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PROGRAM ON
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Nutrition
and Health

LED BY IFPRI

Concept Note: Nutrition-sensitive landscapes

Image:

Agricultural landscape of rice and other mixed crops, with wild areas and homes nearby. These images were taken in Son La province, northwestern Vietnam.

Credit: Bioversity International/L. Sebastian

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A new A4NH research theme “Nutrition-sensitive landscapes” was proposed during previous A4NH planning meetings and followed up at the A4NH CFP meeting (7-9 October, 2013). A specific working group session on 7 October 2013 furthered the discussion on this topic. This concept note is a result of this most recent discussion, as well as draft notes prepared by Bioversity International, CIFOR, ICRAF, ILRI and World Fish (27 May, 2013).

Brief narrative description

Global concerns about the sustainability of food production systems, as well as the quality of diets resulting from them, are escalating. Malnutrition, including undernutrition and overnutrition, together with increases in diet related non-communicable diseases (NCD) are key developmental and political challenges. Agriculture and environmental sustainability concerns have been raised about food production systems, particularly around increased production of a few staple crops and over reliance on sugar and oil crops, whose impacts are seen to both reduce environmental health, and contribute to the rise of diet-related non communicable diseases. Many food production systems have several deleterious, long-term effects on the environment through air and water pollution, high carbon emissions, degradation of soil quality, deforestation and depletion of biodiversity within landscapes. Climate change is an additional challenge impacting our food production systems.

The nature of the relationships between communities, food production systems and the environment is complex and bidirectional as humans impact and are impacted by nature (Millennium Ecosystem Assessment, 2005; Deckelbaum et al., 2006). People's behaviour influences the capacity of landscapes to provide the multiple functions that are essential for our well-being, including multiple nutrition and health functions ranging from the variety of foods produced, the quality of, and access to water, to disease incidence and transmission. The complexity of current global challenges requires a fresh look at how people interact with their environments in order to fulfill the goals of food and nutrition security while maintaining, restoring, and securing the ecosystems upon which we are ultimately dependent.

A Nutrition-Sensitive Landscapes (NSL) approach considers the diverse interactions and interconnectivity within a given landscape to optimize the multiple goals of food and nutrition security, sustainable use of natural resources and conservation of biodiversity, both for human health, as well as environmental health.

Nutrition-sensitive actions, as defined by Ruel et al. (2013) are those which incorporate underlying, rather than immediate determinants of malnutrition and include sectors such as agriculture, health, education and water and sanitation. The NSL approach adds an important dimension to nutrition interventions **by applying a socio-ecosystems approach at the landscape level.**

At the heart of a **systems orientation** is an emphasis on relationships and understanding synergies, tradeoffs and feedback loops between changing factors. The NSL approach addresses the relationship between nutrition, agriculture and the environment, and aims to identify, quantify and tackle unsustainable tradeoffs while generating synergies. The **ecosystems** dimension emphasizes the interaction between species and their environment, while the **socio-ecosystem approach** (in line with other CGIAR Consortium Research Programs (CRPs)) highlights the coupling between people and the environment.

The **landscape** adds an explicit spatial dimension. A landscape is a socio-ecological system that consists of a mosaic of natural and/or human-modified ecosystems, with a characteristic configuration of topography, vegetation, land use and settlements that is influenced by the ecological, historical, economic and cultural processes and activities of the area (Landscapes for People Food and Nature, 2013). In practice, the landscape scale is the scale at which natural resources are managed to achieve multiple objectives in terms of crop and livestock production, income generation and support to livelihoods. Agricultural, forest and aquatic-type ecosystems are dynamic systems sharing space within a landscape. Drivers of change in agricultural systems are often highly dependent on landscape conditions, including soil type, agro-ecosystem typologies, climate, socio-economic conditions, cultural values and globalization status. It is therefore particularly at the landscape scale that key interactions among biophysical and socio-economic factors occur and can be observed over short- and long-term periods (>20 years) (Jackson et al., 2005; Sachs et al., 2011). In landscape ecology, the precise scope and scale within a landscape are not predetermined, but depend on the process of interest. In the case of our research theme, the process of interest is health and nutrition, therefore, nutrition-sensitive landscapes are those in which diverse types of food are sustainably produced or procured to meet human nutrient requirements, while also protecting the environment from which the foods are sourced. A better understanding of the landscape scale interactions that affect food and nutrition security across different agro-ecological zones can provide insights on how to tackle complex issues related to achieving gains in food and nutrition security while preserving the integrity of ecosystems.

