

Senate Standing Committee on Economics
ANSWERS TO QUESTIONS ON NOTICE
Industry, Innovation, Science, Research and Tertiary Education Portfolio
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AGENCY/DEPARTMENT: COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION

TOPIC: Sustainable Agriculture Flagship

REFERENCE: Written Question –Senator Bushby

QUESTION No.: AI-106

What does CSIRO consider have been the most tangible, practical achievements of the Sustainable Agriculture Flagship over the course of its existence?

ANSWER

There have been numerous achievements and impacts from the work of the Sustainable Agriculture Flagship. The following are a number of selected highlights.

- Underpinning science for **National Carbon Accounting System (NCAS)** and **Carbon farming Initiative:** NCAS is Australia's system of tracking changes in carbon stored in vegetation and soils and greenhouse gases emitted from agricultural practices under the Carbon farming Initiative. The tools are in current use for Australia's national carbon account of approx 150 Metric Tonne of carbon dioxide equivalent per annum which represents carbon emissions of over \$3 billion per annum being tracked which can be traded in future carbon markets. This work is being extended internationally, for example, for Indonesia's national carbon account.
- **Dual purpose cropping:** New approaches to wheat and canola crop production across southern and south-western Australia enable crops to be grazed at key times early in the season providing a valuable livestock feed resource without reducing final grain yield. These approaches include combinations of varieties and management practices. While the work is still in the research phase there is evidence of rapid early uptake by farmers. Industry is also investing with the second dual purpose winter canola released in 2012. Research partners in the NSW Department of Primary Industries have estimated the grazing value of dual purpose wheat in NSW at \$40 million per annum. There will be similar benefits possible across the southern and western wheat belt (Victoria, South Australia and Western Australia).
- **Water foot-printing standards for agri-food value chains:** Historical methods for fresh water accounting in food value chains have not distinguished between sources of water and the environmental impacts of water use. New methods have been developed and published which make transparent the impacts of consumption and production on global freshwater scarcity. These methods make it simpler for Australian agriculture and food industries to meet environmental reporting requirements and help direct consumer choice towards products with a reduced environmental footprint. CSIRO is now contributing to the development of an international water footprint standard with the International Organisation for Standardisation.

- **Storing greenhouse gas:** The Flagship delivered an analysis of the potential for greenhouse gases to be stored or mitigated by changes in rural land use. The report provides the best available scientific information on mitigation strategies and carbon storage options for agriculture, forestry and rural land. This report was prepared for the Queensland Premier's Council on Climate Change.
- **Delivering water savings direct to irrigators via mobile phone:** The Flagship, in collaboration with the Cooperative Research Centre for Irrigation Futures, has developed a technological solution using satellite remote sensing and mobile phone technology to deliver real water savings for irrigators. The system known as 'IrriSATSMS' is a major breakthrough in providing real-time farm and paddock specific irrigation management information, at a low-cost, direct to irrigators on their mobile phone.
- **Getting to the root of soil biological health:** Root diseases cost the grains industry between \$100–200 million a year, depending on seasonal conditions. The Flagship and its partners have found crops such as cotton, cereals and canola, can alter root zone microbiology in different ways. The Flagship is applying new molecular approaches to boost soil biological health. Researchers are developing crop specific beneficial micro-organisms which hold promise in lifting farm productivity and improving the efficiency of water and fertiliser use.
- **Sustainable development for northern Australia:** The Flagship took the lead in CSIRO's delivery of a comprehensive national science review on natural resource development in Northern Australia. Delivered to the Australian Government and the Northern Australia Land and Water Taskforce, the review investigated a range of climatic, land use, hydrological, conservation and governance issues and the complex interactions that occur. The review now informs planning and policy in government and industry
- **Less water more food:** In a significant national collaboration, the Flagship (with the Grains Research and Development Corporation, industry partners and 19 regional farmer groups) is investigating new methods to increase water use efficiency on Australian grain farms. Early results have revealed how careful management of summer fallows can significantly preserve soil water and increase water use efficiency.
- **Yield Prophet™ on-line subscriber system for crop management:** With BCG as partners, CSIRO have provided the APSIM computer model as the crop forecasting system that underpins the on-line subscriber Yield Prophet™ system (www.yieldprophet.com.au). Yield Prophet™ provides subscribers with probabilities for yield and quality outcomes. Since 2007, 2066 commercial paddock subscriptions have used APSIM via Yield Prophet. In 2012 the projection is for 750 paddocks subscriptions. The business plan for Yield Prophet targets the current market to be 6000 farmers nationally. Individual case studies of farmer use of YP indicate example returns of over \$20,000 per season. Rainfall during the 2011 winter season in the Victorian Mallee was very low (in the lowest 20% of seasons) and it was yet another very dry cropping season to follow a decade of drought. However, contrary to past seasons, good crops were produced, helped by YP to recognise that soil water storage over summer could ensure good yields. This assurance provided farming communities with hope over another dry season.
- **Smallholder livestock systems in Indonesia** (South Sulawesi and Nusa Tenggara Barat): Within a series of ACIAR projects, CSIRO collaborated with local institutions to introduce improved practices for forage production and livestock husbandry in two regions in Indonesia.

AusAID have funded a scale out, scale up program, including research to understand decision making, information flow and impact. Farmers (~4000) who have adopted improved forages and cattle management have increased calving rate (30%) and survival (10%), increased birth weight (20%), improved liveweight gains and cattle condition (weaning wt from 70 to 90kg). Cattle numbers or sales increased by 140% Beyond the direct economic benefits, farmer communities have improved their governance, resource management, access to microfinance, security, and collaboration

In addition, as part of a review of CSIRO's impact in 2010 ACIL Tasman undertook an analysis of the Flagship program. The Sustainable Agriculture Flagship biochar research was one of the case studies in the analysis and the work was found to be adding to a field now receiving substantial attention. A plausible role for biochar as a substantial contributor to lower cost abatement existed, given its complementarity with several aspects of farm production and with steel production with potential value of many billions of dollars under a carbon target policy. A copy of the full ACIL Tasman report is available on the CSIRO website at: <http://www.csiro.au/en/Portals/About-CSIRO/How-we-work/Budget--Performance/Performance-reviews/Impact-and-Value-2010.aspx>.