimeter of this plan.

This figure reached 83.1 % for the 18-39 year-olds, 88.8% for the 40-59 year-olds, and 80.9% for the 60 year-olds and over. It should be stressed that the approach used during this survey undoubtedly influenced responses: we brought the notion of specific emergency response plan to their attention so they obviously felt they were concerned.

In the ERP towns, 90.6% of respondents thought they fell within the perimeter of the plan compared with 41.8% for Venelles and Manosque though they are actually not at all concerned.

Out of those either working or whose spouse works on the CEA site, 84% had already heard of the plan and 86% thought they fell within its perimeter.

PERCEPTION OF RISKS

Perception of risks in daily life

In everyday life (figure 6 : Green), the average perception of risks for the overall sample population was 4.2 on a scale of 1 to 10. The main risks mentioned by respondents were:

- Environmental impact on the flora and fauna: 41.4%
- Radioactive pollution in the air: 39.6%
- Radioactive pollution in the water: 31%
- Emergency of diseases: 29%

In total, 29% believe there is no risk/ impact on their everyday life under normal conditions.

The average for the 18-39 year-olds was 3.9. The environmental impact was cited by 51.6% of all respondents in this category. However, almost 31% said they believed there was no impact.

The average for the 40-59 year-olds was 3.9. In terms of such impacts, there was no significant difference compared with the overall sample population.

The average for the 60 year-olds and over was 4.4. In this category, only 35.9% of the respondents mentioned the environmental impact on the flora and fauna.

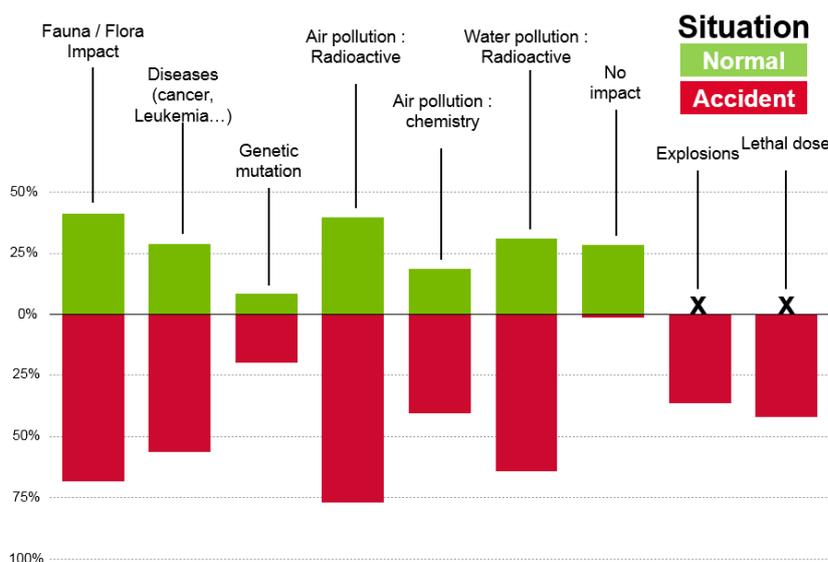


Figure 6. Perception of risk on daily life and during accident conditions

In ERP towns, the average was 4.26 and there was no major noticeable difference on the question of impact.

In non-ERP towns, the average was 3.90 and there was also no major noticeable difference on the question of impact.

For those either working or with a spouse working on the CEA site, the average was 2.6 and each of the impacts mentioned in Question 16 recorded a lower percentage than those for the overall sample. A total of 44% believed there was no risk.

Perception of risks during accident conditions

During an accident (Figure 6 : Red), the average for the overall sample population was 6.8 on the scale of 1 to 10, which is relatively moderate (according to the French ranking system that we all know so well). The main risks mentioned by respondents were:

- Radioactive pollution in the air: 76.9%
- Environmental impact on the flora and fauna: 68.1%
- Radioactive pollution in the water: 64.1%
- Emergence of diseases: 56.2%
- Explosion: 42.1%
- Chemical pollution in the air: 40.4%
- Irradiation causing death: 36.3%

The average for the 18-39 year-olds was 8.1. Each of these choices were nonetheless 'over-represented' (more were being chosen) with respect to the overall sample population; on average, each choice represented 11% more so it seems that these respondents were ticking more boxes in this question than for the rest of the questions in the survey.

The average for the 40-59 year-olds was 7.1. In this case, most choices experienced an increase by an average of 6 points compared with the overall sample population.

The average for the 60 year-olds and over was 6.6. This is the only category for which the number of choices decreased by about 4.7 points.