The NSL approach moves **beyond “do no harm” towards pro-active interventions and practices** in ecosystems and the services they provide (Daily, 1997) to contribute to healthy and sustainable diets (DeClerck, 2013). A nutrition-sensitive landscape does not imply that the environment can produce all nutrients required for adequate human nutrition, it does however mean a focus on producing diverse sources of food within a given landscape while also managing other ecosystem functions that are critical for environmental sustainability and human well-being.

What is the NSL research area about?

Building on ecosystem services concepts, the NSL research area seeks to build a strong knowledge-base of how nutrition and health outcomes can be improved in contexts where finite natural resources are fortified to achieve multiple and sometimes competing objectives. The research theme will document, support and advocate for the scaling-up of landscape approaches to address multiple land use and conservation objectives including sustainability, climate-resilient food and fiber production, biodiversity conservation and improving livelihoods. The main research area focuses on how ecosystems can contribute to food availability, access and utilization, as well as the impact of food system activities on the health and sustainability of these ecosystems.

The CGIAR has the physical presence, breadth and depth of expertise to study and coordinate research for development in agriculture including aquatic systems, biodiversity, forest,

agroforestry, food processing, marketing, consumption and utilization of safe, nutritious food. By examining the direct and indirect pathways for impact of agriculture and related food production systems on nutrition and health, the research theme will take a “whole diet” approach from a sustainable and resilient landscape perspective. This research theme can contribute or complement other themes in the CGIAR system to support and develop tools and methodologies, as well as define programmes and policies which combine landscape and ecosystem approaches to enhance diets and human health. The focus is to apply a nutrition-sensitive lens to research for development through a sustainable and resilient landscape approach.

Overall research questions include:

- What is the relationship between ecosystems, agricultural management and human nutrition in various settings? How and why do ecosystems differ in nutritional function? How do human nutrition selection choices and related agricultural management practices impact ecosystems functioning? *See Figure 1 in powerpoint file (adapted from Millennium Ecosystems Assessment and UNICEF framework. Figure 2 then includes some methods to study these different functions/ relationships.*
- How does this relationship change over time when landscapes are going through a transition e.g. agricultural intensification, from subsistence to commercial agriculture, rural to urban migration? *See Figure 3 in powerpoint to conceptualize this question better.*
- How can we manage landscapes, their ecosystems, biodiversity and the services it provides, for human nutrition, while also managing for other components of human well-being and environmental sustainability? What are potential game changers that can break the vicious cycle of poor agricultural management, environmental degradation and human nutrition? *See Figure 4 in powerpoint - adapted from Deckelbaum et al. 2006*
- How can we efficiently use ecosystem information / knowledge to strengthen and contextualize nutrition intervention programs? What is a minimum package of ecosystem knowledge to help guide nutrition programs?

The NSL approach will apply **an innovative combination of existing and new methods** to address these questions. Examples are described in previous work of our team (DeClerck et al., 2011; Remans et al., 2011; Remans et al., 2013; Remans and Smukler, 2013; Sachs et al. 2010; Sachs et al., 2011).

Plan for developing the research area

In collaboration with system level CRPs expressing interest, initial work on this theme will be related to mapping and characterizing diverse landscapes and food production systems, for example across different agro-ecological zones or along rural to urban continuums.

