Innovative study on methane emissions from Spanish paddy fields

- **IRTA researchers, with collaboration from Kellogg and Ebro Foods, analyse how to reduce greenhouse gases in the Ebro Delta**
- **Intermittent irrigation and selecting the best time to incorporate rice straw in the paddies can reduce methane emissions**

Madrid, 21 September 2017. Few studies have been made in Spain of the greenhouse gas (GHG) emissions from paddy fields and they have never been studied with an integrated focus on their relationship with agricultural practices and the properties of the fields, such as soil texture, salinity, etc. Faced with this challenge, Kellogg Company and Ebro Foods, which source vast quantities of rice from the Ebro Delta and already collaborate in other projects to enhance the crop's sustainability, have embarked on a pioneering research project to measure and reduce GHG emissions. This study, the first one directly engaging growers, is headed by IRTA (Food and Agriculture Research and Technology Institute) in collaboration with Manchester University.

Methane, a very potent greenhouse gas, is produced during the fermentation that takes place in flooded paddy fields. Existing predictive systems suggest that the rice crop is responsible for one-quarter of the global methane emissions in agriculture, so solutions need to be found to reduce those emissions.

Thanks to the collaboration of Kellogg Company and Ebro Foods in the LIFE EBROADMICLIM project directed by IRTA, numerous fields in the Delta were analysed over the period 2015-2017. Different stubble and water management systems were used to identify the best emission mitigation strategies.

On the one hand, the possibility was assessed of reducing GHG emissions by using alternative water management systems. The researchers concluded that with intermittent irrigation, rather than continuous flooding of the paddy fields, methane emissions might have been reduced by up to 90% during the growing season in the field in which this system was applied, which had optimum agronomic conditions for this. However, this percentage may be smaller in other conditions, so further studies are required in more fields, taking account of the varying geophysical and agronomic properties of paddies. It was also possible to reduce water consumption by up to 30% by using this system of flooding.

On the other hand, researchers observed that the highest emissions were produced in August, in the growing season, and October, post-harvest, when rice straw is incorporated in the fields.

Average emission rates were around 3 times greater post-harvest than during the growing season, although this ratio varied somewhat according to the environmental conditions and the properties of each field. To lower emissions in the post-harvest season, the researchers recommend incorporating the rice straw in November or December, when emissions were observed to be lower than in October. But more studies are needed, including emissions during the following crop, to confirm this trend.

It is difficult to predict these emissions, as they vary greatly from one field or geographical area to another, influenced by factors such as the type of soil, growing practices, weather conditions and the irrigation system. The most widely used prediction model in agriculture is the *Cool Farm Tool*, but IRTA's pioneering study has found differences between the real GHG emissions in the Ebro Delta paddies and those predicted by that tool, developed mainly in Asia. Consequently, the possibility is currently being assessed of adapting the tool for the peculiarities of the rice crop, or otherwise creating a new predictive tool specifically for this cereal.

This IRTA study will enable growers to achieve a more sustainable and efficient rice crop by lowering greenhouse gas emissions while also reducing water consumption.

The plots participating in this study are also involved in Kellogg's Origins® sustainable agriculture programme. Kellogg has for decades been using rice produced in Spain as the raw material for its breakfast cereals, including Choco Krispies and Special K, which are manufactured at its plant in Valls (Tarragona) and exported to over 20 countries.

For Ebro Foods, this project slots into its commitment to the sustainability of its supply chain, since the Ebro Delta plays a key role in the Group's rice sourcing policy in Spain. With the results of this study, it will be possible to put new crop techniques and parameters in place to minimise its environmental impact and enhance biodiversity conservation in the Delta region.

About IRTA – The Food and Agriculture Research and Technology Institute (IRTA) is a research institute focusing on R&D and innovation in agri-food in the areas of plant production, animal production, food industries, environment and global climate change and agri-food economy. The transfer of its scientific progress contributes to to modernising, improving, boosting competitiveness, and fostering sustainable development in the sectors of agriculture, food and aquaculture, supplying healthy, high-quality foodstuffs to end consumers and enhancing the well-being of the population. IRTA is attached to the Department of Agriculture, Stockbreeding, Food and Fisheries (DARP) of the Catalan Government.

About Ebro Foods - Ebro (www.ebrofoods.es) is the leading Group in the Spanish food sector in terms of turnover, profit, market capitalisation and international presence. Ebro is world leader in the rice sector and the second group in the international pasta sector. It has leading brands in each of these sectors, including: Panzani®, Ronzoni®, Skinner®, Healthy Harvest®, American Beauty®, San Giorgio®, Catelli®, Lancia®, No Yolks®, Wacky Mac®, Olivieri®, Garofalo®, Santa Lucia®, Russo de Cicciano® and Roland Monterrat® in pastas and sauces; Mahatma®, Success®, Carolina®, Minute Rice®, RiceSelect®, Lustucru Selection®, Taureau Ailé®, Oryza®, Bosto®, Reis-Fit®, Riceland®, Danrice®, Risella®, Abu Bint®, Blue Ribbon®, Adolphus®, Comet®, Lassie®, Saludaes®, SOS®, Brillante®, La Cigala®, Sundari® and La Fallera® in the rice sector; Celnat® and Vegetalia® in organic food, Santa Rita® in high value-added ingredients and Geovita® in the area of pulses, quick-cooking grains and other healthy ingredients.

Follow us in Twitter @GrupoEbro, Facebook Grupo Ebro, Sentirse Bien Se Nota and the corporate blog www.sentirsebiensenota.com.

About Kellogg - At Kellogg Company (NYSE: K), we strive to make foods people love. This includes our beloved brands – Kellogg's®, Special K®, Pringles®, All Bran®, Choco Krispies®, Rice Krispies® and Kellogg's Corn Flakes® and more – that nourish families so they can flourish and thrive. With 2016 sales of $13 billion and more than 1,600 foods, Kellogg is the world's leading cereal company; second largest producer of crackers and savory snacks; and a leading North American frozen foods company. And we're a company with a heart and soul, committing to help create 3 billion Better Days by 2025 through our Breakfasts for Better Days™ global purpose platform.

Learn more about Kellogg at www.kelloggcompany.com and www.kellogg.es or follow us in Twitter @KelloggCompany, YouTube and our Social K corporate blog.

For more information:

Ebro Foods: Ana Antequera. ana.antequera@ebrofoods.es

IRTA: Elisabet Garriga. elisabet.garriga@irta.cat

Kellogg Spain: Amparo Lobato. amparo.lobato@kellogg.com

Related links:

www.lifeebroadmiclim.eu