We can therefore say that those in the 60 year-olds and over category are the least worried by the risks and impact in the event of an accident.

In ERP towns, the average was 7.1 and there was no major noticeable difference on the question of impact.

In non-ERP towns, the average was 6.38 and there was also no major noticeable difference on the question of impact.

For those either working or with a spouse working on the CEA site, an average of 5.4 was recorded. The choices that were chosen the least compared with the overall sample population were: genetic mutation (-7.1 points), emergence of diseases (-17.6) and death resulting from irradiation (-15).

Nuclear risks versus other risks (Question 19)

Within the overall sample population, the risk of a forest fire, earthquake or nuclear event were all perceived more or less equally: 29 %, 29.9% and 32.5%.

The 18-39 year-olds also had difficulty deciding on this question, even though the risk of a forest fire seems to have taken the lead with 34.1% The 40-49 year-olds also tended to choose forest fires, whereas

the 60 year-olds and over were more conscious of earthquakes (34.4%) followed by the nuclear risk (33%).

Respondents from ERP towns also had trouble deciding between the three risks, with forest fires taking a slight lead with 32.6%. For non-ERP towns, the earthquake risk was clearly expressed, totalling 43% of responses. For those either working or with a spouse working on the CEA site, the main risk expressed by most respondents was forest fires at 47.3%, followed by the earthquake risk at 34%, and only 8% for the nuclear risk.

Level of apprehension associated with living in close proximity to the CEA site

Almost 55.6% of the overall sample population said they did not feel very safe or not at all safe. This figure is relatively high and should be taken into consideration.

In the category of 18-39 year-olds, 54.8% said they did not feel safe, with 57.7% for the 40-59 year-olds and 53.7% for 60 year-olds and over.

For ERP towns, 57.3% of the respondents said they felt unsafe, compared with 48% for the non-ERP towns of Venelles and Manosque.

For those either working or with a spouse working on the CEA Cadarache site, only 30% said they did not feel safe.

EMERGENCY PROCEDURES

Warning sirens

Within the overall sample population (Figure 7), almost 37% said they did not know the warning signals, 59.6% said there were sirens, and 11.5% said warnings were announced via loud speakers (Figure 7).

Ignorance of the warning signals was stable across all three age categories, as was the proportion of warning signals recognised and understood.

A total of 30.7% of the respondents from ERP towns said they did not know the warning signals, compared with 54.61% from Venelles and Manosque.

For those either working or with a spouse working on the CEA Cadarache site, 14% said they did not know the warning signals.

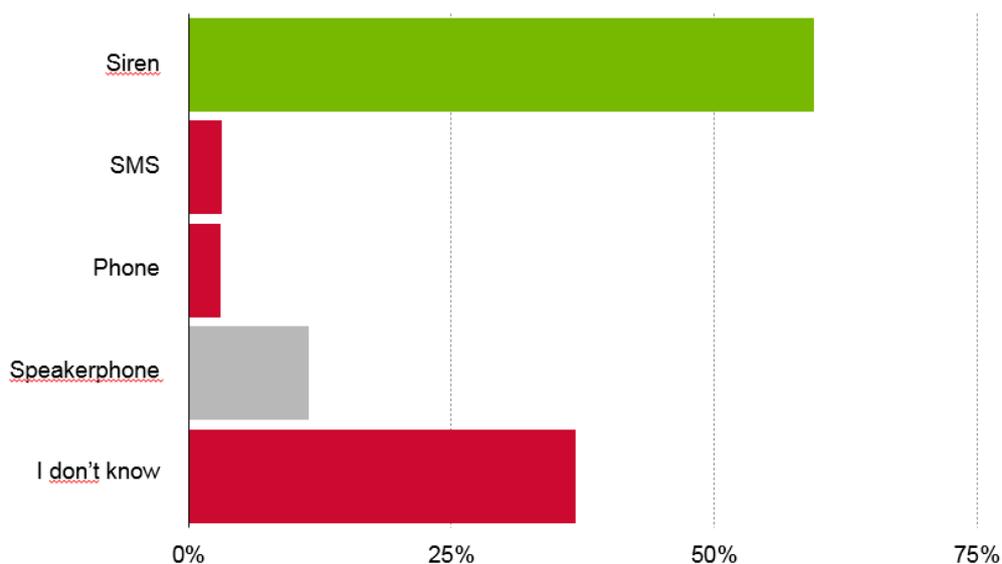


Figure 7. Warning signals

Siren testing

Whereas 47.3% of the respondents said they did not know when the sirens were tested, 36.2% said they believed the sirens were tested on the first Wednesday of every month at midday. It should, however, be pointed out that there is some confusion with the onsite siren tests conducted every Thursday at 1 pm because 13.6% of respondents gave this answer.