Five CGIAR Centers and AVRDC have expressed interest in preparing a joint research proposal to explore the theme of nutrition-sensitive landscapes across diverse landscapes. Synergies will also be sought across the three systems CRPs, as well as with other partners and initiatives, such as Landscapes for People, Food and Nature, which is a collaborative initiative to foster cross-sectoral dialogue, learning and action to better understand and support integrated agricultural landscape approaches to simultaneously meet goals for food production, ecosystem health and human well-being.

Partnerships

The key CGIAR partners expressing interest in this flagship include Bioversity International, CIAT, CIFOR, ICRAF, IITA, ILRI and World Fish. In addition to partnerships across other CRPs and across CGIAR Centers, the research theme will seek to engage non-CGIAR partners such as Universities, NARS, national Ministries of different sectors, NGOs and CBOs in the target regions/countries.

Data generation and sharing:

The research theme will partner with Universities to assist with primary data collection, analysis, synthesis of findings and lessons learned. There are a host of suitable Universities with whom the research theme may partner and many of the decisions taken related to these partnerships will depend on the countries in which the work under this research theme is carried out. Some preliminary but by no means exhaustive suggestions of University partners working across International settings include:

- Friedman School of Nutrition Science and Policy at Tufts University, US, an internationally recognized leader in the field of nutrition and health, with research programs spanning the globe. They have provided technical assistance to IFPRI and other CGIAR centers.
- Nutrition Group of the London School of Hygiene and Tropical Medicine, UK, has been undertaking research in many developing countries and is active in the development of a software “Optifoods” to help countries better analyze the role of foods to inform nutrition programme planning and policy decisions.

- Wageningen University, the Netherlands, have also piloted “Optifood” linear programming tool in several countries and have ongoing partnerships with Bioversity International through the Humid Tropics Systems CRP.
- Multidisciplinary teams from Columbia University (the Institute of Human Nutrition, The Earth Institute, and E3B) who have been piloting and pushing the frontiers of the early thinking on ecology, agriculture and nutrition (Deckelbaum et al., 2006; DeClerck et al., 2011; Remans et al., 2011; DeClerck et al., 2013; Remans et al., 2013; Remans and Smukler, 2013).

Other partners

In addition to primary data collection and analysis a large part of the value added in terms of the research relates to making the findings available to a wider audience for greater uptake in terms of program and policy development. The research theme will seek partners with capacity in knowledge sharing and networks in order to increase the public utility of the research findings. Preliminary ideas on such networks include;

- The INFOODS network is the International Network of Food Data Systems which is managed by FAO (Food and Agriculture Organization of the United Nations). It is a worldwide network of food composition experts aiming to improve the quality, availability, reliability and use of food composition data. INFOODS is organized into several [regional data centers](#) with a global coordinator. The INFOODS network can serve as both a resource for information on food composition, as well as a repository of research findings generated by the research theme (for more information see <http://www.fao.org/infoods/en/>);
- L’Institut de recherche pour le développement (IRD), France, has vast experience in nutrition research and is currently a research partner of the MEDINA project which seeks to better understand dietary patterns and sustainability of food systems in the Mediterranean;
- The University of Ghent developed the ‘Lucille’ software for analyzing food intake data. They are currently working to further develop the tool to become an open access data analysis and data sharing platform.

Outreach to target communities:

In order to operationalize findings and engage in monitoring impact, partnerships with government and non-government partners in the countries in which the research will be conducted need to be built. These partners may include, but are not limited to Ministries of Agriculture, Natural Resources and the Environment, Women’s Affairs and Health and NGOs working directly with the communities involved in the research.

Some internationally recognized NGOs working on nutrition and food systems include Helen Keller International, Action Contre le Faim, Save the Children and many others.

