

More Food without Growing Greenhouse Gas Emissions: Outlines of GRA Research Activities

Kazuyuki Yagi, on behalf of co-chairs of GRA Research Groups

Institute for Agro-Environmental Sciences, NARO

Tsukuba, Japan

kyagi@affrc.go.jp

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The Global Research Alliance on Agricultural Greenhouse Gases (GRA) brings 48 countries together to find ways to grow more food without growing greenhouse gas (GHG) emissions. Since it has been established in the margins of the UNFCCC Conference of Parties (COP15) in Copenhagen, Denmark on 16 December 2009, GRA was formed to build upon the positive scientific understanding of GHG emissions research within the agricultural community of many countries, as well as to bring greater visibility to the larger role that agriculture could undertake in mitigating global GHG emissions.

Currently, there are 4 research groups organized around themes of livestock, paddy rice, croplands, and integrative research (Fig. 1). Each group operates somewhat independently with member country representation in any or all groups. Typically, each group meets annually, although there is significant sharing of information among group leaders at quarterly teleconferences and annual meetings associated with the Alliance Council gathering. To increase collaboration and enhance research synergies, all research groups have agreed to work under a common thematic structure that has two lines of activities, one based on common understanding for a member country, partner, or individual scientist and the other based on assembling the shared vision into concerted actions representing the GRA (Fig. 2). Research groups have contributed to the overall goals of the GRA by forming collaborative research projects, developing research networks, creating joint funding initiatives, sharing data, transferring information and technology, networking with other organizations to leverage resources and create synergies, and developing capacity among members.



Fig. 1 Structure of the Alliance

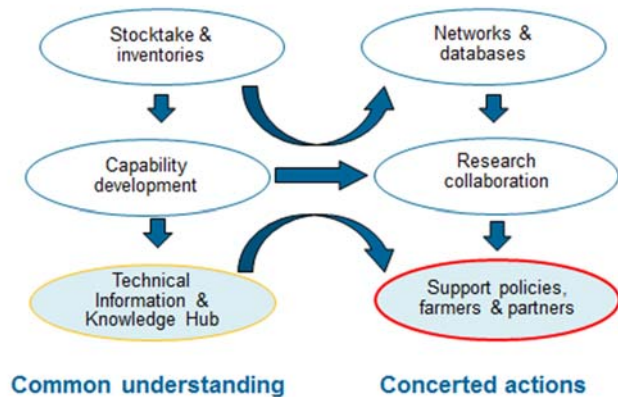


Fig. 2 Outline of activities in Research Groups

The Livestock Research Group (LRG) is focused on reducing the emissions intensity of livestock production and increasing the carbon stored in soils supporting those systems. The LRG works with scientists, farmers and farm advisors, industry and policy makers to research mitigation options, share knowledge and experiences and help strengthen the resilience of livestock farming. Members collaborate to advance global research on livestock emissions intensity at the same time as supporting countries to achieve their own agriculture and climate change priorities. The LRG has five research networks focused on specific aspects of livestock emissions research: (1) animal health and greenhouse gas emissions intensity, (2) animal selection, genetics and

genomics, (3) feed and nutrition, (4) manure management, and (5) rumen microbial genomics. The LRG also has several regional networks helping scientists and policy makers address livestock challenges in the Mediterranean, Latin America and the Caribbean and South East Asia. Building the capability of countries to measure, report and verify GHG emissions from livestock systems is also a critical area of work for the LRG. Those activities take place by technical training workshops in different regions or fellowship and award schemes that enable researchers and technicians to undertake ‘on-the-job’ training and can help seed new collaborative ideas. A core part of the LRG’s capability building effort is focused on supporting countries to develop more advanced (Tier 2) inventories for estimating livestock GHGs. The LRG works closely with key international partners such as the FAO, the World Bank and CCAFS’ (the CGIAR’s Research Program on Climate Change, Agriculture and Food Security) to help deliver these programmes.

The Paddy Rice Research Group (PRRG) is working together to find ways to reduce the emissions intensity of GHG, particularly for CH₄, in paddy rice cultivation systems, while improving its overall production efficiency. Trade-offs with emissions of N₂O and changes of the quantity of C stored in paddy soils are also being considered. The work of the PRRG is focused on helping provide knowledge of source/sink processes and mitigation options to paddy rice farmers, land managers, and policy makers by looking at the impacts of water management, organic matter and fertilisers, and cultivar selection. It will also help to improve national inventories of GHG emissions from paddy rice cultivation systems. The PRRG is conducting activities on the topic areas including (1) standardising measurement techniques, (2) developing databases and (3) multi-country field experiments for testing mitigation options. The PRRG is divided into two regional sub-Groups, Asia and America. Both sub-Groups deliver activities to the same work plan which spans six areas of research group activities.

The Croplands Research Group (CRG) is focused on reducing GHG intensity and improving the overall production efficiency of cropland systems. Scientists from CRG-member countries work together to find ways to limit losses to the atmosphere of valuable carbon and nitrogen from crops and soils, and to transfer that knowledge and associated technologies to croplands farmers, land managers and policy makers around the world. The CRG has interest in a wide range of topics, including crop selection, tillage management, crop rotations, and fertilizer management, as well as the fundamental processes underlying greenhouse gas emissions from crops and soils. Seven research networks were organized in the CRG: (1) irrigation efficiency, (2) peatlands and land use planning, (3) landscape management of agricultural systems, (4) agroforestry systems, (5) conservation agriculture, (6) integrated crop-livestock systems, and (7) nutrient management. Collaborative research projects, such as Managing Agricultural Greenhouse Gases network (MAGGnet) and Global Research Alliance Modelling Platform (GRAMP) are also conducted in the CRG.

The Integrative Research Group (IRG) is a new group approved by the 2015 Council meeting, focusing on the integration of issues that are common to and/or cut across the other three Research Groups of the Alliance. The vision for the IRG is to undertake collaborative work to develop the knowledge and capabilities for estimation, monitoring, and projection of GHG emissions and soil carbon within and across agricultural systems. Five research networks have been established in the Group at the first IRG meeting in Rome, January 2017. Those networks include grasslands, soil carbon sequestration, field scale (for assessing models), farm and regional scale (includes demonstration farms), and GHG inventories networks.

In order to strengthen the activities of research groups, GRA has organized taskforces to prepare proposals for their priority activities, or ‘**flagships**’, for discussion and adoption at the Council. The flagships clearly identify its research priorities to focus on specific areas that Members could align existing research activities and funding. Proposals for 4 flagships: (1) rice production systems, (2) improved GHG inventories, (3) enteric fermentation, and (4) soil carbon sequestration, have been adopted in the 2016 Council meeting and are further discussed in the 2017 Council meeting how member countries can support them.

References

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