These figures remain relatively stable according to the age categories and for inhabitants in ERP towns. The opinion in non-ERP towns is divided between the first Wednesday of the month at midday (47.7%) and the answer "*I don't know*" (43.4%).

For those either working or with a spouse working on the CEA site, 21.33% of the respondents nonetheless said they did not know when sirens were tested, even though 46.7% said they believed it was the first Wednesday of the month at midday. Once again, there is great confusion with the onsite tests: 31.33% chose every Thursday at 1 pm.

During siren testing, 23.8% of the sample population said they paid no attention, 34.7% said they did not hear the sirens, and 28.7% said they checked the date and time when the sirens sounded. This data was stable for each age category.

A total of 39% of inhabitants from ERP towns said they did not hear the siren, whereas it was only 23.7% for Manosque and Venelles cities which is rather surprising. Almost 34% of the inhabitants from Venelles and Manosque cities said they checked the date and time of the siren, compared with only 26.8% from ERP towns. In this case, we could assume that the more the siren forms an integral part of their daily lives, the less they hear or pay attention to it; this hypothesis will however need to be confirmed qualitatively.

Out of those working on the CEA site, 50.7% said they checked the date and time of the siren, even though 42% said they did not hear or pay attention to it.

Emergency procedure in the case of an alert

The emergency procedures most frequently mentioned (figure 8) by the overall sample population were:

- Remain inside the building and wait: 72.3%
- Listen to the radio or TV: 69.25%
- Take an iodine tablet: 33.9%
- I don't know: 12.27%

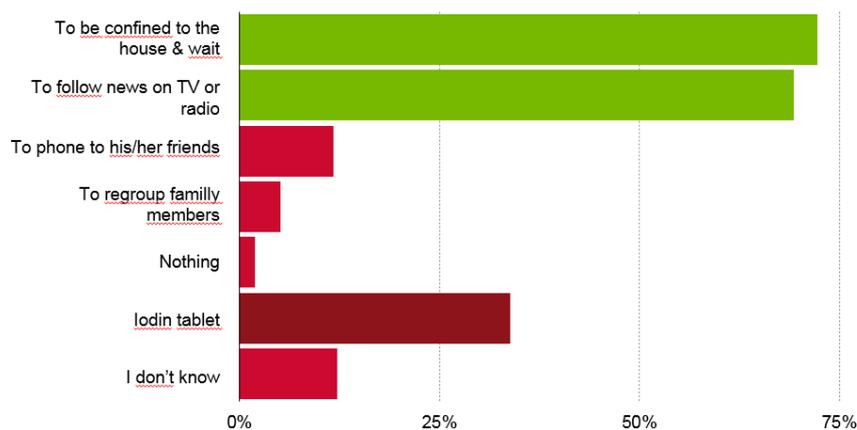


Figure 8. Emergency procedure in case of an alert

These answers were stable across the three age categories, even if the 40-59 year-olds tended to choose the response "*telephone*" more than the others (16.7% compared with 11.8% for the overall sample population).

Taking an iodine table was widely popular across all three age categories: an awareness campaign on this subject therefore seems necessary.

More than often, respondents from non-ERP towns said they did not know the emergency procedure: 18.4% compared with 10.5% for ERP towns. Iodine tables are, however, a lot less popular among the inhabitants from Manosque and Venelles (17.4%).

For those either working or with a spouse working on the CEA site, the options "*remain indoors*" and "*listen to the radio*" were cited more often than for the overall sample population: 87.3% and 77.3% respectively. Iodine tablets were nonetheless chosen by 26% of the respondents in this category. Yet only 3% said they did not know the emergency procedure.

Searching for information on emergency procedures

On figure 9, 52.5% respondents from the survey said they had never looked for information on emergency procedures. For those having looked for information, they tended to consult brochures (18.3%), the town hall (11.4%), the CEA website (9%) or through word of mouth (9%).

Only 50% of the 18-39 year-olds had never searched for information in this field. They tended to turn to brochures (14.3%) or the CEA site (14.3%), followed by word of mouth (11.9%); however, the most frequently cited answer was "*other means*" (15%). The two other categories gave similar answers to the overall sample population.