Figure 1: A combination of the Millennium Ecosystem Assessment framework and the UNICEF framework of nutrition determinants. Both handle with complex interactions that call for a systems approach. Nutrition has many determinants/ factors that interact with each other. Studying this with a ecosystem landscape lense adds new dimension. Adapted from Remans and Smukler, 2013

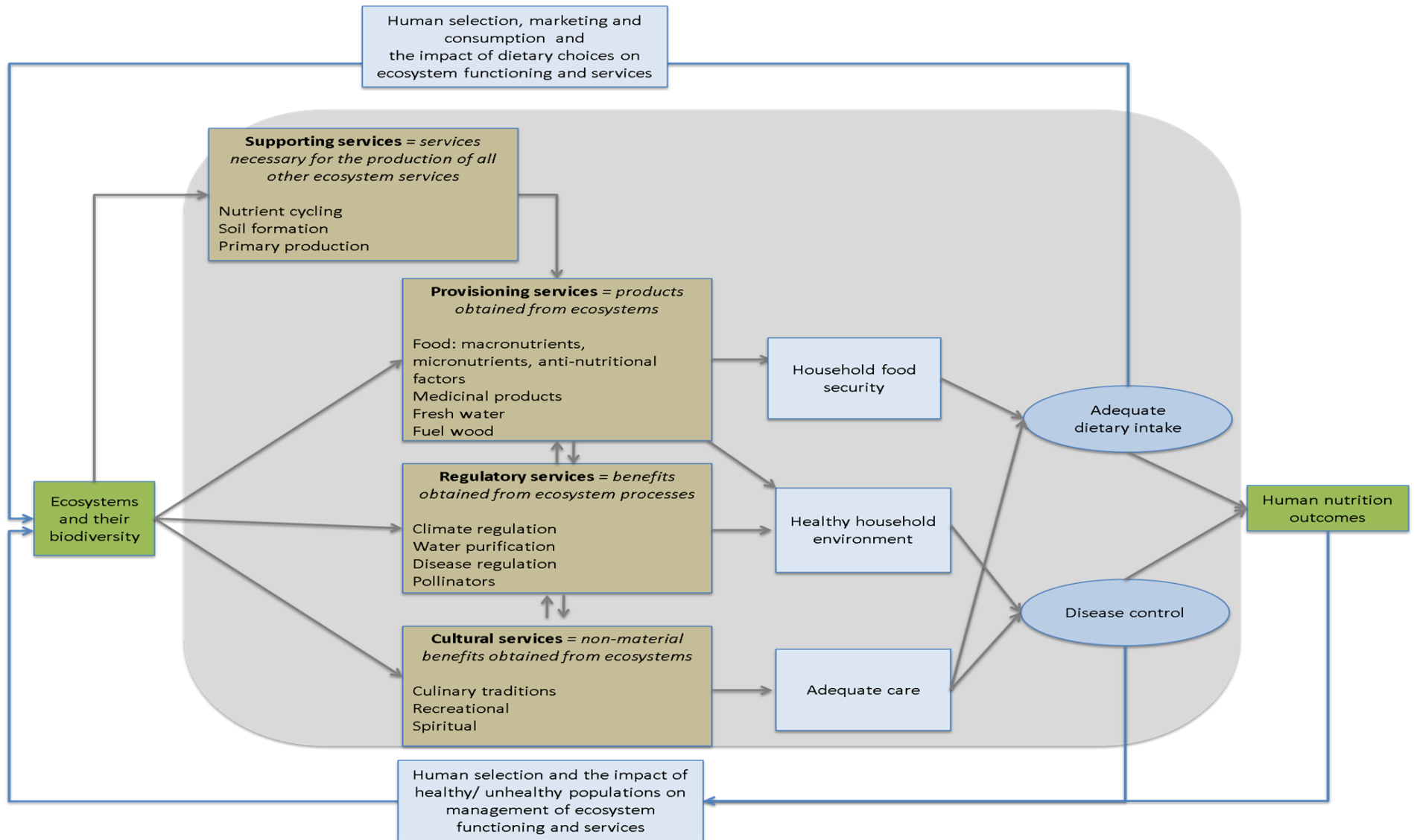
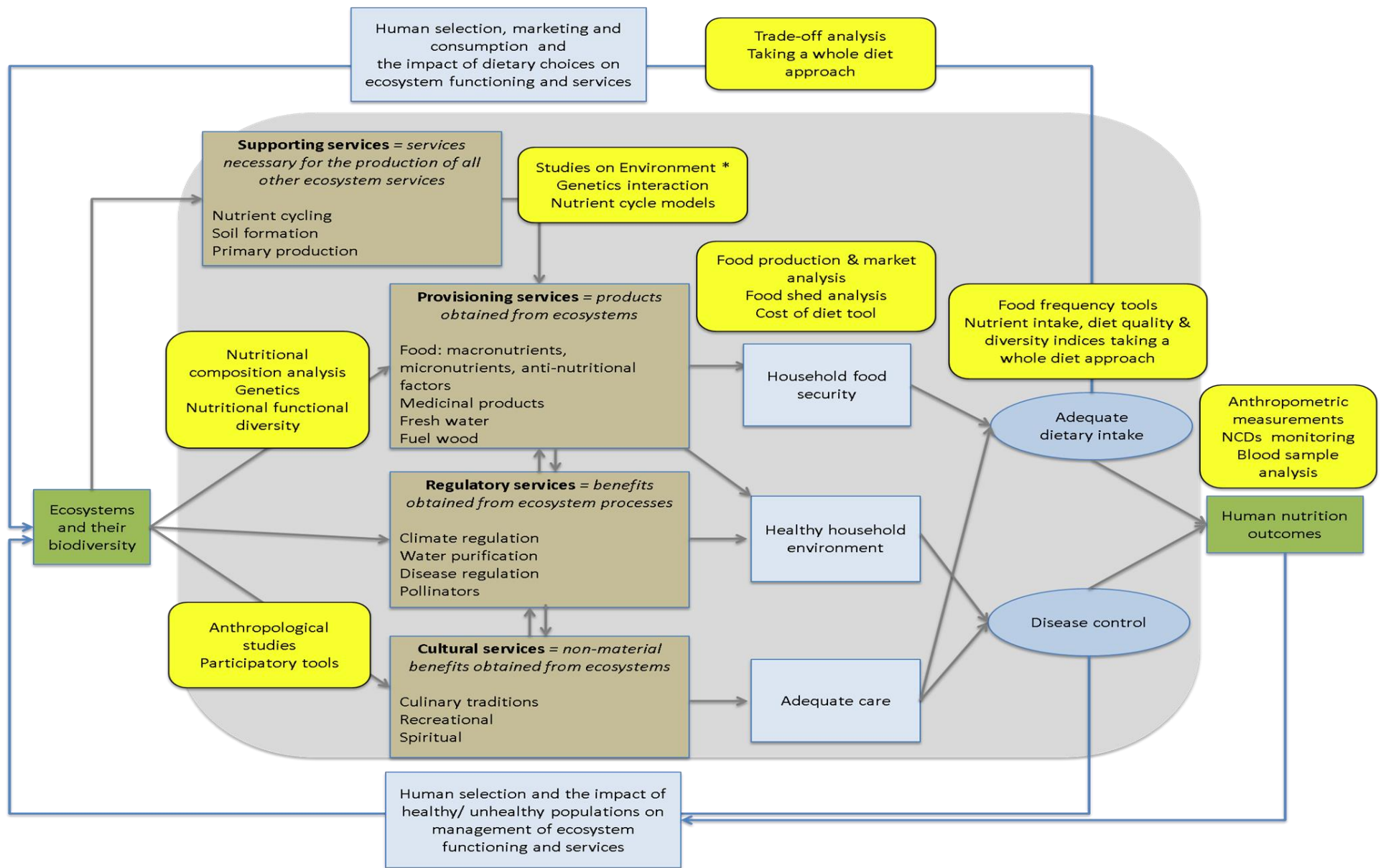


Figure 2: Examples of research tools to study different functions and interactions are highlighted in yellow



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