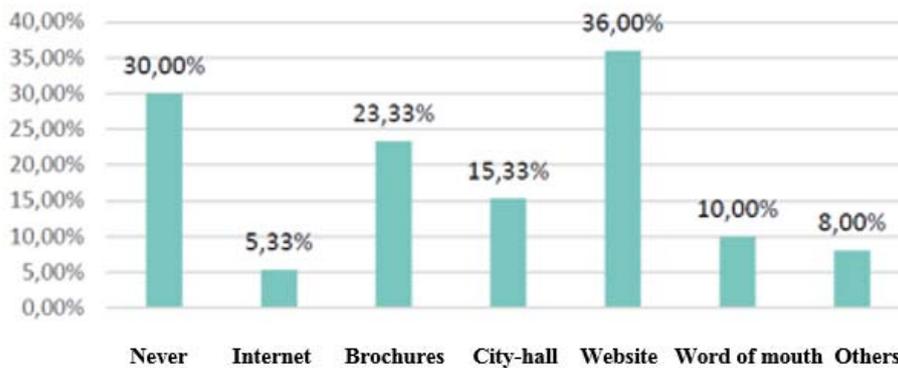


Figure 9. Searching for information on emergency procedures

In ERP towns, 47.4% of the inhabitants said they had never done any research on the matter compared with 68% for Venelles and Manosque. The data collected on the ERP towns was similar to that collected for the overall sample population. On the contrary, the inhabitants of Venelles and Manosque mainly cited brochures (8.55%), the CEA site (7.89%), word of mouth (7.57%) and other means (6.25%). There is therefore no clear preference in how to gain information for respondents living in towns outside the perimeter of the specific emergency response plan.

For those either working or with a spouse working on the CEA site, only 30% said they had never looked for information on the emergency procedure, even if this figure is not insignificant for people working on the site. The preferred means of gaining information for this category tended to be the CEA site (36%), brochures (23.3%), the town hall (15.3%), word of mouth (10%) and other means (8%).

Expected information materials on risks and emergency procedures

The information materials most frequently expected by the overall sample population were:

- Information brochures: 51.4%
- Internet: around 32%
- E-mail: 27.5%

- Information meetings: 26.7%
- School/ French national education system: 15.3%

These figures vary according to the age category:

18-39 year-olds

- Information brochures: 65%
- School/ French national education system: 41.3%
- Internet: 35.7%
- E-mail: 35.7%
- Information meetings: 23.7%
- Informative video: 20%
-

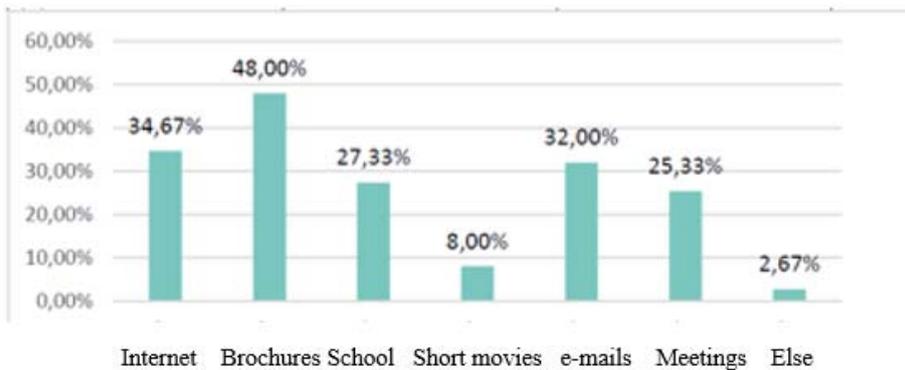


Figure 10. Expected information materials on risks and emergency procedures

This age category appears to be particularly sensitive to the dissemination of information to future generations, seeing that the "*French national education system*" was their most popular choice for relaying information

40-59 year-olds (quite similar to the overall sample population)

- Information brochures: 54.2%
- Internet: 38.5%
- E-mail: 35.3%
- Information meeting: 23.6%
- School: 22.4%

60 year-olds and over

- Information brochures: 47.6%
- Information meetings: 29.2%
- Internet: 27.3%
- E-mail: 21%

The responses varied only a little according to the difference between towns with a specific emergency response and those without.

For those either working or with a spouse working on the CEA site, the only noticeable difference concerned the number of responses in favour of the French national education system, which again totalled 27.33%.

RESULTS AND MAIN STRATEGIC RECOMMENDATIONS

After having analysed the results of the survey, it became evident that people generally had a sound understanding of the CEA and its activities, even if most respondents said they felt they were very little or not at all informed. The fact of having carried out this survey is already a first step to remedying this sentiment among the population, with the second step being to provide feedback on the results at information meetings. Despite the fact that respondents felt they were poorly informed, very few of them actually took steps to become informed. When they did, however, the importance of word of mouth was a means that all categories relied on to gain information on CEA activities. In several instances, word of mouth seems to be preferred to internet as a way of gaining information. In the end, it appears that CEA employees or spouses of CEA employees have rather good knowledge of CEA activities but require awareness training on their role as spokespeople vis-à-vis their family and friends.

In terms of risks, the grading is relatively moderate for a conventional ranking system out of 10: 4.19 under normal circumstances and an average of 6.88 in accident conditions. However, an appreciable proportion of respondents do believe there is a certain impact resulting from CEA activities, e.g. 30% believe in the emergence of diseases in everyday life. In accident conditions, 56% of respondents think that the risk of disease is possible, 42% for explosions, and 36% for irradiation causing death. It is therefore important to make sure such risks are understood at the right level, whether on a day-to-day basis or under accident conditions. From a communications perspective, we recommend focusing the presentation on the maximum risks that may arise in the event of a critical accident on the CEA site. It also seems relevant to quantify the nuclear risk comparatively with the risk of a forest fire or an earthquake so they are considered at the right level. Judging by the results of the survey, the ranking of these three risks remains unclear since the respondents tended to place them all on the same level, i.e. 30% each.

In terms of the perception of risks, surprisingly enough it is the 18-39 year-olds that need the most reassurance as they tended to rank the risks at a higher level than the overall sample population.

Another key aspect that demands attention is the respondents' feeling of not being completely safe owing to the close proximity of the CEA site. Once again, it is a question of finding the right balance. When presenting the risks involved in a critical situation, it would be a good idea to demonstrate the effects on towns concerned by the specific emergency response plan, together with the measures foreseen by French law.

As for the emergency procedures in the event of a critical situation, they are poorly understood by 37% of the respondents, which is a high proportion. This remains to be put into perspective when considering the responses of ERP towns as this figure falls to 30%. When the respondents were shown the list of recommended emergency procedures, they were all clearly identifiable from a theoretical viewpoint, excepting the iodine tablets.

The most striking aspect of this part of the survey is just how many people believed they should take iodine tablets. This idea needs to be amended within the local population since most respondents cited this solution regardless of the age category.

In terms of information materials on the emergency procedures to follow, none of them seemed to be clearly preferred over another. One of the strategies worth adopting would be to reproduce the necessary information using various different materials/ formats to make sure the message gets across.

As for siren testing, it would also be a good idea to remind everyone of the dates and times of siren drills in an awareness campaign, seeing that 39% of the respondents from EPR towns said they did not hear

them. This figure also needs to be put into perspective in light of the fact that these drills are conducted regularly, which leads people to pay less attention.

CONCLUSION

The CEA Cadarache would bring the around population's anxiety in consistency with the actual risks generated by the nuclear research activities within the site of CEA Cadarache and develop a communication strategy in order to reach the objective of affecting surrounding populations' perception.

It was decided to call upon surveys professionals to council during the elaboration of the form, and to deploy the study

Results shows a better knowledge of the center's activities than anticipated, but still some lacks that could lead to unwanted panic in the event of an incident on the site. Five points were emphasized during the exchanges with the populations: the absence of nuclear power plant on the Centre of CEA Cadarache, the absence of nuclear weapon, the impact of the site in daily activities and in the event of an accident, the alert signals, the alert instructions

These points were chosen because it appeared that the biggest risk generated by the research site is not more a nuclear risk than a crowd panic that could result in accidents unrelated to any nuclear causes because of a hypothetical hysteria.

We worked on the elaboration of the communication campaign, in consultation with psychology experts from Nimes and Aix-Marseille University universities.

It has been decided to deploy three actions at first, as well as repeating the process every two to three years and the setting up of a lasting structure of exchange with the population in a form yet to be determined. The three ongoing actions are: meetings with every town council to inform them of the result of the study and to pass on the information previously detailed. The close communication between representatives and townspeople is an effective vector in small villages such as these we are targeting, the publication in the local newspaper "La Provence", 70 000 readers, of one page of information each month, the organization of visits of the center for any citizen.

The modification of a population's perception is a long process, which requires small touches and a regular following which should be ensured by the repetition of the approach initiated this year. This year's campaign is currently ongoing.

REFERENCES

1. IRSN, 2017 Baromètre IRSN, La perception du risque et de la sécurité des français, Résultats d'ensemble, juillet 2017.